

Estimating the ex-ante and the ex-post effects of Chinese outward FDI

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Abstract

This study investigates the relationship between outward Foreign Direct Investment (FDI) and the performance of Chinese enterprises. Using firm-level panel data over the period 2008–2014, we introduce a taxonomy of outward FDI that accounts for the decision to invest abroad and the location of foreign affiliates. Through different specifications, we show systematic differences in performance between FDI starters and non-starters two years before and two years after the first investment by the starters. This fact points to the existence of strong ex-ante and ex-post effects of Chinese outward FDI. On one hand, we provide evidence – so far not present in the literature – that the best performing Chinese firms self-select into outward FDI. On the other hand, controlling for endogeneity through propensity score matching (PSM) techniques, we detect significant learning effects from outward FDI to firm-level performance. Interestingly, these effects are heterogeneous with respect to destination, with deeper learning for Chinese enterprises investing in Asia.

KEYWORDS

China, ex-ante effects, ex-post effects, FDI, panel data

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1 | INTRODUCTION

In 2019, China was the third largest foreign investor in the world. Outward Foreign Direct Investment (FDI)¹ flows from China accounted for 8.9% of the worldwide total, up from 0.6% in 1995 (UNCTAD, 2020). Fast-growing outward FDI flows increased Chinese outward FDI stocks from 0.4% of the worldwide total in 1995 to 6.1% in 2019 (UNCTAD, 2020). Because of these impressive figures, the outstanding growth rate experienced by Chinese outward FDI has become a cause of concern among Chinese authorities, who are wary of the quality and payoffs of the Chinese investments abroad (UNCTAD, 2018, 2019).² In this study, we investigate the relationship between the decision to engage in outward FDI by Chinese enterprises and their performance.³

Following in the steps of Bernard and Jensen (1995), a large body of evidence has been collected and a wide consensus formed that internationalised firms are in the minority, but they perform better than domestic enterprises. A lively debate has developed instead about the causal interpretation of the positive correlation between internationalisation and performance at the firm level.

Serving foreign markets may entail fixed costs in addition to those incurred in the domestic market. Under these circumstances, only the most productive firms—able to command a large market share—can successfully enter foreign markets via exports or outward FDI. It follows that a positive correlation between internationalisation and performance emerges as a consequence of differences in performance between internationalised firms and firms operating exclusively in domestic markets that predate the decision of the former to serve foreign markets. In this study, we refer to such differences as the ex-ante effects of outward FDI.

Alternatively, firms operating in international markets may have opportunities for knowledge acquisition and capability development unavailable to firms that exclusively operate in domestic markets. If this is the case, a positive correlation between internationalisation and performance is observed because of differences in performance between internationalised and domestic firms arising subsequent to the decision of the former to serve foreign markets. In this study, we refer to such differences as the ex-post effects of outward FDI.

The joint study of ex-ante and ex-post effects of outward FDI is of particular relevance in the context of the Chinese economy, to enlighten some implications of the policy measures adopted to promote internationalisation and economic growth. Most measures implemented from the early 1980s aimed at fostering economic growth through internationalisation, in the spirit of the previously defined ex-post effects of outward FDI. However, the recent launch of supply-side structural reforms, meant to improve firm-level productivity, seems to pursue internationalisation through economic growth, in the spirit of the ex-ante effects of outward FDI.

Using firm-level panel data over the period 2008–2014, we are able to assess rigorously the presence of ex-ante and ex-post effects of outward FDI for Chinese firms. Our econometric analysis exploits firm-level information downloaded from Orbis, a commercial database compiled by Bureau van Dijk. A distinctive feature of the Orbis database is that it contains a wide array of performance measures as well as the number and location of subsidiaries for firms that invest abroad. Using these data,

¹Consistent with IMF/OECD definitions, we define FDI as an investment in a foreign company where the investor owns at least 10 percent of the ordinary shares, and which is undertaken with the objective of establishing a lasting interest in the country, a long-term relationship, and significant influence on the firm's management (IMF, 1993; OECD, 1996).

²See Section 2 for a discussion of the regulatory framework governing Chinese outward FDI and the policy measures recently adopted by authorities.

³By China, we refer to mainland China; Hong Kong is not included in our data.



we introduce a taxonomy of outward FDI that accounts for the decision to invest abroad and the location of foreign affiliates.⁴ The panel nature of the data allows us to observe a firm's performance before and after its first investment abroad and thus to disentangle the ex-ante and ex-post effects of outward FDI. Moreover, the Orbis data on FDI by destination make it possible to assess whether ex-ante and ex-post effects of outward FDI are heterogeneous with respect to destination.

Our empirical approach thus allows us to offer a number of novel contributions to the empirical literature on the relationship between outward FDI and firm-level performance and to highlight the implications of outward FDI on performance for Chinese enterprises. In the following, we briefly summarise our results.

Our analysis confirms a positive correlation between outward FDI and several performance measures at the firm level for Chinese enterprises. This holds true when considering Asia and the rest of the world as separate destinations for Chinese outward FDI. Moreover, the magnitude of the correlation appears to be sensitive to location of Chinese subsidiaries. This result is original to our study and is made possible by our classification of outward FDI by destination.

Furthermore, we highlight significant differences in performance between future outward FDI starters and future non-starters, revealing that Chinese firms self-select into investing abroad, even if they do not appear to self-select into specific destinations. To the best of our knowledge, ours is the first study to present rigorous evidence on the ex-ante effects of outward FDI for Chinese enterprises.

Finally, turning to the ex-post effects of outward FDI, after controlling for endogeneity through propensity score matching techniques, our results show significant ex-post effects that tend to be larger when investments are targeted to closer regions. Our contribution to the existing literature is twofold. We consider a time span that is longer and more recent than previous contributions (Chen & Tang, 2014; Cozza et al., 2015; Edamura et al., 2014; Huang & Zhang, 2017). In particular, our data allow us to study the ex-post effects of outward FDI in the years following the adoption of the 12th Five Year Plan in 2010, which involved a major overhaul of Chinese inward and outward FDI policies. In addition, we investigate whether the ex-post effects of outward FDI are heterogeneous by destination, as our data set allows us to estimate the ex-post effects of the first investment in Asia and in the rest of the world.

The remainder of the paper is organised as follows. Section 2 provides an overview of outward FDI from China and the regulatory framework governing it. Section 3 reviews the existing literature on the relationship between FDI and performance at the firm level. In Section 4, we present our data, while Section 5 describes the variables and econometric specifications adopted for our empirical purposes. Section 6 illustrates our main results. Section 7 concludes and derives some policy implications.

2 | CHINESE OUTWARD FDI: EVOLUTION AND REGULATORY FRAMEWORK

The last twenty years have witnessed China's development as an important source of outward FDI (Table 1). In 1995, the country contributed 0.6% of worldwide outward FDI flows. In 2019, China's share of worldwide outward FDI flows amounted to 8.9%, making it the third largest investor in the world. In the same period, China's share of worldwide outward FDI stocks increased from 0.4% to 6.1%. China's share in worldwide outward FDI flows has closed the gap with the country's share in worldwide inward FDI flows, which equalled 9.2% in 2019. The same holds true for FDI stocks, with China contributing 4.9% of worldwide inward FDI stocks in 2019 (UNCTAD, 2020).

⁴Note that we use 'subsidiaries' and 'affiliates' synonymously.

TABLE 1 Outward FDI flows and stocks, billion USD and percentage, selected years

Region/economy	1995	2005	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Outward FDI flows												
World	361	833	1396	1627	1305	1421	1367	1708	1543	1601	986	1314
China	2	12	69	75	88	108	123	146	196	158	143	117
China as % World	0.6	1.5	4.9	4.6	6.7	7.6	9.0	8.5	12.7	9.9	14.5	8.9
Outward FDI stocks												
World	3993	11,909	20,465	20,919	22,836	25,181	26,314	26,575	28,102	33,041	31,508	34,571
China	18	57	317	42.5	532	660	883	1098	1357	1809	1982	2099
China as % World	0.4	0.5	1.5	2.0	2.3	2.6	3.4	4.1	4.8	5.5	6.3	6.1

Source: Authors' elaborations from UNCTAD (2020) data.



The growing importance of China as a source and not only a recipient of FDI reflects the striking pace of expansion of outward FDI flows and stocks from the country.

The outstanding gross domestic product annual growth rates experienced by China over the last two decades account for its success as a source of outward FDI flows and stocks (Andreff, 2015). This is consistent with China moving along the investment development path (IDP) identified in Dunning (1981) and Dunning and Narula (1998). In the first steps along the IDP, a developing country attracts a limited number of foreign investors and does not invest abroad. As the country progresses along the IDP, inward FDI sharply increases; at the same time, the country undertakes its first investments abroad. Further along the IDP, the combination of low unit labour cost and technological competence acquired through inward FDI fosters both inward and outward FDI flows. The latter growing faster than the former eventually turns the developing country from a net FDI importer into a net FDI exporter. Full economic development leads to a rebalance of inward and outward FDI flows.

Albeit convincing, this picture leaves in the shadow a distinctive feature of Chinese outward FDI: its careful management by the central government and local authorities. According to Sauvant and Chen (2014), a well-defined regulatory framework governs Chinese outward FDI, whereas continuously adjusted home country measures stir its course. The adoption of a well-defined regulatory framework dates back to the launch of the 'Go out' strategy in 2000. The aim of this strategy was to promote the internationalisation of Chinese firms on the eve of China's access to the WTO in 2001. In the following years, the government shaped the framework governing outward FDI to promote those investments abroad that specifically contributed to China's development (Sauvant & Nolan, 2015). Increasing labour costs, weak external demand and signs of declining return on investment (Wei et al., 2017), together with the availability of large foreign exchange reserves (Garcia-Herrero et al., 2015), favoured regulatory liberalisation in 2007–2009. The adoption of the 12th Five Year Plan in 2010 imparted further acceleration, at the same time favouring a change of target for Chinese outward FDI. In the early stages of the 'Go out' strategy implementation, natural resource-seeking projects attracted most outward FDI flows. Starting in 2010, resources were successfully channelled towards projects pursuing acquisition of advanced technology and high-quality brands (The Economist, 2013, 2015) as well as entry into large markets or markets with high development potential (The Economist Intelligence Unit, 2017). The adopted measures achieved the goal set in the 12th Plan of balancing outward and inward flows within 5–10 years well in advance of the deadline (Davies, 2013).

In essence, the regulatory framework governing Chinese outward FDI works on the principle that interventions and home country measures must be designed with the aim of encouraging, allowing or prohibiting investments (Sauvant & Chen, 2014). An instance of the latter materialised recently. In 2016, China's outward FDI flows peaked at 196 billion USD, accounting for more than 12% of worldwide outward FDI flows. This spurred concerns among Chinese authorities regarding excessive capital outflows and poor selection of investment projects. In response to that, restrictions were imposed on state-owned enterprise investments abroad in specific sectors such as property development, hotels and entertainment (UNCTAD, 2018, 2019). On the other hand, China actively pursues promoting outward FDI by entering into international investment agreements and bilateral treaties. The Belt and Road Initiative is a prominent example of the former, involving 68 countries and committing China to underwriting important infrastructure investments in the regions crossed by the ancient Silk Road linking Asia to Europe. Bilateral investment treaties not only provide protection to Chinese investors abroad; they also help overcome the strategic concerns and oppositions Chinese multinationals face in advanced countries because of the State backing they often have (Dollar, 2017; Sauvant, 2016).

3 | LITERATURE REVIEW

Starting with the seminal contribution of Bernard and Jensen (1995), a vast body of literature has investigated the relationship between internationalisation and performance at the firm level. No matter the year and country of the analysis, empirical evidence suggests that internationalised firms are in the minority, but they outperform domestic enterprises, and this result is robust to different internationalisation strategies and performance measures.⁵

For the purpose of the present research, it is particularly interesting to review those papers studying the relationship between outward FDI and performance at the firm level. For the sake of clarity, we group them in three classes: those providing basic correlations (3.1), and those addressing the ex-ante (3.2) and ex-post effects of outward FDI (3.3).

3.1 | Basic correlations

Broad empirical evidence supports the existence of a positive and statistically significant relationship between outward FDI and performance at the firm level. In Castellani and Zanfei (2007), Castellani and Giovannetti (2010), Benfratello and Razzolini (2009), Bugamelli et al. (2000), Bugamelli et al. (2001), Casaburi et al. (2007), and Borin and Mancini (2016), Italian firms with at least one subsidiary abroad are shown to outperform exporters and domestic enterprises on a number of measures. These include economic variables, such as size (Borin & Mancini, 2016; Bugamelli et al., 2000, 2001; Casaburi et al., 2007), productivity (Benfratello & Razzolini, 2009; Borin & Mancini, 2016; Castellani & Giovannetti, 2010) and capital intensity (Borin & Mancini, 2016; Casaburi et al., 2007); and innovation variables, such as patents, product innovation and process innovation (Castellani & Zanfei, 2007). Complementary evidence from single-country analyses is available for Germany (Arnold & Hussinger, 2010; Wagner, 2006), France (Engel & Procher, 2012), Japan (Head & Ries, 2003; Kimura & Kiyota, 2006), the UK (Girma, 2005), Ireland (Girma et al., 2004) and the US (Helpman et al., 2004). Multiple-country studies on the EU (Gattai & Sali, 2018), the BRIC (Gattai et al., 2018; Gattai & Natale, 2016) and the former Soviet states (Gattai et al., 2019) confirm that firms engaged in outward FDI are in the minority, but outperform those that only operate domestically.

To establish some basic correlations between outward FDI and firm-level performance, the studies mentioned simply regress economic and innovation variables on a dummy for outward FDI status or vice versa. In some cases, the regressand and the regressors are contemporaneous variables (see, for instance, Benfratello & Razzolini, 2009; Casaburi et al., 2007; Castellani & Zanfei, 2007; Kimura & Kiyota, 2006); in others, some lags are considered to avoid complete simultaneity (Gattai & Sali, 2018). Although the majority of the studies reviewed in this subsection employ cross-sectional information, a few of them rely on panel data (Arnold & Hussinger, 2010; Castellani & Giovannetti, 2010; Castellani & Zanfei, 2007; Girma, 2005; Kimura & Kiyota, 2006). However, causality issues are not addressed econometrically, which is the major drawback of this line of research.

⁵For a survey, see Lopez (2005), Wagner (2007, 2012, 2016), Greenaway and Kneller (2007), Singh (2010), and Hayakawa et al. (2012).



3.2 | Ex-ante effects

Studying the ex-ante effects of outward FDI means imparting a certain direction of causality to the relationship between outward FDI and firm-level performance. If ex-ante effects are at play, the best firms are expected to self-select and become involved in outward FDI. Put another way, the existence of ex-ante effects is consistent with causality running from performance to outward FDI.

The theoretical foundation of the self-selection mechanism can be traced back to Helpman et al. (2004), Head and Ries (2003), and Grossman et al. (2006) who extend the benchmark framework of Melitz (2003) to analyse the intra-industry effects of horizontal (Helpman et al., 2004), vertical (Head & Ries, 2003) and mixed (Grossman et al., 2006) FDI.^{6,7} In Helpman et al. (2004), upon entry into the market, firms draw a productivity level from a known distribution. Operating abroad entails considerable fixed costs related to transportation, marketing, human capital and production. These costs are higher in the case of outward FDI and lower in the case of export. As the model predicts, exposure to international markets induces the most productive firms to engage in outward FDI and the least productive firms to operate domestically. Firms with intermediate productivity levels self-select into export operations. Head and Ries (2003) consider a richer framework in which firms are allowed to engage in both horizontal and vertical FDI. Horizontal FDI is motivated by market access considerations, that is, potential gains from producing directly in the host market rather than producing at home and exporting abroad. Vertical FDI is motivated by cost saving considerations, that is, potential gains from splitting the production process across many phases and letting each phase be performed in the country where it is least expensive. As Head and Ries (2003) show, the most productive firms engage in outward FDI in advanced countries to serve local demand directly, whereas the least productive firms set subsidiaries in emerging economies to reduce labour costs. Given that firms may follow mixed strategies, Grossman et al. (2006) allow firms to offshore single stages of production to multiple countries, depending on both market access and cost saving considerations. Many factors, such as the foreign market dimension, transportation costs and fixed costs of production and assembly, crucially determine which strategy a firm should undertake, thus complicating the relationship between outward FDI and firm-level performance.

The hypothesis of self-selection has been tested quite convincingly in the case of trade, whereas outward FDI has received less attention so far. Consistent with the theoretical framework delineated above, Murakami (2005), Kimura and Kiyota (2006), Barba Navaretti and Castellani (2004), Barba Navaretti et al. (2010), and Borin and Mancini (2016) detect a positive and statistically significant effect of firm performance on outward FDI. To this aim, they employ panel data and regress past performance on a dummy for future FDI starters. This methodology allows studying performance differentials between firms engaged versus not engaged in outward FDI before first involvement in FDI by the former. As explained in Wagner (2007), this is a proper econometric approach to deal with endogeneity and provide conclusive evidence on the ex-ante effects of internationalisation. Refinements of these simple analyses follow two broad research trajectories. On one hand, Tomiura (2007), Federico (2010), and Kohler and Smolka (2011, 2012) analyse heterogeneous firms' mapping into different sourcing strategies, including outward FDI. Along the theoretical argument of Antras and Helpman (2004, 2008), these papers show that most productive firms self-select into outward FDI; in other words, they choose to source intermediate components within the boundaries of a foreign subsidiary. On the other hand, outward FDI is dissected according to the destination and the ownership structure.

⁶Mixed FDI refers to a combination of horizontal and vertical outward FDI.

⁷For a survey, see Redding (2011).

Regarding destination, Aw and Lee (2008) and Damijan et al. (2007) find that the most productive firms invest in developed—rather than developing—countries, supporting the theoretical predictions of Grossman et al. (2006). On ownership structure, the theoretical and empirical analysis of Raff et al. (2012) suggests that the most productive firms engage in wholly foreign-owned enterprises, followed by joint ventures and mergers and acquisitions.

3.3 | Ex-post effects

Studying the ex-post effects of outward FDI means considering the opposite direction of causality, from outward FDI to firm-level performance. If ex-post effects are at play, those firms that are involved in outward FDI are expected to perform better than those firms that are not. Put another way, ex-post differences in performance might be channelled by a learning process that allows firms to take advantage of their FDI experience.

Compared with the self-selection mechanism delineated in Section 3.2, this learning process has less profound theoretical foundations. Indeed, the model by Clerides et al. (1998), which is a cornerstone in the learning-by-internationalisation literature, deals uniquely with export and has not yet been extended to outward FDI. Another model, from Grossman and Rossi-Hansberg (2008), shows that global supply chains emerge depending on firms' optimal strategies. This is because offshoring a task frees up some resources that could be profitably employed in other tasks, thus increasing overall efficiency. Exogenous reductions in the costs of offshoring might fuel this process further, producing larger efficiency gains. This might explain differences in performance between firms that are involved in outward FDI and firms that are not if one thinks the former have benefited from decreasing coordination costs due to innovation and information and communications technologies (ICT).

Despite the absence of an ad hoc theoretical framework, one could imagine several factors explaining a learning-by-FDI mechanism. For instance, through interaction with foreign competitors and customers, firms derive information about processes to reduce cost and improve quality (De Loecker, 2007), they increase their scale and become more efficient (Baldwin & Gu, 2009), and they are strongly encouraged to innovate (Aw & Lee, 2008). Moreover, operating abroad can be regarded as a substitute for importing (access to) better institutions, thus correcting for credit constraints and a weak institutional environment in the home country (Van Biesebroeck, 2005). For all these reasons, firms involved in outward FDI are expected to improve more quickly than their domestic counterparts.

Papers investigating the learning effects of outward FDI focus on a limited group of countries. These include Italy (Barba Navaretti & Castellani, 2008; Borin & Mancini, 2016; Castellani, 2002; Castellani et al., 2008); France (Barba Navaretti et al., 2010; Hijzen et al., 2011); Japan (Hijzen et al., 2010; Ito, 2007); Taiwan (Yang et al., 2013); and China (Huang & Zhang, 2017). To estimate the ex-post effects of outward FDI, these studies make use of panel data and regress future performance on a dummy for past FDI starters. To control for endogeneity, sophisticated econometric techniques are applied, such as GMM/IV (Castellani, 2002; Castellani et al., 2008) and propensity score matching estimations (Barba Navaretti & Castellani, 2008; Barba Navaretti et al., 2010; Borin & Mancini, 2016; Hijzen et al., 2010, 2011; Huang & Zhang, 2017; Ito, 2007; Yang et al., 2013). As explained in Wagner (2007), these are proper econometric approaches for providing conclusive evidence on the ex-post effects of internationalisation. However, evidence of a learning effect from outward FDI is still controversial. Although Barba Navaretti et al. (2010), Barba Navaretti and Castellani (2008), Castellani et al. (2008), Borin and Mancini (2016), Yang et al. (2013) and Huang and Zhang (2017) find outward FDI has a positive impact on many performance variables, Hijzen et al. (2010), Hijzen et al. (2011) and Ito (2007) do not detect any significant ex-post effect.



4 | DATA

Our econometric analysis exploits firm-level information downloaded from Orbis, a commercial database compiled by Bureau van Dijk that contains administrative data on 300 million firms around the globe.⁸ We believe that Orbis is an appropriate database for obtaining data to estimate the ex-ante and ex-post effects of Chinese outward FDI for several reasons.⁹ Unlike other administrative firm-level databases, Orbis covers small and large firms, public and private firms, and all sectors of the economy, which is important to allow for firm- and industry-level heterogeneity. Furthermore, Orbis reports information regarding the firm ownership type and structure, including the list of subsidiaries, which is key for defining outward FDI.¹⁰ Lastly, Orbis data have a longitudinal nature. Some information is available for download only for the previous year; however, older records can be retrieved from Bureau van Dijk under special research agreements, which allows working with panel data.

For the purpose of the present research, we make use of a balanced panel of Chinese enterprises. Our sample covers the whole set of 747 listed industrial companies, that are headquartered in mainland China continuously over the period 2008–2014.¹¹ Industrial companies are selected from a long list of company types¹² to study the behaviour of heterogeneous firms within a relatively homogeneous class, still covering all NACE 2-digit industries. Although Orbis collects information on both listed and unlisted companies, attention is restricted to the former because listed firms are surveyed in a more detailed format, which is more appropriate for our goals. From a geographical point of view, we focus on mainland China and do not consider companies headquartered in Hong Kong. A vast literature in International Business argues that multinational companies from developing and developed countries have different characteristics and behave differently (Deng, 2013; Ramamurti, 2012). Mainland China is a developing country, whereas Hong Kong can be considered an advanced economy. For this reason, we do not consider companies headquartered in the latter.

From an industrial point of view, our sample is skewed towards manufacturing firms, which account for 68% on average over the 6-year period of interest. Wholesale and retail trade, ICT and constructions are also well represented, amounting to 14%, 5.1% and 3.4%, respectively. Smaller shares accrue to professional, scientific and technical activities (2.6%) and agriculture, forestry and fishing (2.1%).

From a geographical point of view, most of our firms are headquartered in Beijing (20%), Guangdong (11%), Jiangsu (13%), Shandong (6%), Anhui (5%) and Fujian (4.5%). Hubei, Hunan and Shanghai are important as well, accounting for 3% each on average. Smaller shares accrue to the other provinces included in our data set.

⁸For more details, see Ribeiro et al. (2010).

⁹For a comprehensive analysis of the pros and cons of the Orbis data, see Kalemli-Ozcan et al. (2015).

¹⁰At this stage, it is worth mentioning that Orbis allows us to employ data on the actual outward FDI rather than announced deals (Amighini et al., 2013; Edamura et al., 2014) or approved transactions (Chen & Tang, 2014).

¹¹We are aware that our sample is not representative of the population of Chinese firms. Nevertheless, as we show below our descriptive evidence is consistent with the literature on Chinese firms investing abroad. In addition, in our econometric analysis, we control for biases due to the potential overrepresentation by firm's size, industry, age and headquarter location in our sample.

¹²Including banks, insurance companies, financial companies, private equity funds, venture capital, hedge funds, mutual and pension funds, foundation and research institutes, and public authorities.

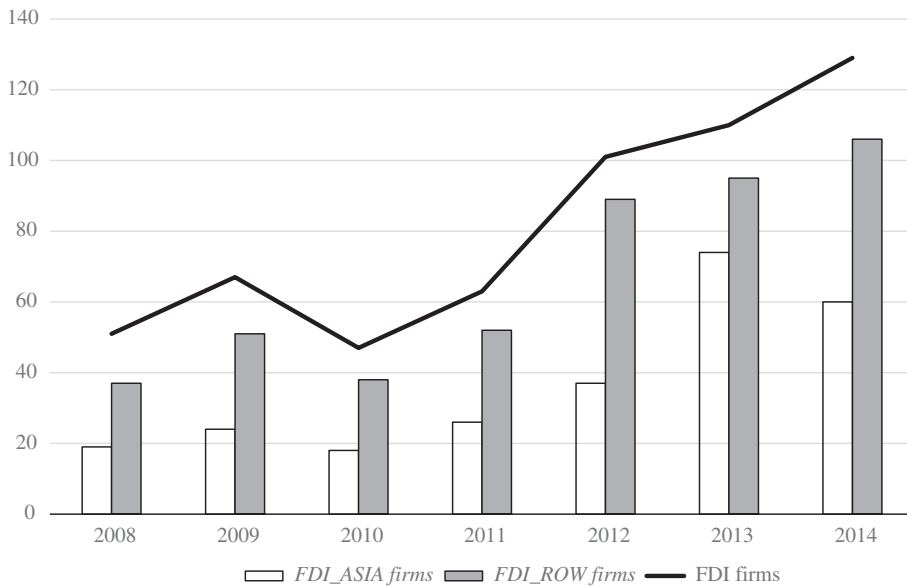


FIGURE 1 Involvement in outward FDI by sample Chinese firms

From an ownership point of view, state-owned firms are in the majority (76%).¹³ State-owned firms are credited with being more likely to invest abroad for a number of reasons (Amighini et al., 2013). These range from easy access to financial resources (Sutherland & Ning, 2011) to responding to national interests (Song et al., 2011). In light of these considerations, we control for the ownership type in all our estimates.

Figure 1 summarises the involvement in outward FDI by the Chinese firms in our sample. The richness of Orbis data on firm ownership structure allows us to define different types of involvement in outward FDI. On one hand, we consider firms with at least one subsidiary abroad in a certain year (*FDI firms*); on the other hand, we distinguish between firms having at least one subsidiary in Asia (*FDI_ASIA firms*) and firms having at least one subsidiary in the rest of the world (*FDI_ROW firms*) over the same year. It is worth mentioning that we do not classify as outward FDI subsidiaries located in Hong Kong. There is consolidated evidence that Hong Kong is just a stopover location for Chinese outward FDI directed to other destinations (UNCTAD, 2001). In addition, large shares of Chinese capital invested in Hong Kong are channelled back to China as inward FDI, with the aim of enjoying the preferential treatments reserved for foreign investors (Garcia-Herrero et al., 2015; UNCTAD, 2001). As we are unable to identify the final destinations of Chinese outward FDI to Hong Kong and round-tripping FDI would distort our results, we exclude outward FDI to Hong Kong from our analysis.

As our most notable finding, involvement in outward FDI by Chinese firms is rather scant. In fact, starting with 51 *FDI firms* in 2008, we reach the modest peak of 129 in 2014. Nonetheless, involvement in outward FDI has been steadily increasing over the 6-year period of interest. According to our data, the percentage of Chinese enterprises having at least one subsidiary abroad was close to 7% in the years 2008–11, increased to 13% in 2012 and reached 17% in 2014, with an average value of 11% over the entire period.¹⁴ Consistent with Chen and Tang (2014), the average share of private firms

¹³This is not a peculiar feature of our sample. See Ramasamy et al. (2012).

¹⁴Note that these data are consistent with the information on aggregate outward FDI flows discussed in Section 2 and reported in Table 1.



having at least one subsidiary abroad is 12.5%, above the 10.25% average share of state-owned firms investing abroad. Besides following the evolution of *FDI firms* over time, it is interesting to consider *FDI_ASIA firms* and *FDI_ROW firms* to appreciate the potential differences in involvement by destination of outward FDI.

Physical and cultural distance increase management costs and thus reduce the attractiveness of investing abroad (Kolstad & Wiig, 2012; Quer et al., 2012). At the same time, culturally distant destinations may offer access to strategic resources as well as social and organisational models that foster firm performance (Quer et al., 2012). To capture both physical and cultural distance, we distinguish between Asian and non-Asian destinations. A third of Asian countries share a border with China. In addition, several Asian countries host native Chinese communities, a feature facilitating communications and integration for Chinese investing firms.¹⁵ Unfortunately, data limitations prevent us from adopting finer destination categories.

Our evidence reported in Figure 1 suggests that the group of *FDI_ASIA firms* is systematically smaller than the group of *FDI_ROW firms*. Put another way, within the subsample of *FDI firms*, Chinese enterprises tend to open subsidiaries in rest of the world rather than in Asia. The share of *FDI_ROW firms* in *FDI firms* is 81% on average between 2008 and 2014. The share of *FDI_ASIA firms* is remarkably lower, with an average value of 43%.¹⁶ Empirical evidence suggests that state-owned firms tend to invest in distant regions (Amighini et al., 2013; Ramasamy et al., 2012). One could argue that the prevalence of state-owned firms in our sample might drive the large share of *FDI firms* investing in the rest of the world. However, this is not the case because a consistent distribution of destinations characterises FDI by state-owned and private firms in our sample.

5 | VARIABLES AND SPECIFICATIONS

Having described our data, in this section we introduce the variables and specifications employed for econometric purposes. First, we establish some basic correlations between involvement in outward FDI and performance of Chinese firms (5.1). Second, we introduce our empirical methodology to estimate the ex-ante (5.2) and ex-post effects (5.3) of Chinese outward FDI. Taking advantage of the longitudinal nature of our data, particular attention is devoted to causality issues.

5.1 | Basic correlations

A first look at our data suggests estimating Equation (1) to establish some basic correlations between involvement in outward FDI and performance of Chinese enterprises:

$$\ln P_{it} = a + bdu_FDI_{it} + cC_{it} + \varepsilon_{it} \quad (1)$$

The dependent variable P_{it} denotes the performance of firm i in year t . For the purpose of this research, we consider several performance variables, including sales (*sales*), profit (*profit*), labour

¹⁵The presence of native Chinese communities is used in the literature as a proxy for cultural distance (Quer et al., 2012).

¹⁶The share of *FDI firms* investing in both regions is less than 10% in 2008 and takes an average value of 27% in the following years. Due to the limited number of *FDI firms* in our data, we consider mutually inclusive categories of outward FDI by destination in our empirical analysis. The small share of *FDI firms* investing in both Asia and the rest of the world suggests the opportunity of doing so.

productivity (lp) and intangible assets (ia). In selecting these variables, we capture different aspects of firm performance. Sales, profit and labour productivity are purely economic variables that proxy for firm efficiency, whereas intangible assets primarily relate to firm innovation capacity and thus account for firm innovative strength.¹⁷

On the right-hand side of Equation (1), du_FDI_{it} is a dummy equal to 1 if firm i has at least one subsidiary abroad in year t , and 0 otherwise. Clearly, du_FDI_{it} equals 1 for the FDI firms introduced in Section 4. The literature review presented in Section 3 suggests that the coefficient of du_FDI_{it} should be positive and statistically significant, meaning that there is a positive correlation between involvement in outward FDI and performance of Chinese enterprises. Put another way, we expect FDI firms to outperform non- FDI firms.

Adding to du_FDI_{it} , C_{it} is a matrix of control variables that we include in every specification to account for firm, industry and space heterogeneity. At the firm level, we control for firm age (age), size ($large$) and type of ownership ($public$). At the industry level, we consider NACE 2-digit industry dummies, whereas province dummies account for space heterogeneity. Time fixed effects are included by means of year dummies.

To delve more deeply into establishing some basic correlations, we estimate Equation (2):

$$\ln P_{it} = a + b_1 du_FDI_ASIA_{it} + b_2 du_FDI_ROW_{it} + cC_{it} + \varepsilon_{it} \quad (2)$$

The only difference between Equations (1) and (2) lays in our measure of involvement in outward FDI, which is du_FDI_{it} in the former case and both $du_FDI_ASIA_{it}$ and $du_FDI_ROW_{it}$ in the latter case. $du_FDI_ASIA_{it}$ ($du_FDI_ROW_{it}$) is a dummy equal to 1 if firm i has at least one subsidiary in Asia (the rest of the world) in year t , and 0 if the firm has no subsidiary abroad. Clearly, $du_FDI_ASIA_{it}$ ($du_FDI_ROW_{it}$) equals 1 for the FDI_ASIA firms (FDI_ROW firms) introduced in Section 4. The reason for dissecting outward FDI by destination is that the expected positive correlation between involvement in outward FDI and firm-level performance might differ in magnitude when allowing for heterogeneous destinations. However, which coefficient should be greater is not obvious because, to the best of our knowledge, our classification cuts across previously adopted taxonomies of destinations (see, for instance, Amighini et al., 2013; Casaburi et al., 2007; Chen & Tang, 2014; Gattai et al., 2018).

Table 2 includes a full description of the variables employed for econometric purposes.

5.2 | Ex-ante effects

Having studied some basic correlations, we now introduce our empirical methodology to investigate the ex-ante effects of Chinese outward FDI. Consistent with the literature reviewed in Section 3, we test the self-selection hypothesis by allowing causality to run from performance to outward FDI. If the best performing firms become outward investors, then we should expect to observe significant differences in performance between future outward FDI starters and future non-starters a few years before the former begin to invest abroad. To test whether today's outward FDI starters were better performers than today's non-investors in the past, when none of them was engaged in outward FDI, we proceed as follows. First, we restrict attention to those firms that were not engaged in outward FDI in 2008, the first year in our panel. Using this approach, we intend to consider only firms that could potentially

¹⁷Our selection of performance variables is in line with the literature on outward FDI and performance. See Borin and Mancini (2016), Chen and Tang (2014), Edamura et al. (2014), Cozza et al. (2015) to mention a few.

TABLE 2 Description of firm-level variables

Variable	Description
<i>du_age</i>	Dummy variable; 1 if the age of firm is no larger than the sample mean age, 0 otherwise
<i>du_FDI</i>	Dummy variable; 1 if the firm has at least one subsidiary abroad, 0 otherwise
<i>du_FDI_ASIA</i>	Dummy variable; 1 if the firm has at least one subsidiary in Asia, 0 if the firm has no subsidiary abroad
<i>du_FDI_ROW</i>	Dummy variable; 1 if the firm has at least one subsidiary in the rest of the world (defined w.r.t. Asia), 0 if the firm has no subsidiary abroad
<i>du_START_FDI</i>	Dummy variable; 1 if the firm had no subsidiary abroad in the years $t - 2$ and $t - 1$ and has at least one in year t ; 0 if the firm has no subsidiary abroad in the years $t - 2$, $t - 1$ and t
<i>du_START_FDI_ASIA</i>	Dummy variable; 1 if the firm had no subsidiary abroad in the years $t - 2$ and $t - 1$ and has at least one in Asia in year t ; 0 if the firm has no subsidiary abroad in the years $t - 2$, $t - 1$ and t
<i>du_START_FDI_ROW</i>	Dummy variable; 1 if the firm had no subsidiary abroad in the years $t - 2$ and $t - 1$ and has at least one in the rest of the world (defined w.r.t. Asia) in year t ; 0 if the firm has no subsidiary abroad in the years $t - 2$, $t - 1$ and t
<i>sales</i>	Firm's sales (USD)
<i>profit</i>	Firm's profit (USD)
<i>n</i>	Firm's number of employees
<i>lp</i>	Labour productivity, defined as $sales/n$
<i>ia</i>	Firm's intangible assets (USD)
<i>ta</i>	Firm's tangible assets (mln USD)
<i>k</i>	Firm's capital (mln USD)
<i>k/n</i>	Capital intensity (mln USD)
<i>rd</i>	Firm's R&D expenditure (mln USD)
<i>age</i>	Firm's age, defined as the difference between year t and the year of foundation (hundreds)
<i>large</i>	Dummy variable; 1 if the firm has a number of employees larger than the sample mean, 0 otherwise
<i>public</i>	Dummy variable; 1 if the firm is state-owned, 0 otherwise

become outward FDI starters (*starters*) during the period of interest and compare them with those that will never engage in outward FDI (*non-starters*).¹⁸ Second, we investigate the average difference in performance in year $t - 2$ between firms that are *starters* and *non-starters* in year t .¹⁹ More formally, we estimate Equation (3):

$$\ln P_{it-2} = a + b du_START_FDI_{it} + c C_{it-2} + \varepsilon_{it-2} \quad (3)$$

¹⁸To this aim, we accept a reduction to 696 in the number of firms in our panel.

¹⁹Given the time dimension of our panel, the two-year lag is chosen to preserve a reasonable interval between the year in which performance is evaluated and the year in which some firms became *starters*, without sacrificing too many of the potential *starters*.

In Equation (3), the dependent variable P_{it-2} denotes the performance of firm i in year $t - 2$ and it is measured in terms of sales, profit, labour productivity and intangible assets, as in Equations (1) and (2).

On the right-hand side of Equation (3), $du_START_FDI_{it}$ is a dummy equal to 1 if firm i becomes a *starter* in year t , and 0 if it remains a *non-starter*. More precisely, considering a two-year lag, $du_START_FDI_{it}$ equals 1 if firm i had no subsidiary abroad in years $t - 2$ and $t - 1$ and has at least one in year t ; it equals 0 if firm i has no subsidiary abroad in years $t - 2$, $t - 1$ and t .

The literature review in Section 3 suggests that the coefficient of $du_START_FDI_{it}$ should be positive and statistically significant, meaning that the best performing firms self-select into outward FDI. Put another way, we expect outward FDI *starters* to outperform *non-starters* a couple of years before the former engage in outward FDI. Adding to $du_START_FDI_{it}$, C_{it} is the same matrix of control variables we consider in Equations (1) and (2).

To shed more light on the ex-ante effects of Chinese outward FDI, we further estimate Equation (4), in which involvement in outward FDI is measured by the two dummies $du_START_FDI_ASIA_{it}$ and $du_START_FDI_ROW_{it}$:

$$\ln P_{it-2} = a + b_1 du_START_FDI_ASIA_{it} + b_2 du_START_FDI_ROW_{it} + c C_{it-2} + \varepsilon_{it-2} \quad (4)$$

$du_START_FDI_ASIA_{it}$ is a dummy equal to 1 if firm i becomes a *starter* in Asia in year t , and 0 if it remains a *non-starter*. More precisely, considering a two-year lag, $du_START_FDI_ASIA_{it}$ equals 1 if firm i had no subsidiary abroad in years $t - 2$ and $t - 1$ and has at least one in Asia in year t ; it equals 0 if firm i has no subsidiary abroad in the years $t - 2$, $t - 1$ and t . Similarly, $du_START_FDI_ROW_{it}$ is a dummy equal to 1 if firm i becomes a *starter* in the rest of the world in year t , and 0 if it remains a *non-starter*. Considering the usual two-year lag, $du_START_FDI_ROW_{it}$ equals 1 if firm i had no subsidiary abroad in years $t - 2$ and $t - 1$ and has at least one in the rest of the world in year t ; it equals 0 if firm i has no subsidiary abroad in years $t - 2$, $t - 1$ and t .

The reason for dissecting outward FDI by destination is to disentangle potential differences in the ex-ante effects by host country. However, which coefficient should be larger remains an open issue because our classification cuts across the previously adopted taxonomies of destinations (see, for instance, Aw & Lee, 2008; Borin & Mancini, 2016; Damijan et al., 2007).

5.3 | Ex-post effects

In this subsection, we introduce the empirical methodology we use to study the ex-post effects of Chinese outward FDI. Consistent with previous contributions on the learning-by-internationalisation hypothesis,²⁰ we allow causality to run from outward FDI to performance. If outward investors become the best performing firms, then we should expect to find significant differences in performance between past outward FDI starters and past non-starters a few years after the former began to invest abroad. To test whether yesterday's outward FDI starters will be better performers in the future than yesterday's non-investors, we proceed as follows. First, we restrict attention to those firms that were not engaged in outward FDI in 2008, the first year in our panel. Using this approach, we intend to consider only firms that could potentially become outward FDI starters during the period of interest and compare them with those that never engage in outward FDI.²¹ Second, we investigate the average

²⁰See Section 3.

²¹As mentioned above, this entails a reduction to 696 in the number of firms in our panel.



difference in performance in year t between firms that were *starters* and *non-starters* in year $t - 2$. Lastly, we estimate the average difference in performance in year t between firms that were *starters* in Asia and the rest of the world and *non-starters* in year $t - 2$.

More formally, our empirical analysis suggests estimating Equations (5) and (6), where the regressand and the regressors are the same as in Section 5.2:

$$\ln P_{it} = a + bdu_START_FDI_{it-2} + cC_{it} + \varepsilon_{it} \quad (5)$$

$$\ln P_{it} = a + b_1 du_START_FDI_ASIA_{it-2} + b_2 du_START_FDI_ROW_{it-2} + cC_{it} + \varepsilon_{it} \quad (6)$$

Based on the literature reviewed in Section 3, we expect the coefficient of $du_START_FDI_{it-2}$ to be positive and statistically significant, meaning that firm performance is affected by first involvement in outward FDI. The relative magnitude of the coefficient of $du_START_FDI_ASIA_{it-2}$ and $du_START_FDI_ROW_{it-2}$ is instead open to investigation, as physical and cultural distance may have opposite effects on firm performance.²²

However, we acknowledge that Equations (5) and (6) are particularly challenging estimating due to endogeneity issues. Suppose our evidence is that firms starting to invest abroad outperform those that do not engage in outward FDI. This might not point to a causal effect from outward FDI to performance if a self-selection mechanism is at play. In this case, best performing firms self-select into outward FDI and so, if *starters* perform better than *non-starters* tomorrow, this might be the result of pure self-selection rather than learning. Put another way, *starters* might perform better than *non-starters* tomorrow simply because they were better performers before investing and remained so over time. That is, *starters* will perform better tomorrow even if they do not start outward FDI, meaning that there is no ex-post effect of outward FDI on performance. To deal with reverse causality in a proper way, one would ideally need data for the counterfactual situation to observe whether today's starters would have been better performers than non-starters tomorrow if the former had not started investing abroad. Unfortunately, these data are not available because we cannot follow the same firm under both circumstances: it is either a *starter* or a *non-starter*. To overcome this problem, we adopt the propensity score matching (PSM) procedure as in Barba Navaretti and Castellani (2008), Barba Navaretti et al. (2010), Hijzen et al. (2010, 2011), Ito (2007), Yang et al. (2013), Borin and Mancini (2016), and Huang and Zhang (2017).²³ Roughly speaking, the rationale for this statistical approach can be summarised as follows. Since it is not possible to observe the same firm in the event it becomes a *starter* and in the event it does not, we match each *starter* with firms, which are ex-ante similar to the first one, but did not invest abroad. We then proceed to evaluate the ex-post differences in performance between the former and the latter, which serves as a proxy for the unobservable counterfactual.

To implement the PSM procedure, our first step is to match each *starter* with ex-ante similar *non-starters*. Ex-ante similarity is established by estimating the probability that a firm invests for the first time at t conditional on firm characteristics as observed at $t - 1$, the so-called propensity score. We estimate the propensity score by means of a probit model. The set of variables that capture a firm's characteristics include firm age, number of employees, capital intensity and industry and province dummies. We proceed to evaluate the ex-post difference in performance between *starters* and the matched *non-starters* by estimating the per-period average treatment effects on treated (ATTs). The

²²See Section 4.

²³For a comprehensive discussion of these techniques, see Becker and Ichino (2002), Caliendo and Hujer (2006), Caliendo and Kopeinig (2008), and Imbens and Wooldridge (2009).

latter corresponds to the difference between the average performance of the *treated* firms and the propensity score weighted average performance of the *control* firms.²⁴ For the sake of robustness, *starters* and *non-starters* are matched via two alternative matching methods, the kernel matching and the radius matching.

Following Caliendo and Kopeinig (2008), these methods are credited for addressing the matching between treated and control firms in a different way. Kernel matching is a non-parametric matching estimator that uses weighted averages of all firms in the control group to construct the counterfactual outcome, assigning more weights if control observations are closer in terms of propensity score of a treated firm and lower weights on more distant observations. Under radius matching, instead, firms within a pre-specified propensity score distance (calliper) are chosen as matching partners for the treated firms. This avoids the risk of bad matches thus increasing the matching quality; however, if few matches are performed, the variance of the estimates might increase.²⁵

We apply the same approach to the treatments *first investment in Asia* and *first investment in rest of the world*, separately considered. In this way, we intend to assess potential differences in the ex-post effects of outward FDI by destination.

Eventually, we evaluate the quality of matching between our *starters* or *treated* firms and the *non-starters* or *control* firms by testing the so-called balancing hypothesis, that is, whether the observations with the same propensity score have the same distribution of observable characteristics, independent of the treatment.

6 | RESULTS

In this section, we comment on the most important results from our econometric analysis. For the sake of consistency, our findings are organised in three subsections, dealing with basic correlations (6.1) and the ex-ante (6.2) and ex-post effects (6.3) of Chinese outward FDI.

6.1 | Basic correlations

Table 3 displays our OLS estimates of Equation (1).

As our most notable finding, the coefficient of *du_FDI* is positive and statistically significant. As it is robust to different specifications and a large number of controls at the firm, industry and space levels, this result helps to establish some basic correlations between involvement in outward FDI and firm-level performance.

According to our estimates, Chinese enterprises with at least one subsidiary abroad tend to be more efficient and more innovative than those with none. This evidence points to the existence of a positive correlation between involvement in outward FDI and firm-level performance, as already documented in Castellani and Zanfei (2007), Girma et al. (2004), Girma (2005), Kimura and Kiyota (2006), and

²⁴For technical details, see Borin and Mancini (2016).

²⁵In the case of the kernel matching method, to avoid any matching bias and to improve the matching quality, we employ the variant 'common support'. Results are computed by using a bandwidth of 0.06. In the case of radius matching method, following Piermartini and Rousová (2013), we employ a calliper of 0.001, which is a good compromise for avoiding bad matches and ensuring representative results. For radius matching method, we employ the variants 'common support' and 'without replacement'. The matching procedure is computed with Stata 14.0 using the routine provided by Leuven and Sianesi (2003).

**TABLE 3** Basic correlations

	(1)	(2)	(3)	(4)
	<i>sales</i>	<i>profit</i>	<i>lp</i>	<i>ia</i>
<i>du_FDI</i>	1.08*** (0.08)	1.06*** (0.07)	0.16*** (0.06)	0.89*** (0.09)
<i>age</i>	-1.39*** (0.37)	-0.95*** (0.36)	1.03*** (0.29)	-0.10 (0.44)
<i>public</i>	0.53*** (0.06)	0.60*** (0.06)	-0.45*** (0.05)	0.36*** (0.08)
<i>large</i>	1.96*** (0.06)	1.87*** (0.05)	-1.26*** (0.04)	1.46*** (0.07)
Province dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	3885	3890	3869	3729
R-squared	0.44	0.43	0.28	0.33

Note: OLS estimates of Equation (1).

Standard errors in parentheses.

A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

All the dependent variables are transformed into natural logarithms.

Gattai and Sali (2018), to mention just a few. Compared with previous research on the same topic, our contribution is providing evidence for a large panel of Chinese enterprises, rather than focusing on advanced economies.

To probe more deeply into establishing some basic correlations, we estimate Equation (2), in which involvement in outward FDI is defined by the destination of investments. Our results are summarised in Table 4.

Interestingly, the coefficients of *du_FDI_ASIA* and *du_FDI_ROW* are positive and statistically significant. This suggests that the positive correlation between involvement in outward FDI and firm-level performance survives when we allow for heterogeneity in the destination of investments, consistent with our priors as derived in Section 3.1. Looking at the magnitude of the coefficients, one might push the argument a bit further and ask whether Chinese firms with certain characteristics tend to select one destination or another. From Table 4, we see that the coefficient of *du_FDI_ROW* is larger than that of *du_FDI_ASIA* for all the dependent variables. These are completely original results of the present study, which elaborates on a new classification of host countries.

Lastly, it is worth noting that the variable *public*, included in our estimates as a mere control, is significant in most specifications. Moreover, its positive sign is consistent with the literature on the relationship between state ownership and firm-level performance (Amighini et al., 2013).

6.2 | Ex-ante effects

Table 5 displays our OLS estimates of Equation (3). Consistent with the theoretical predictions of Helpman et al. (2004), Head and Ries (2003), and Grossman et al. (2006), the coefficient of

TABLE 4 Basic correlations by destination of outward FDI

	(1)	(2)	(3)	(4)
	<i>sales</i>	<i>profit</i>	<i>lp</i>	<i>ia</i>
<i>du_FDI_ASIA</i>	0.62*** (0.10)	0.50*** (0.10)	0.07 (0.08)	0.40*** (0.13)
<i>Du_FDI_ROW</i>	0.99*** (0.08)	1.04*** (0.08)	0.18*** (0.07)	0.90*** (0.10)
<i>age</i>	-1.31*** (0.37)	-0.89** (0.36)	1.04*** (0.29)	-0.05 (0.44)
<i>public</i>	0.55*** (0.06)	0.61*** (0.06)	-0.45*** (0.05)	0.38*** (0.08)
<i>large</i>	1.94*** (0.06)	1.85*** (0.05)	-1.26*** (0.04)	1.44*** (0.07)
Province dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	3885	3890	3869	3729
R-squared	0.44	0.43	0.28	0.34

Note: OLS estimates of Equation (2).

Standard errors in parentheses.

A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

All the dependent variables are transformed into natural logarithms.

TABLE 5 Ex-ante effects

	(1)	(2)	(3)	(4)
	<i>sales</i>	<i>profit</i>	<i>lp</i>	<i>ia</i>
<i>du_START_FDI</i>	0.72*** (0.15)	0.65*** (0.16)	0.58*** (0.12)	0.54*** (0.19)
<i>age</i>	-0.98** (0.48)	-0.19 (0.50)	-0.42 (0.37)	1.07* (0.61)
<i>public</i>	0.75*** (0.09)	0.92*** (0.09)	0.46*** (0.07)	0.59*** (0.12)
<i>large</i>	1.79*** (0.07)	1.72*** (0.08)	-0.26*** (0.06)	1.31*** (0.09)
Province dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	1887	1900	1856	1812
R-squared	0.39	0.36	0.16	0.28

Note: OLS estimates of Equation (3).

Standard errors in parentheses.

A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

All the dependent variables are transformed into natural logarithms.

du_START_FDI is positive and statistically significant. This result is robust to different measures of performance and a large number of controls at the firm, industry and space levels, documenting the existence of strong ex-ante effects of outward FDI.

Our estimates report significant differences in performance between future outward FDI *starters* and future *non-starters* a couple of years before the former begin to invest abroad. Thus, a self-selection mechanism is at play, meaning that causality runs from past performance to future involvement in outward FDI: Chinese enterprises with larger sales (*sales*), profit (*profit*), labour productivity (*lp*) and intangible assets (*ia*) in $t - 2$ do become FDI *starters* in t .

Our evidence reported in Table 5 is consistent with previous studies by Kimura and Kiyota (2006), Barba Navaretti et al. (2010), and Borin and Mancini (2016), to mention just a few. Compared with previous research on the same topic, our contribution is testing the self-selection hypothesis for a large sample of Chinese enterprises. To the best of our knowledge, this is the first study to assess rigorously the ex-ante effects of outward FDI in China.

Table 6 reports the results of our OLS estimates of Equation (4). Interestingly, the coefficients of $du_START_FDI_ASIA$ and $du_START_FDI_ROW$ remain positive and statistically significant in most specifications. This suggests that Chinese firms self-select to become FDI *starters*. However, when looking at the magnitude of the estimated coefficients, we do not find evidence of self-selection to a specific destination. Partially contrasting results are those of Aw and Lee (2008), Damijan et al. (2007), and Borin and Mancini (2016), who find that the most productive Taiwanese, Slovenian and Italian firms invest in advanced rather than developing countries. One possible explanation for our contrasting findings is that we consider a geographical classification, rather than one based on the

TABLE 6 Ex-ante effects by destination of outward FDI

	(1)	(2)	(3)	(4)
	<i>sales</i>	<i>profit</i>	<i>lp</i>	<i>ia</i>
$du_START_FDI_ASIA$	0.60*** (0.16)	0.47*** (0.16)	0.44*** (0.12)	0.19 (0.21)
$du_START_FDI_ROW$	0.52*** (0.17)	0.48*** (0.18)	0.55*** (0.13)	0.54** (0.22)
<i>age</i>	-0.94** (0.48)	-0.16 (0.50)	-0.40 (0.37)	1.09* (0.61)
<i>public</i>	0.77*** (0.09)	0.93*** (0.09)	0.47*** (0.07)	0.60*** (0.12)
<i>large</i>	1.78*** (0.07)	1.72*** (0.08)	-0.27*** (0.06)	1.31*** (0.10)
Province dummies	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	1887	1900	1856	1812
R-squared	0.39	0.36	0.16	0.28

Note: OLS estimates of Equation (4).

Standard errors in parentheses.

A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

All the dependent variables are transformed into natural logarithms.

TABLE 7 Average treatment effects on treated (treatment *START_FDI*, *START_FDI_ASIA* and *START_FDI_ROW*) – Kernel matching method

	(1)	(2)	(3)	(4)
	<i>sales</i>	<i>profit</i>	<i>lp</i>	<i>ia</i>
<i>du_start_FDI</i>	0.8724*** (0.2349)	0.8216*** (0.2053)	0.3640** (0.1524)	0.9395*** (0.2655)
Treated	52	51	52	49
Control	1084	1093	1078	1043
<i>du_START_FDI_ASIA</i>	1.6356*** (0.4509)	1.2350** (0.4991)	0.6009* (0.2927)	1.7661*** (0.5078)
Treated	16	15	16	15
Control	1120	1129	1114	1077
<i>du_START_FDI_ROW</i>	0.9599*** (0.2531)	1.0979*** (0.2061)	0.2242 (0.1497)	1.1547*** (0.2995)
Treated	42	41	42	40
Control	1094	1103	1088	1052

Note: Standard errors in parentheses.

A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

All the dependent variables are transformed into natural logarithms.

development stage of the host country. Another explanation is our focus on a developing country (China) rather than an advanced country (Taiwan, Slovenia, Italy), in light of the vast literature on the differences between multinationals from emerging countries and those from developed countries.²⁶

Among control variables, the coefficient of *public* is positive and statistically significant in Tables 5 and 6. This suggests that public ownership tends to favour good performance of Chinese enterprises.

6.3 | Ex-post effects

Drawing from our previous discussion in Section 5.3, we estimate the ex-post effects of outward FDI through propensity score matching techniques.²⁷ As a first step, we estimate a probit model for the treatments *first investment abroad* (*START_FDI*), *first investment in Asia* (*START_FDI_ASIA*) and *first investment in rest of the world* (*START_FDI_ROW*). Results are reported in Appendix A.

As a second step, we proceed by estimating the ATTs.²⁸ For consistency, we alternatively consider three different treatments, that is, *START_FDI*, *START_FDI_ASIA* and *START_FDI_ROW*.

Tables 7 and 8 display the ATTs estimated with the kernel matching and radius matching methods, respectively.

The kernel matching and radius matching methods deliver very consistent results. As for the treatment *START_FDI*, the estimated ATTs are always positive and statistically significant. Large

²⁶For a survey, see Deng (2013) and Ramamurti (2012).

²⁷Preliminary OLS estimates of Equations (5) and (6) are available from the authors upon request.

²⁸Our propensity score specification is consistent with Cozza et al. (2015) and Huang and Zhang (2017).

TABLE 8 Average treatment effects on treated (treatment *START_FDI*, *START_FDI_ASIA* and *START_FDI_ROW*) – Radius matching method

	(1)	(2)	(3)	(4)
	<i>sales</i>	<i>profit</i>	<i>lp</i>	<i>ia</i>
<i>du_start_FDI</i>	0.6791*** (0.2591)	0.5182** (0.2174)	0.4499*** (0.1759)	0.7676** (0.3111)
Treated	52	51	52	49
Control	1084	1093	1078	1043
<i>du_START_FDI_ASIA</i>	1.5455*** (0.4815)	0.8678 (0.5272)	0.6216* (0.3325)	1.5824*** (0.5602)
Treated	16	15	16	15
Control	1120	1129	1114	1077
<i>du_START_FDI_ROW</i>	0.6065** (0.2774)	0.6472*** (0.2214)	0.2092 (0.1684)	0.6575* (0.3345)
Treated	42	41	42	40
Control	1094	1103	1088	1052

Note: Standard errors in parentheses.

A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

All the dependent variables are transformed into natural logarithms.

differences in performance after outward FDI arise when considering sales, profits and intangible assets; smaller, but still positive ex-post effects emerge for labour productivity. This evidence suggests that a learning mechanism is at play in our sample, consistent with previous results on Chinese firms reported by Huang and Zhang (2017), Chen and Tang (2014), Cozza et al. (2015) and Edamura et al. (2014). Compared with these papers, our work considers the most recent years and treat self-selection and learning effects in a more comprehensive framework.

As for the treatment *START_FDI_ASIA* and *START_FDI_ROW*, our evidence in Tables 7 and 8 suggests that the ex-post effects of outward FDI vary by destination. We find that undertaking outward FDI in Asia delivers greater returns than undertaking outward FDI in the rest of the world, the latter being nevertheless positive. This result highlights that physical and cultural distance can partially compromise the efficiency gains Chinese firms enjoy from investing abroad. This effect is absent in Cozza et al. (2015) and Edamura et al. (2014), since they restrict attention to Chinese outward FDI to Europe. With this approach, they are unable to control for heterogeneous hosts.

Lastly, to evaluate the quality of our matching we test the so-called balancing hypothesis before and after the matching, testing whether the observations with the same propensity score have the same distribution of observable characteristics independent of the treatment. Moreover, we also test balancing properties for every variable used in the propensity score. Results, reported in Appendix B, confirm that the two groups are well balanced.

7 | CONCLUSION

In this study, we investigate the relationship between performance and the decision by Chinese enterprises to invest abroad. Using firm-level panel data over the period 2008–2014, we are able to observe

a firm's performance before and after its first investment abroad and thus rigorously assess the ex-ante and ex-post effects of outward FDI for Chinese firms. Moreover, our data allow us to identify investments by destination and thus evaluate whether the ex-ante and ex-post effects of outward FDI are heterogeneous with respect to the host country.

Our results contribute to the empirical literature on the relationship between outward FDI and firm-level performance and offer some elements for policy considerations.

In line with the existing literature, we detect a positive correlation between outward FDI and several measures of performance for Chinese firms. New to the literature is our evidence that the magnitude of the correlation varies across destinations.

To the best of our knowledge, our study is the first to examine rigorously self-selection by Chinese enterprises into outward FDI. Our estimates detect significant differences in performance between future outward FDI starters and future non-starters. This suggests that Chinese firms self-select into investing abroad, even if they do not appear to self-select into specific destinations.

Controlling for endogeneity through propensity score matching techniques, we show that outward FDI positively affects performance of Chinese companies and that the ex-post effects tend to be larger when investing in closer regions. Our analysis provides fresh evidence of the ex-post effects of Chinese outward FDI over a recent period, not covered by previous studies (Chen & Tang, 2014; Cozza et al., 2015; Edamura et al., 2014; Huang & Zhang, 2017), and involving a major overhaul of Chinese inward and outward FDI policy.

Our results provide some elements for policy considerations, as the causal interpretation of a positive correlation between firm performance and outward FDI has relevant policy implications (Mayer & Ottaviano, 2008). If outward FDI has positive ex-post effects, promoting firm investment abroad may significantly contribute to a country's development. In the past, and certainly more forcefully since the adoption of the 12th Five Year Plan in 2010, Chinese authorities' interventions have steered the course of foreign direct investment in expectation of benefitting from the ex-post effects of outward FDI. Our evidence suggests that such policies have paid off. If firms investing abroad are ex-ante different from non-investing firms, policy measures aimed at promoting firm-level productivity are likely to result in improved internationalisation. The supply-side structural reforms recently undertaken by the Chinese authorities are precisely designed to improve firm performance, potentially deploying the ex-ante effects of outward FDI. Our evidence suggests that such policies will pay off.

To conclude, joint consideration of the ex-ante and ex-post effects of outward FDI detected for Chinese enterprises suggests that the interplay between them is worth further investigation and may provide valuable policy prescriptions.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from Bureau van Dijk. Restrictions apply to the availability of these data, which were used under license for this study. The authors do not have permission to share the data.

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APPENDIX A

To deal with the potential endogeneity of the explanatory variables, we estimate the ex-post effects of outward FDI by means of a propensity score matching procedure. The first step in the procedure is to estimate the probability that a firm invests for the first time at t conditional on firm characteristics as observed at $t - 1$, the so-called propensity score. We estimate the propensity score by means of a probit model for the treatments *first investment abroad* ($START_FDI$), *first investment in Asia* ($START_FDI_ASIA$) and *first investment in rest of the world* ($START_FDI_ROW$).

Results are reported below.A1

TABLE A1 Probit model treatment $START_FDI$, $START_FDI_ASIA$ and $START_ROW$

	$START_FDI$	$START_FDI_ASIA$	$START_FDI_ROW$
<i>Lagged k/n</i>	0.17** (0.07)	0.18 (0.11)	0.17** (0.08)
<i>Lagged n</i>	0.31*** (0.06)	0.31*** (0.09)	0.29*** (0.06)
<i>du_age</i>	-0.07 (0.14)	-0.02 (0.21)	-0.10 (0.15)
Province dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Constant	-4.84*** (0.71)	-5.46*** (1.07)	-4.62*** (0.75)
Observations	1169	1169	1169

Note: Standard errors in parentheses.

A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

APPENDIX B

The propensity score matching procedure rests on the match of *treated* and *control* firms. To evaluate the quality of our matching, we test the so-called balancing hypothesis before and after matching, testing whether the observations with the same propensity score have the same distribution of observable characteristics independent of the treatment.

Tables B1 and B2 show that the t tests computed on the *treated* group are not statistically different from zero, the mean and the median biases generally decrease, and the pseudo- R^2 (not reported) exhibits the expected reduction after matching.

Tables B3 and B4 report the results from testing balancing properties for every variable used in the propensity score and confirm that the two groups are well balanced.

TABLE B1 Balancing test of propensity score matching (treatment *START_FDI*, *START_FDI_ASIA* and *START_FDI_ROW*) - kernel matching method

	R^2	X^2	$p > X^2$	Mean bias	Median bias	R-stat
<i>Dependent variable: sales</i>						
<i>START_FDI</i>						
Unmatched	0.07	31.39***	0.00	24.40	21.20	1.10
Matched	0.01	1.91	0.86	6.70	3.60	0.93
<i>START_FDI_ASIA</i>						
Unmatched	0.09	15.71**	0.01	32.10	21.80	1.23
Matched	0.06	2.64	0.76	18.30	10.10	0.77
<i>START_FDI_ROW</i>						
Unmatched	0.06	23.00***	0.00	22.40	9.40	1.16
Matched	0.03	3.16	0.68	8.50	2.00	0.85
<i>Dependent variable: profit</i>						
<i>START_FDI</i>						
Unmatched	0.07	31.39***	0.00	24.40	21.20	1.10
Matched	0.02	2.06	0.84	7.90	5.50	0.90
<i>START_FDI_ASIA</i>						
Unmatched	0.09	15.71**	0.01	32.10	21.80	1.23
Matched	0.07	2.90	0.72	23.80	18.00	0.78
<i>START_FDI_ROW</i>						
Unmatched	0.06	23.00***	0.00	22.40	9.40	1.16
Matched	0.03	3.52	0.62	9.30	1.10	0.82
<i>Dependent variable: lp</i>						
<i>START_FDI</i>						
Unmatched	0.07	31.39***	0.00	24.40	21.20	1.10
Matched	0.01	1.85	0.87	6.60	3.40	0.94
<i>START_FDI_ASIA</i>						
Unmatched	0.09	15.71***	0.01	32.10	21.80	1.23
Matched	0.06	2.57	0.77	18.00	9.90	0.77
<i>START_FDI_ROW</i>						
Unmatched	0.06	23.00***	0.00	22.40	9.40	1.16
Matched	0.03	3.08	0.69	8.40	2.20	0.85
<i>Dependent variable: ia</i>						
<i>START_FDI</i>						
Unmatched	0.07	31.39***	0.00	24.40	21.20	1.10
Matched	0.01	1.88	0.87	6.60	3.00	0.93
<i>START_FDI_ASIA</i>						
Unmatched	0.09	15.71**	0.01	32.10	21.80	1.23
Matched	0.08	3.27	0.66	22.20	12.90	0.71
<i>START_FDI_ROW</i>						
Unmatched	0.06	23.00***	0.00	22.40	9.40	1.16
Matched	0.03	2.84	0.73	8.30	4.00	0.85

Note: A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

TABLE B2 Balancing test of propensity score matching (treatment *START_FDI*, *START_FDI_ASIA* and *START_FDI_ROW*) - radius matching method

	R^2	X^2	$p > X^2$	Mean bias	Median bias	R-stat
<i>Dependent variable: sales</i>						
<i>START_FDI</i>						
Unmatched	0.07	31.39***	0.00	24.40	21.20	1.10
Matched	0.00	0.23	1.00	3.30	2.30	0.93
<i>START_FDI_ASIA</i>						
Unmatched	0.09	15.71***	0.01	32.10	21.80	1.23
Matched	0.00	0.18	1.00	5.20	5.40	0.75
<i>START_FDI_ROW</i>						
Unmatched	0.06	23.00***	0.00	22.40	9.40	1.16
Matched	0.00	0.44	0.99	6.20	6.90	1.02
<i>Dependent variable: profit</i>						
<i>START_FDI</i>						
Unmatched	0.07	31.39***	0.00	24.40	21.20	1.10
Matched	0.01	1.30	0.94	8.20	6.10	1.03
<i>START_FDI_ASIA</i>						
Unmatched	0.09	15.71***	0.01	32.10	21.80	1.23
Matched	0.01	0.41	1.00	8.30	6.10	1.78
<i>START_FDI_ROW</i>						
Unmatched	0.06	23.00***	0.00	22.40	9.40	1.16
Matched	0.01	0.66	0.99	7.10	6.70	1.03
<i>Dependent variable: lp</i>						
<i>START_FDI</i>						
Unmatched	0.07	31.39***	0.00	24.40	21.20	1.10
Matched	0.00	0.41	1.00	4.30	3.60	1.10
<i>START_FDI_ASIA</i>						
Unmatched	0.09	15.71***	0.01	32.10	21.80	1.23
Matched	0.00	0.19	1.00	5.30	5.50	0.75
<i>START_FDI_ROW</i>						
Unmatched	0.06	23.00***	0.00	22.40	9.40	1.16
Matched	0.01	0.56	0.99	6.30	7.40	1.38
<i>Dependent variable: ia</i>						
<i>START_FDI</i>						
Unmatched	0.07	31.39***	0.00	24.40	21.20	1.10
Matched	0.01	0.79	0.98	6.20	3.40	0.80
<i>START_FDI_ASIA</i>						
Unmatched	0.09	15.71***	0.01	32.10	21.80	1.23
Matched	0.00	0.13	1.00	3.60	2.30	0.73
<i>START_FDI_ROW</i>						
Unmatched	0.06	23.00***	0.00	22.40	9.40	1.16
Matched	0.00	0.28	1.00	4.80	3.50	1.29

Note: A *, ** and *** denote significance at the 10, 5 and 1 per cent levels.

TABLE B3 Balancing test of propensity score matching (treatment *START_FDI*, *START_FDI_ASIA* and *START_FDI_ROW*) by variable kernel matching method

	Dependent variable: sales				Dependent variable: profit				Dependent variable: ip				Dependent variable: ia			
	Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio	
<i>START_FDI</i>																
<i>Lagged k/n</i>																
	U	-22.40	0.81	U	-22.40	0.81	U	-22.40	0.81	U	-22.40	0.81	U	-22.40	0.81	
	M	-3.60	83.90	M	-5.50	75.20	M	-3.40	84.60	M	-3.00	86.40	M	-3.00	1.00	
<i>Lagged n</i>																
	U	70.40	0.69	U	70.40	0.69	U	70.40	0.69	U	70.40	0.69	U	70.40	0.69	
	M	22.00	68.80	M	23.90	66.00	M	21.60	69.40	M	21.80	69.00	M	21.80	0.80	
<i>diu_age</i>																
	U	-7.20	0.99	U	-7.20	0.99	U	-7.20	0.99	U	-7.20	0.99	U	-7.20	0.99	
	M	1.40	80.80	M	2.10	71.50	M	1.50	78.60	M	1.80	75.30	M	1.80	0.97	
<i>Province dummies</i>																
	U	21.20	1.29	U	21.20	1.29	U	21.20	1.29	U	21.20	1.29	U	21.20	1.29	
	M	5.80	72.60	M	5.70	73.30	M	5.80	72.70	M	5.90	72.10	M	5.90	1.05	
<i>Industry dummies</i>																
	U	0.80	0.95	U	0.80	0.95	U	0.80	0.95	U	0.80	0.95	U	0.80	0.95	
	M	0.80	4.50	M	2.10	-152.80	M	0.70	14.20	M	0.50	43.50	M	0.50	1.01	
<i>START_FDI_ASIA</i>																
<i>Lagged k/n</i>																
	U	-21.80	0.91	U	-21.80	0.91	U	-21.80	0.91	U	-21.80	0.91	U	-21.80	0.91	
	M	-10.10	53.70	M	-18.00	17.40	M	-9.90	54.50	M	-8.70	60.10	M	-8.70	1.10	
<i>Lagged n</i>																
	U	83.10	0.61	U	83.10	0.61	U	83.10	0.61	U	83.10	0.61	U	83.10	0.61	
	M	48.90	41.10	M	55.20	33.50	M	48.30	41.90	M	51.30	38.30	M	51.30	0.62	
<i>diu_age</i>																
	U	-1.90	1.04	U	-1.90	1.04	U	-1.90	1.04	U	-1.90	1.04	U	-1.90	1.04	
	M	-1.50	21.70	M	0.40	77.80	M	-1.30	29.50	M	-8.10	-331.30	M	-8.10	1.01	
<i>Province dummies</i>																
	U	38.30	1.89	U	38.30	1.89	U	38.30	1.89	U	38.30	1.89	U	38.30	1.89	
	M	24.60	35.80	M	30.00	21.60	M	24.50	36.10	M	29.80	22.30	M	29.80	1.44	
<i>Industry dummies</i>																
	U	15.40	0.94	U	15.40	0.94	U	15.40	0.94	U	15.40	0.94	U	15.40	0.94	
	M	6.30	59.40	M	15.40	-0.10	M	6.00	60.90	M	12.90	16.20	M	12.90	0.85	

TABLE B3 (Continued)

	Dependent variable: sales				Dependent variable: profit				Dependent variable: ip				Dependent variable: ia			
	Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio	
<i>START_FDI_ROW</i>																
<i>Lagged k/h</i>	U	-18.80	0.76	U	-18.80	0.76	U	-18.80	0.76	U	-18.80	0.76	U	-18.80	0.76	
	M	-5.50	0.95	M	-8.80	0.96	M	-5.50	0.95	M	-5.50	0.95	M	-5.50	0.99	
<i>Lagged n</i>	U	67.40	0.72	U	67.40	0.72	U	67.40	0.72	U	67.40	0.72	U	67.40	0.72	
	M	32.10	0.82	M	35.50	0.79	M	31.70	0.82	M	31.60	0.82	M	31.60	0.89	
<i>du_age</i>	U	-9.40	1.00	U	-9.40	1.00	U	-9.40	1.00	U	-9.40	1.00	U	-9.40	1.00	
	M	-1.70	1.01	M	-1.00	1.00	M	-1.70	1.01	M	-0.10	1.01	M	-0.10	0.99	
<i>Province dummies</i>	U	7.20	0.89	U	7.20	0.89	U	7.20	0.89	U	7.20	0.89	U	7.20	0.89	
	M	-1.10	0.98	M	-1.10	0.97	M	-0.90	0.98	M	-0.50	0.98	M	-0.50	0.99	
<i>Industry dummies</i>	U	-9.20	0.86	U	-9.20	0.86	U	-9.20	0.86	U	-9.20	0.86	U	-9.20	0.86	
	M	-2.00	0.96	M	0.10	0.99	M	-2.20	0.96	M	-4.00	0.96	M	-4.00	0.94	

TABLE B4 Balancing test of propensity score matching (treatment *START_FDI*, *START_FDI_ASIA* and *START_FDI_ROW*) by variable radius matching method

	Dependent variable: sales				Dependent variable: profit				Dependent variable: ip				Dependent variable: ia			
	Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio		Bias (%)	Reduction in bias	Variance ratio	
<i>START_FDI</i>																
<i>Lagged k/h</i>																
	U	-22.40	0.81		U	-22.40	0.81		U	-22.40	0.81		U	-22.40	0.81	
	M	1.20	94.50	0.82	M	15.30	31.50	0.72	M	3.60	84.00	0.84	M	2.80	87.30	1.05
<i>Lagged n</i>																
	U	70.40	0.69		U	70.40	0.69		U	70.40	0.69		U	70.40	0.69	
	M	1.00	98.60	0.82	M	-3.10	95.60	0.79	M	-0.70	99.10	0.81	M	-3.40	95.10	0.68
<i>du_age</i>																
	U	-7.20	0.99		U	-7.20	0.99		U	-7.20	0.99		U	-7.20	0.99	
	M	-2.30	67.70	1.00	M	-2.40	66.30	1.02	M	-5.10	28.80	1.06	M	-9.40	-30.60	0.83
<i>Province dummies</i>																
	U	21.20	1.29		U	21.20	1.29		U	21.20	1.29		U	21.20	1.29	
	M	-4.30	79.60	1.12	M	-13.80	34.70	1.03	M	-2.10	90.10	1.01	M	-1.40	93.60	0.96
<i>Industry dummies</i>																
	U	0.80		0.95	U	0.80		0.95	U	0.80		0.95	U	0.80		0.95
	M	-7.40	-784.50	1.11	M	-6.10	-626.50	1.05	M	-9.80	-1070.90	1.01	M	13.90	-1554.10	0.95
<i>START_FDI_ASIA</i>																
<i>Lagged k/h</i>																
	U	-21.80	0.91		U	-21.80	0.91		U	-21.80	0.91		U	-21.8	0.91	
	M	-3.20	85.10	1.15	M	5.50	74.80	0.94	M	-3.10	85.70	1.14	M	-0.8	96.2	1.03
<i>Lagged n</i>																
	U	83.10	0.61		U	83.10	0.61		U	83.10	0.61		U	83.1	0.61	
	M	11.60	86.00	0.66	M	6.10	92.70	0.62	M	11.70	85.90	0.66	M	11.2	86.5	0.81
<i>du_age</i>																
	U	-1.90	1.04		U	-1.90	1.04		U	-1.90	1.04		U	-1.9	1.04	
	M	5.80	-206.40	0.90	M	-5.20	-173.00	0.91	M	5.50	-193.60	0.91	M	-2.3	-19.6	1.00
<i>Province dummies</i>																
	U	38.30	1.89		U	38.30	1.89		U	38.30	1.89		U	38.3	1.89	
	M	0.00	99.90	0.99	M	-18.10	52.70	1.13	M	-0.40	99.00	1.00	M	-3.2	91.6	0.96
<i>Industry dummies</i>																
	U	15.40	0.94		U	15.40	0.94		U	15.40	0.94		U	15.4	0.94	
	M	5.40	65.10	0.94	M	6.60	57.20	0.91	M	5.50	64.40	0.94	M	0.3	97.8	1.00

TABLE B4 (Continued)

	Dependent variable: sales			Dependent variable: profit			Dependent variable: ip			Dependent variable: ia		
	Bias (%)	Reduction in bias	Variance ratio	Bias (%)	Reduction in bias	Variance ratio	Bias (%)	Reduction in bias	Variance ratio	Bias (%)	Reduction in bias	Variance ratio
<i>START_FDI_ROW</i>												
<i>Lagged k/h</i>	U -18.80		0.76	U -18.80		0.76	U -18.80		0.76	U -18.8		0.76
	M -8.10	56.80	1.31	M 11.80	37.20	0.86	M -2.00	89.30	0.79	M 7.6	59.4	1.05
<i>Lagged n</i>	U 67.40		0.72	U 67.40		0.72	U 67.40		0.72	U 67.4		0.72
	M 5.20	92.30	0.81	M -6.70	90.10	0.93	M 2.70	96.00	0.71	M -3.5	94.7	0.91
<i>du_age</i>	U -9.40		1.00	U -9.40		1.00	U -9.40		1.00	U -9.4		1.00
	M 6.90	27.00	0.91	M -13.00	-38.40	1.11	M 11.70	-24.60	0.91	M 3.1	66.6	1.02
<i>Province dummies</i>	U 7.20		0.89	U 7.20		0.89	U 7.20		0.89	U 7.2		0.89
	M 7.90	-10.10	1.09	M 1.90	74.10	1.04	M 7.40	-3.30	1.05	M 8.6	-19.0	1.02
<i>Industry dummies</i>	U -9.20		0.86	U -9.20		0.86	U -9.20		0.86	U -9.2		0.86
	M -2.80	69.40	1.01	M -2.00	78.60	1.01	M -7.70	16.00	0.96	M -1.2	87.3	0.98