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The Belt and Road Initiative, sister-city partnership and Chinese outward FDI

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ABSTRACT

Extant research has explicitly recognized the importance of the compatible environment in the context of globalization. Sister-city partnership has long been developed for the establishment of such a favorable environment to facilitate international investment. Using a panel data set that covers 66 Belt Road countries and 75 non-Belt Road countries from 2006 to 2017, we investigate the impact of sister-city relationship between China and her partner countries as well as its interactive effect with China's recent global home institution, BRI on the Chinese outward FDI. We find consistent evidence that both sister-city partnership and BRI promote the Chinese outward FDI while these effects are rather complementary than supplementary to each other. Further, we find that the positive impact of BRI seems to be more pronounced in privately owned enterprises (POE) rather than state-owned enterprises (SOE), which suggests that BRI at this stage is more market-oriented and less political-oriented. Our findings suggest that the policymakers should hold more open attitudes towards the establishment of sister-city partnership and towards the Belt Road Initiative to promote more Chinese outward foreign investment so as to deepen the bilateral economic cooperation.

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1. Introduction

With the rapid growth of globalization, the literature has extensively investigated what drives the outward FDI (foreign direct investment). Building on the institutional theory (North, 1990, p. 3) who defines institution as “the rule of the game in a society”, some studies ascribe this foreign capital flow to the institutional environment in the host country (Cuervo-Cazurra, 2016; Globerman & Shapiro, 2003; Sethi et al., 2003) while other studies work on how the institutional distance between home and

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host countries influence the FDI sense (Aleksynska & Havrylchyk, 2013; Choi et al., 2016; Cuervo-Cazurra & Genc, 2008). However, it has been recognized that the influence of home country institution has been severely neglected (Cuervo-Cazurra et al., 2018a; Estrin et al., 2016). As a recent China's global strategy, the Silk Road Economic Belt and the 21st-century Maritime Silk Road, briefly known as the Belt Road Initiative (or BRI hereafter), is such a new home institutional landscape (Li et al., 2019). Proposed by the Chinese government in 2013, the BRI targets at deepening the bilateral economic cooperation between China and the member countries that accounts for 64% population and 30% GDP in the world (Huang, 2016). The launch of such global strategy propels an economic wave on the Eurasian community where most BRI members are from.

Although it is generally believed that the BRI can serve a function to stimulate the Chinese outward FDI (Huang, 2016, Du & Zhang, 2018), the arguments on whether the home country institution can exert a positive or negative effect on its outward FDI are still inclusive. The outward FDI is largely driven by the home-based advantage (Cuervo-Cazurra et al., 2018b) but subject to home-host country institutional distance (Choi et al., 2016; Cuervo-Cazurra & Genc, 2008). This is along with the widespread consensus on the important role of culture in economic performance. Larger culture distance between home and host countries impedes the home countries' investments due to lower preference and higher transaction costs (Guiso et al., 2006; 2009). In this context, China has been no exception under the BRI. A large number of troubled transactions by Chinese firms' overseas investment in 59 countries after the introduction of BRI is mainly resulted from the unexpected investment risks caused by differences in culture and legal systems (Huang, 2019). Meanwhile, the Belt Road countries are also shown to respond differently to culture distance (Du & Zhang, 2018; Liu et al., 2020).

With an increasing number of studies that highlight the role subnational institutions in a large and diverse country like China, the uneven distribution of institutional development across subnational regions (Chan et al., 2010), the different regional absorptive capacity (Wang, 2013) and the diverse subnational cultures and dialects (Dow et al., 2016; Gong et al., 2011) are shown to play significant roles in determining FDI location. These studies only focus on the subnational institutions yet fail to consider the connection between the home and host countries or how the host countries may benefit from such home subnational institutions. This suggests a demand for extending the literature by bridging the home and host countries from the subnational level.

In this paper, we contextualize one global partnership with a potential in reducing the institutional distance and increasing the cultural familiarity between countries, the twinning agreement between international cities. Since the earliest known pair of the twinning, Paderborn, Germany and Le Mans, France in 836, the concept of the sister-city was strengthened after the World War 2, aiming at establishing friendship and fostering understanding among different cultures and communities, and between former foes as an act of peace and reconciliation. This subnational bilateral partnership that can potentially contribute to eliminating the home-host cultural distance from the city level has, yet, surprisingly received little effort, especially from the empirical evidence.

To fill this niche, we conduct an empirical study to examine how the development of sister-city partnership between China and the host countries affects the Chinese outward FDI, and also to investigate how this effect is interacted with the China's home institution, the BRI. Our empirical strategy on the basis of a panel dataset that covers 141 countries including 65 Belt-Road countries and 75 non-Belt Road countries from 2006 to 2017. The empirical results are broadly in line with our arguments. We find that both sister-city partnership and BRI have a positive effect on Chinese outward FDI. In particular, we study how the state ownership matters in the effect of sister-city partnerships and the BRI. While this positive effect of sister-city partnerships does not vary from state-owned enterprises (SOE) to privately owned enterprises (POE), the effect of BRI is more pronounced in POEs rather than SOEs. Somewhat surprisingly, their interactive effect is mostly neutral while negative in some cases. We understand this as the complementary relationship between the BRI and the development of sister-city partnership as most of the sister-city partnerships were developed in non-Belt Road countries.

Our study contributes to the literature in several ways. First, it has been explicitly recognized that the sister-city partnership, as an important connection between countries from a local level can bring economic benefits. Acting as a bridge for cultural exchange at the local level, the sister-city partnership is believed to shorten the institutional distance so as to develop mutual benefits and facilitate trade and cross border investment (Ramasamy & Cremer, 1998). These studies, however, require further evidence from empirical strategy. Utilizing a comprehensive panel dataset, we adopt the gravity model and show that the sister-city partnership can deepen the economic cooperation and favors the overseas investment, which provides empirical evidence to the literature. Second, we contribute to the literature on cultural distance and FDI. Cultural distance between home and host countries defers the bilateral investment (Che et al., 2015; Guiso et al., 2006; 2009; Wang et al., 2020). The goal of this paper is not to reexamine the relationship between cultural distance and FDI. Instead, based on the previous literature, we rather utilize the sister-city partnership as an underlying proxy as a tool that can serve to shorten the cultural distance between countries as an important mechanism to explain its positive role in promoting the flux of foreign investment. In addition, while previous research focuses on either subnational institutions in home countries or host countries but not both (Li et al., 2018; Ma et al., 2016; Yang, 2018), we highlight the importance of subnational culture connection between home and host countries. Third, our study is in line with the literature on the home country institution and home country outward FDI (Cuervo-Cazurra et al., 2018a), especially with those that study the BRI and Chinese investment (Du & Zhang, 2018; Li et al., 2019). By contextualizing the role of sister-city partnership in the BRI, we extend this line of inquiry by investigating how the home country institution effect interplays with the sister-city partnerships. Fourth, our study is also related to the literature on state ownership and outward FDI. SOEs and POEs have different goals and incentives to invest abroad and thereby response differently to the home institutions (Estrin et al., 2016; Li et al., 2018). We contribute to this strand of the literature by comparing how SOEs and POEs are affected the sister-city partnership in the context of BRI.

The rest of the paper is organized as follows. In [Section 2](#), we offer the background and review the relevant studies. [Section 3](#) describes the data and outlines the methodology. [Section 4](#) discusses the empirical results. [Section 5](#) concludes.

2. Literature review

2.1. *The Belt Road Initiative and Chinese outward FDI*

After the economic reform in 1978, the economic development of China has been growing rapidly. Chinese outward FDI has also been increasing considerably after a set of China's global policy such as the "Going out policy". The Chinese outward FDI flows exceed over 100 billion U.S. dollars, making China the 2nd largest cross-border investor (see the Ministry of Commerce of the Peoples' Republic of China, 2018). Initiated in 2013, the BRI aims at strengthening and promoting the economic cooperation between China and the Belt Road countries. As Italy has recently joined the Belt Road Initiative cooperation, there are by now more than 150 Belt Road members, reaching a newest high level.

Home country institutions play a key role in determining home country's outward FDI (Cuervo-Cazurra et al., 2018a; 2018b; Estrin et al., 2016) and the BRI is considered as an institutional force that drives Chinese outward FDI (Li et al., 2019). Although it might be at a preliminary stage to evaluate the economic outcome of the BRI (Huang, 2016), there are several empirical evidence on the relationship between the BRI and Chinese outward FDI. Comparing most Belt Road countries and several non-Belt Road countries from 2005 to 2015, Du and Zhang (2018) adopt a difference in difference approach to estimate the impact of BRI on Chinese green filed investment and cross border acquisitions and detect a positive association between them. Focusing on the infrastructure investment under the BRI, Zhai (2018) uses the global computable general equilibrium model to show that the BRI can bring sizable benefits to both Belt Road countries and non-Belt Road countries. Yu et al. (2019) also provide empirical evidence showing that the BRI promotes the Chinese outward FDI based on 188 host economies from 2000 to 2015. Further, they point out that this effect differs according to the partnership countries' attitude towards BRI and show that developing countries in general with a greater willingness to participate in the BRI receive more investment in this regard. This finding is in line with several case studies that examine the impact of BRI on a specific host country. For example, Timofeev et al. (2017) argue that the favorable effect under the BRI should be on the basis of the agreement on the co-development between China and Russia. Huang argue that more Chinese FDI flowing into Pakistan is attributable to the Pakistan's positive attitude towards the BRI. Given the conflict of India and Pakistan, Jacob (2017) conjectures that India can hardly benefit from the BRI.

The role of SOEs under the BRI also draws our attention. There has been a common debate on whether BRI is more a form of foreign aid with strong political objectives as comparable to the Marshall plan or more a form of global marketization (Cheng, 2016; Huang, 2016; Yu et al., 2019). The outward FDI from SOEs is more political oriented whereas the outward FDI from POEs is more profit oriented. (Estrin et al., 2016; Li et al., 2018; Shapiro & Globerman, 2012; Zhou et al., 2017). As

the home government utilizes SOEs to achieve its domestic political, social, and economic goals, the outward FDI from SOEs is stronger protected by the home government via target selection, favorable resource allocation and public policy designs (Yang, 2018). Hence, SOEs are more embedded in, home institutions than POEs and thus possess more home advantages (Cuervo-Cazurra et al., 2014). One main suggestion from these studies is that SOEs' investment carries more political objectives of BRI, which is supported by Du and Zhang (2018) who find that the SOEs invest more in infrastructure development whereas POEs are more active in non-infrastructure investment under the BRI.

2.2. Institutional distance, cultural distance and outward FDI

The institutional distance should be taken into accounts when a home institution enters a host country with different institutional settings. According to the literature, institutional distance refers to the difference between home and host countries in terms of formal institutions such as legal system, law enforcement, standard of taxation and the informal institutions such as social norms and cultures. (Choi et al., 2016; Estrin et al., 2009; Mingo et al., 2018; Phillips et al., 2009). Any international expansion from a home country needs to comply with the different institutional settings in the host countries and the BRI has no exception (Li et al., 2019). Due to the institutional distance, the greater success of the BRI suffers a certain amount of risks such as regulatory risk, refinancing risk and political risk. Focusing on the energy investment along the Belt Road countries, Duan et al. (2018) propose an integrated evaluation model based on 50 countries in the Belt Road region to calculate their rate of energy investment risk. They further suggest that the variation of the investment risk under the BRI reflects the different institutional distance between China and host countries. Not only the formal institutional distance plays a significant role in overseas investment but also the informal institutional distance matters. The cultural distance is considered as a major type of the informal institutional distance between home and host countries and its effect has been widely studied.

As a factor undermining the bilateral investment, cultural distance lowers the investment preference due to miscommunication and distrust. For example, based on the data covers 48 countries from 1999 to 2000, Beugelsdijk and Frijns (2010) show that the cultural distance negatively affects the foreign investment allocation. They argue that the greater cultural distance leads to a lower preference for foreign stocks based on the channel of uncertainty avoidance and individualism (Hofstede, 2001). Using 20,893 cross-border mergers across 52 countries from 1985 to 2008, Ahern et al. (2015) document trust, hierarchy and individualism as key dimensions to capture the cultural distance and find that the volume of cross-border mergers is lower when there is a great cultural distance between countries.

Cultural distance not only lowers the preference but can also increase the investment transaction cost. In line with arguments that higher transaction cost is associated with the higher cultural distance studies find that greater linguistic distance leads to information asymmetry and thereby causes a higher transaction cost, which in turn deters the foreign investment expansion (Cuypers et al., 2015; Li et al., 2018).

Cultural impact is ingrained in the historical ties between countries. For instance, colonial legacies have left different institutional influence that exerts a long-term impact on the cultural norms (Acemoglu et al., 2001; Becker et al., 2016). On the one hand, former colonies tend to trade and invest more extensively with their former colonizers and other regions colonized by the same colonies due to similar institutions (Acemoglu et al., 2001; La Porta et al., 2008). On the other hand, Guiso et al. (2009) ascribe the cultural distance to the history of conflicts between countries. In their study on how cultural biases affect the economic exchange, it is found that lower trust related to the cultural distance leads to less bilateral trade and investment. In the case of China, Che et al. (2015) show that inferior institutional influence left by Japan from Sino-Japanese War in the modern history leads to lower trust and less trade between China and Japan. Wang and Luo (2020) and Wang et al. (2021a) also find that the Japanese legacy also hampers the positive impact of inward FDI on China's economic development.

The impact of cultural distance also applies to the BRI. Li et al. (2019) argue that the cultural distance will cause the inevitable cultural friction when BRI-driven investment enters the host countries even with the formal institutional support. To what extent the cultural friction between China and its partners under the BRI, however, depends on how large the cultural distance is. Liu et al. (2020) study the effect of cultural distance and institutional distance between China and 38 Belt Road countries, and 61 non-Belt Road countries from 2002 to 2016. According to their findings, the effect of cultural distance is more pronounced than the effect of institutional distance and such effect varies across European countries and Asian countries since European countries are comparatively more culturally remote. Therefore, it is of crucial importance to address the issue of cultural unfamiliarity given the cultural diversity across different regions for both Belt Road and non-Belt Road countries.

2.3. The role of sister-city

While most studies focusing on institutional distance including cultural distance are mainly from the national level, several studies have underscored the importance of home subnational institutions and subnational cultures in international investment (Li et al., 2018; 2019; Ma et al., 2016). With a purpose to promote cultural exchange, the sister-city movement can be seen as a powerful element of the “‘quiet revolution’ in local governance” (The World Bank, 2000, pp. 154–155) and allows “synergy and the combining of resources among the public sector, international organizations, the voluntary and community sector, individuals and households” (The World Bank, 2000, p. 155). As a bilateral partnership, sister-city relationship linking two local communities from different countries can serve the function to reduce the cultural barrier, which is referred to bridging the global local divide (Cremer et al., 2001). This partnership that deserves greater recognition from both domestic and global perspectives, has been largely ignored by the existing body of research.

Indeed, an early framework for evaluating the sister-city relationship's influence is based on cultural exchange, educational exchange and economic exchange (O'Toole, 2001). Baycan-Levent et al. (2008) conduct a survey based on European cities and

their sister-cities and find that the number of visitors, students, cultural activities and economic cooperation with entrepreneurs have increased in 50% of these cities after the agreement is signed. In particular, they find that the remarkable increase in the number of visitors by 59% and students by 52% is due to the cultural exchange introduced by sister cities. In a similar vein, Ramasamy and Cremer (1998) investigate the sister-city relationship between New Zealand and a number of Asian countries likewise. According to their survey, the sister-city partnership reduces the cultural differences, which can be conducive to the international investments. These studies all provide evidence on the cultural communication driven by the sister-city partnership.

After the establishment of China's first sister-city partnership with Japan, Tianjin and Kobe in 1973, the world has witnessed the increasing development of this partnership. By the end of 2018, there are 2,571 pairs of sister cities established between China and 136 countries (Ministry of Foreign Affairs of the Peoples' Republic of China, 2019). Following the framework of O'Toole (2001), we response to the call by examining the role of the sister-city partnership in driving the Chinese outward FDI based on the mechanism of cultural effect to moderate the negative impact of cultural distance.

The literature discussed above provides both theoretical and empirical insights and points to that the sister-city relationship can potentially promote the foreign investment. First, the cultural effect can establish a more affiliative relationship to build up the trust among foreigners, thereby not only increasing the preference to invest abroad from the foreign countries on the one hand but also creating favorable attitudes for hosting the MNEs. Second, such cultural effect can also reduce the language barrier, which in turn lowers the communication and transaction cost during the investment procedure. Third, given the existence of institutional barriers between China and the partner countries in the context of BRI, the cultural effect of sister-city relationship can ensure the effectiveness of the BRI, thus promoting more Chinese investment. Alternatively, this causality can go the other way around: the BRI sequentially strengthens such cultural effect.

3. Methodology

3.1. Model specification

Based on the conceptual framework from the discussion in Section 2, we argue that sister-city partnership can play a significant role in increasing the home country's investment overseas. In the empirical strategy, we adopt the gravity model which has been widely used in international trade and foreign investment, to estimate the impact of sister-city partnership and its interaction with BRI on the outward FDI. Notable, due to existence of zero observations in the sample, ordinary least squares (OLS) estimation will automatically drop the zero observations and lead to sample selection bias. Two-step Heckman estimators and Poisson pseudo maximum likelihood estimation (PPML) introduced and are two useful approaches to address this problem. In the gravity model, PPML is more widely adopted because not only can it solve the issue of zero observations but also mitigate the issue of endogeneity (Silva & Tenreyo, 2006). Like previous relevant studies (e.g. Lien et al., 2012; Lien & Lo, 2017; Wang et al., 2021b), we take the log form of population, GDP, and geographical

distance as these variables are with much larger values than the others. Therefore, our empirical model is specified as in Equation (1).

$$F_{it} = \exp[\beta_0 + \beta_1 SC_{it-1} + \beta_2 INF_{it} + \beta_3 CD_i + \beta_4 ER_{it} + \beta_5 INS_{it} + \beta_6 \ln POP_{it} + \beta_7 \ln GDP_{it} + \beta_8 \ln CGDP_t + \beta_9 \ln DIS_i + \varepsilon_{it}] \pi_{it} \quad (1)$$

where F_{it} is a dependent variable, a vector of outward FDI including the volume and the number of cross border mergers and acquisitions (CMAs) from China to host country i at year t . SC_{it-1} is the independent variable of interest, the number of the sister-city relationship between China and the host country at year $t - 1$, as to minimize any possible errors caused by endogeneity. CD_i is the cultural distance capturing four cultural dimension values including Power Distance, Individualism vs Collectivism, Masculinity vs Femininity, and Uncertainty Avoidance (Kogut & Singh, 1988).¹ ER_{it} is the RMB and foreign currency exchange rate and INF_{it} is the host country's inflation rate. These two factors are directly related to the transaction cost that matters greatly in the decision of foreign investment. As aforementioned, INS_{it} is the host country's institutional quality that should not be neglected. It covers 6 dimensions of governance, namely, Voice and Accountability, Regulatory Quality, Political Stability and Absence of Violence, Rule of Law, Control of Corruption and Government Effectiveness from worldwide governance indicators from World Bank. GDP_{it} is the gross domestic product of host country and $CGDP_t$ is the gross domestic product of China, the home country. DIS_{it} is the geographic distance between the capitals of China and the host country. These three factors are basic controls in the traditional gravity model. ε_{it} denotes the error term.

Further, we capture the interaction effect of sister-city partnership and the BRI, which is specified as in Equation (2). Because different countries join BRI in different years (see Appendix, [supplementary material](#), for detail), we measure the duration of the BRI membership instead of using a binary variable, which should more precisely capture the effect of BRI over longer period. We also allow one year for BRI membership to serve its function so as to mitigate the issue of endogeneity. The model is specified in Equation (2) as follows.

$$F_{it} = \exp [\beta_0 + \beta_1 SC_{it-1} + \beta_2 BRI_{it-1} + \beta_3 Sis_{it-1} \times BRI_{it-1} + \beta_4 INF_{it} + \beta_5 CD_i + \beta_6 ER_{it} + \beta_7 INS_{it} + \beta_8 \ln POP_{it} + \beta_9 \ln GDP_{it} + \beta_{10} \ln CGDP_t + \beta_{11} \ln DIS_i + \varepsilon_{it}] \pi_{it} \quad (2)$$

3.2. Data

We construct a comprehensive dataset pertaining to 66 Belt Road countries and 75 non-Belt Road countries from 2006 to 2017 for empirical analysis of the impact of sister-city partnership on Chinese outward FDI flowing in these countries in the context of BRI. This period covers 12 years including 7 years of observations before the BRI and 5 years after the BRI. First, we collect the total volume of outward FDI information from the Ministry of Commerce of Peoples' Republic of China and Wind

Table 1. Descriptive statistics.

Variables	Mean	S. D.	Min	Max	Obs.	Source
Outflow of Chinese FDI	2.04	8.37	0	170	1692	Chinese Ministry of Commerce
Total CMA accomplishments	0.46	1.95	0	25	1692	Wind database
CMA accomplishments by SOEs	0.14	0.58	0	7	1692	Wind database
CMA accomplishments by POEs	0.35	1.65	0	26	1692	Wind database
Total CMA announcements	0.96	4.11	0	75	1692	Wind database
CMA announcements by SOEs	0.24	0.87	0	11	1692	Wind database
CMA announcements by POEs	0.72	3.73	0	73	1692	Wind database
Sister-city partnership	10.99	31.48	0	278	1692	Chinese Ministry of Foreign Affairs
Cultural distance between China and host countries	3.92	2.09	0.22	7.67	1692	Geert-Hofstede website
Duration of BRI membership	0.76	0.42	0	5	1692	Chinese Ministry of Foreign Affairs
Institutional quality of host country	0.026	0.89	-1.89	1.88	1692	World Bank
Currency exchange rate	2.58	3.61	0.01	20.96	1692	World Bank
Host country inflation rate	5.48	5.86	0.01	59.22	1692	World Bank
Log of host country population	15.25	1.72	10.49	20.07	1692	World Bank
Log of host country GDP	8.59	1.53	5.11	11.68	1692	World Bank
Log of home country GDP (China)	10.96	0.68	9.25	11.17	1692	World Bank
Log of geographic distance	8.94	0.52	6.69	9.86	1692	Google map

Source: calculated by authors.

database that covers the outbound investment on all Chinese publicly listed companies. Second, we collect the number of cross-border mergers and acquisitions (CMA hereafter) from Wind database that publishes all publicly listed of Chinese firms and it has been one of the main sources of for empirics focusing on Chinese investment. Third, the information of sister-city partnership and the BRI are obtained from the Ministry of Foreign Affairs of the Peoples' Republic of China. Fourth, the source of other control variables in the gravity model is mainly from the World Bank. The data of cultural distance comes from the Geert Hofstede Website (<http://geert-Hofstede.com>). Table 1 summarizes the descriptive statistics and the data sources.

As shown in Figure 1, Chinese outward FDI has overall been increasing dramatically from 2006 to 2015 when it peaked especially after the launch of BRI in 2013 before it dropped slightly from 2016. Asian countries that joined the BRI have hosted most of Chinese Outward FDI and a great amount of investment also has also flowed to United States during this period. As shown in Figure 2a, the number of cities involved in the sister-city partnership has increased and are evenly distributed across China from 2006 to 2017. Figure 3 depicts the number of sister-city relationships between China and its partner countries in 2017.

4. Estimation results

Table 2 reports the PPML estimation results for the effect of sister-city partnership on the flow of Chinese outward FDI in three different periods: full sample from 2006 to 2017, 2006 to 2012 and 2013 to 2017 (model 1-3), sample of Belt-Road countries for three sub-periods (models 4-6) and sample of Belt-Road countries for the same sub-periods (model 7-9). We separate these three periods in order to capture the impact of sister-city partnership before the BRI and after the BRI, and the whole period. In the full sample estimation shown in models 1-3, the coefficients of sister-

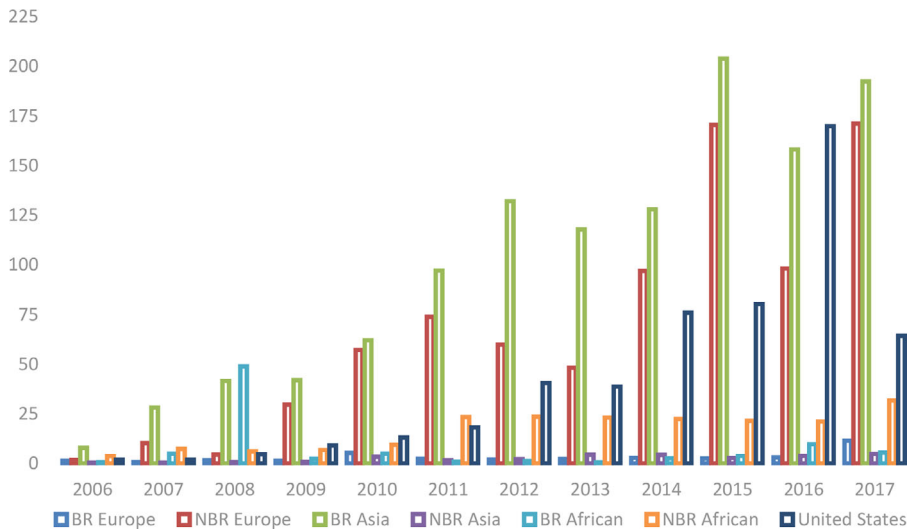


Figure 1. Chinese outward FDI flows from 2006 to 2017.

Source: Authors' plot based on the data from the Ministry of Commerce of the Peoples' Republic of China.

Notes: Year is presented in the horizontal axis and the volume of Chinese OFDI in the unit of hundred million USD is presented in the vertical axis. The exact numbers are not reported due to limited space in the figure but are available upon requests.

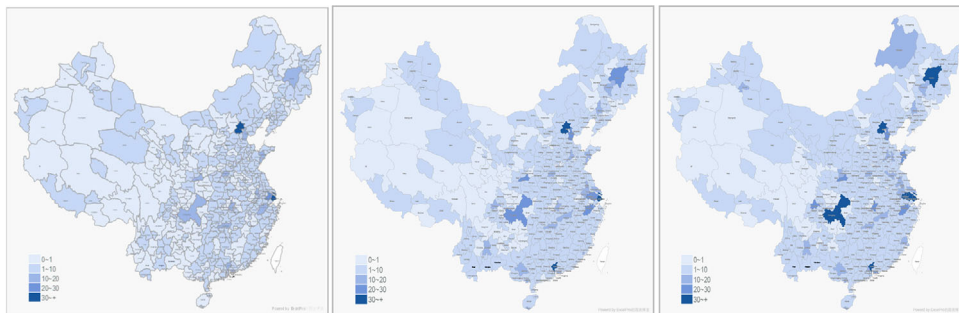


Figure 2. Number of Chinese cities twinning with their sister cities globally in 2006, 2013 and 2017.

Source: Authors' plot based on the data from the Ministry of Foreign Affairs of the Peoples' Republic of China by ArcGIS 10.2.

city partnership are all statistically significant and positive at 5% in the whole period, 10% from 2006 to 2012 and 5% from 2013 to 2017, respectively, which means that the establishment of sister-city partnership between China and the host country leads to the increase of Chinese outward FDI from all sample periods. As presented in model 4-6, the effect of sister-city in Belt Road countries is statistically significant over the whole sample period from 2006 to 2017. Yet, the coefficient is insignificant in the subsample analysis before the BRI was launched from 2006 to 2012 and after the BRI was initiated from 2013 to 2017. Similarly, the effect of sister-city partnership is more salient from 2006 to 2017 than from 2006 to 2012 while it is insignificant from 2013 to 2017 in non-Belt Road countries. These results overall suggest that the sister-city partnership has a positive effect on Chinese Outward FDI flowing into

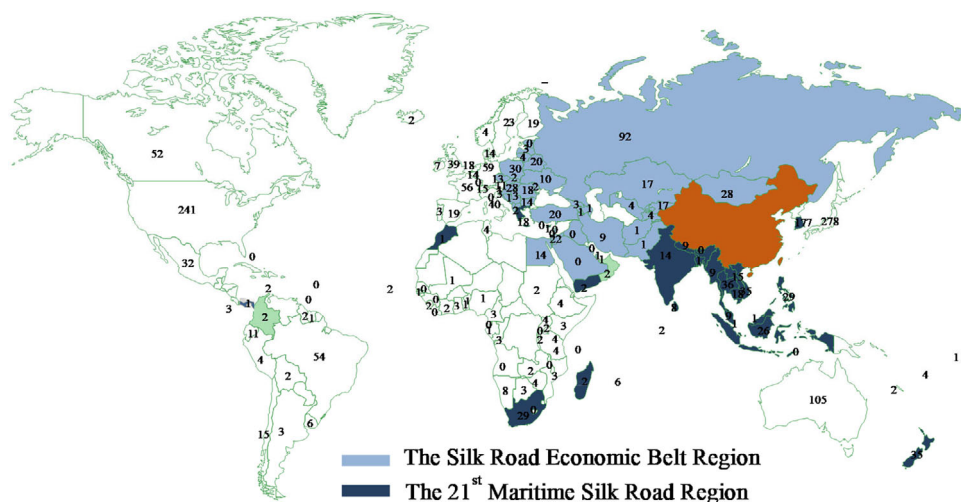


Figure 3. Number of sister-city relationships with China in 2017.

Source: Authors' calculation based on the data from the Ministry of Foreign Affairs of the Peoples' Republic of China by ArcGIS 10.2.

both Belt Road and non-Belt Road countries but this effect is only significant over a longer period. Among the control variables in the gravity model, the coefficients of host country GDP, home country GDP, host country population, cultural distance are mostly statistically significant and have expected sign in general, in line with the general gravity model. That is, close Sino-foreign cultural distance, higher population, GDP and better institutional quality are also contributors to promoting Chinese outward FDI.

Tables 3 and 4 present the PPML estimation results for the effect of sister-city partnership on the Chinese CMA activities measured by announcements and accomplishments. Most of the control variables maintain the expected signs and are statistically significant. We find evidence on a positive effect of sister-city partnership on both Chinese firm's CMA announcements and accomplishments in the full sample over different periods presented in models 1–3. The coefficients of sister-city partnership are all statistically significant at 5% level from 2006 to 2017, from 2006 to 2012 and from 2013 to 2017. For example, one additional sister-partnership can lead to the number of CMA accomplishments and announcements by 0.6% and 0.7%, respectively from 2006 to 2017. However, this effect is rather negligible and mostly insignificant when we split the sample into Belt Road and non-Belt Road countries as shown in model 4–6 and model 7–9 respectively. One exception is that the sister-city partnership has a statistically significant and positive effect on the Chinese CMA announcements and accomplishments in non-Belt Road from 2006 to 2012.

The subsample analysis only shows a positive effect of sister-city partnership on Chinese outward FDI but does not provide much insight on the relationship between BRI and sister-city partnership. Therefore, we consider the effect on the Chinese outbound investments of their interaction term in Table 5. The result of model 1 shows that that the duration of BRI has a statistically significant and positive effect on the flow of Chinese outward FDI. Every additional year being as a BRI member for the

Table 2. PPML estimation for Chinese outward FDI and sister-city partnership.

	Full								
	Belt Road			Belt Road			Non-Belt Road		
	Model 1 06-17	Model 2 06-12	Model 3 13-17	Model 4 06-17	Model 5 06-12	Model 6 13-17	Model 7 06-17	Model 8 06-12	Model 9 13-17
SC_{it-1}	0.013** (0.007)	0.009* (0.005)	0.012** (0.006)	0.027*** (0.009)	0.025 (0.017)	0.019 (0.013)	0.016*** (0.005)	0.012** (0.006)	0.008 (0.005)
INF_{it}	-0.012 (0.008)	-0.001 (0.010)	0.012 (0.012)	-0.009 (0.011)	0.008 (0.012)	0.029 (0.035)	-0.027** (0.012)	-0.019 (0.018)	-0.003 (0.016)
INS_{it}	0.412*** (0.153)	0.382 (0.253)	0.207* (0.135)	0.215* (0.118)	-0.713 (0.442)	0.436 (0.526)	-0.018 (0.315)	-0.369 (0.409)	-0.223 (0.378)
CD_t	-0.087* (0.046)	-0.103* (0.054)	0.080 (0.071)	0.088 (0.112)	0.064 (0.133)	0.059 (0.149)	0.266* (0.148)	0.313* (0.163)	0.200 (0.166)
ER_{it}	0.036** (0.015)	-0.010 (0.037)	0.025 (0.041)	0.015** (0.008)	-0.006 (0.010)	0.015 (0.014)	0.033 (0.051)	0.011 (0.020)	0.017 (0.028)
$\ln PO_{it}$	0.391*** (0.068)	0.202*** (0.075)	0.355*** (0.074)	0.645*** (0.146)	0.521*** (0.164)	0.676*** (0.178)	0.518*** (0.103)	0.467*** (0.109)	0.497*** (0.113)
$\ln GDP_{it}$	0.386*** (0.108)	0.382*** (0.127)	0.231* (0.132)	0.813*** (0.191)	0.684*** (0.219)	0.339 (0.295)	1.174*** (0.174)	0.838*** (0.207)	0.592*** (0.228)
$\ln CGDP_{it}$	0.207* (0.137)	0.197* (0.112)	0.219* (0.130)	0.153 (0.087)	0.212* (0.132)	0.195 (0.154)	0.188* (0.107)	0.176 (0.135)	0.201** (0.097)
$\ln DIS_t$	-0.021 (0.167)	-0.727*** (0.276)	-0.658** (0.262)	-1.098** (0.499)	-1.255** (0.576)	-1.674*** (0.636)	-0.037 (0.628)	0.502 (0.658)	0.165 (0.678)
R^2	0.411	0.398	0.432	0.378	0.346	0.429	0.357	0.365	0.276
Pseudo log-likelihood	-4904.19	-3141.12	-3907.57	-3774.28	-3076.91	-4141.92	-45964.01	-4234.20	-4276.18
Ramsey p-value	0.142	0.151	0.158	0.103	0.236	0.071	0.163	0.155	0.092
Observations	1551	846	705	726	396	330	825	450	375

Notes: 1. Robust standard errors are reported in parentheses; 2. *, **, *** signify statistical significance at 10%, 5% and 1% level; 3. Results are conducted with the use of the STATA 14.

Source: calculated by authors.

Table 3. PPML estimations for Chinese firms' CMA accomplishment and sister-city partnership.

	Full			Belt Road			Non-Belt Road		
	Model 1 06-17	Model 2 06-12	Model 3 13-17	Model 4 06-17	Model 5 06-12	Model 6 13-17	Model 7 06-17	Model 8 06-12	Model 9 13-17
SC_{it-1}	0.009*** (0.001)	0.011*** (0.002)	0.004*** (0.001)	0.004 (0.004)	-0.003 (0.013)	0.003 (0.006)	0.001 (0.002)	0.004*** (0.002)	-0.002 (0.002)
INP_{it}	-0.042** (0.022)	-0.011 (0.026)	-0.113*** (0.040)	0.007 (0.033)	-0.034 (0.039)	0.080** (0.031)	-0.038 (0.054)	0.065 (0.043)	-0.108** (0.054)
INS_{it}	0.113 (0.200)	0.213 (0.231)	0.379* (0.239)	0.262* (0.151)	0.347 (0.486)	0.751** (0.374)	0.765 (0.054)	0.231 (0.651)	-0.779 (0.585)
CD_t	-0.119** (0.061)	-0.142** (0.059)	-0.152* (0.089)	-0.261** (0.122)	-0.152 (0.122)	-0.511*** (0.176)	-0.068 (0.086)	-0.111 (0.109)	-0.205 (0.135)
ER_{it}	0.048*** (0.017)	0.046* (0.024)	0.054* (0.028)	-0.034 (0.038)	0.093* (0.056)	0.066 (0.066)	0.012 (0.023)	0.014 (0.030)	-0.026 (0.042)
$\ln POP_{it}$	0.485*** (0.056)	0.423*** (0.083)	0.564*** (0.077)	0.725*** (0.117)	0.887*** (0.181)	0.610*** (0.143)	0.774*** (0.084)	0.744*** (0.096)	0.907*** (0.158)
$\ln GDP_{it}$	0.312*** (0.112)	0.716*** (0.173)	0.734*** (0.186)	0.481** (0.226)	0.580* (0.338)	0.496** (0.248)	0.627** (0.312)	0.350* (0.218)	0.638*** (0.216)
$\ln CGDP_{it}$	0.217** (0.091)	0.357*** (0.104)	0.193* (0.126)	0.206* (0.121)	0.341*** (0.092)	0.229** (0.115)	0.319** (0.159)	0.250** (0.118)	0.176 (0.119)
$\ln DIS_t$	-0.742*** (0.117)	-0.737*** (0.169)	0.557 (0.467)	0.067 (0.229)	0.106 (0.501)	-0.404 (0.403)	-0.621* (0.368)	-0.465** (0.185)	-0.471 (0.298)
R^2	0.6453	0.6218	0.7076	0.3279	0.1962	0.5416	0.7115	0.6792	0.8711
Pseudo log-likelihood	-1116.26	-725.17	-482.07	-307.47	-159.66	-113.35	-515.15	-252.28	-172.85
Ramsey (p-value)	0.153	0.145	0.171	0.128	0.193	0.217	0.186	0.116	0.154
Observations	1551	846	705	726	396	330	825	450	375

Notes: 1. Robust standard errors are reported in parentheses; 2. *, **, *** signify statistical significance at 10%, 5% and 1% level; 3. Results are conducted with the use of the STATA 14.

Source: calculated by authors.

Table 4. PPML estimations for Chinese firms' CMA announcement and sister-city partnership.

	Full			Belt Road			Non-Belt Road		
	Model 1 06-17	Model 2 06-12	Model 3 13-17	Model 4 06-17	Model 5 06-12	Model 6 13-17	Model 7 06-17	Model 8 06-12	Model 9 13-17
SC_{it-1}	0.007*** (0.001)	0.008*** (0.002)	0.004*** (0.001)	0.004 (0.004)	-0.001 (0.010)	0.005 (0.006)	0.001 (0.001)	0.003* (0.002)	-0.003 (0.002)
INP_{it}	-0.045*** (0.020)	-0.019 (0.024)	-0.113*** (0.041)	0.007 (0.033)	-0.035 (0.039)	0.068* (0.040)	-0.057 (0.049)	0.065 (0.043)	-0.107* (0.057)
INS_{it}	0.332 (0.226)	0.215 (0.233)	-0.379 (-1.12)	0.962** (0.451)	0.647 (0.587)	1.357** (0.555)	4.098*** (0.838)	0.072 (0.541)	-0.006 (1.128)
CD_t	-0.083 (0.054)	-0.132 (0.082)	-0.152* (0.089)	-0.261** (0.122)	-0.052 (0.133)	-0.523*** (0.172)	0.008 (0.077)	-0.029 (0.110)	-0.142 (0.133)
ER_{it}	0.047*** (0.015)	0.045* (0.024)	0.054* (0.028)	-0.034 (0.038)	-0.093* (0.056)	0.057 (0.057)	0.018 (0.019)	0.007 (0.028)	0.001 (0.037)
$\ln PO_{it}$	0.467*** (0.044)	0.446*** (0.083)	0.563*** (0.077)	0.725*** (0.117)	0.888*** (0.182)	0.584*** (0.129)	0.760*** (0.076)	0.739*** (0.108)	0.912*** (0.135)
$\ln GDP_{it}$	0.368*** (0.087)	0.030 (0.110)	0.734*** (0.186)	0.481** (0.226)	0.580* (0.336)	0.380 (0.253)	0.929*** (0.235)	0.547* (0.278)	0.632* (0.344)
$\ln CGDP_t$	0.261** (0.091)	0.293*** (0.102)	0.203 (0.126)	0.218* (0.131)	0.299*** (0.092)	0.186* (0.113)	0.303** (0.129)	0.250 (0.188)	0.201* (0.119)
$\ln DIS_t$	-0.538*** (0.105)	-0.617*** (0.169)	0.523 (0.467)	0.167 (0.3279)	0.106 (0.500)	-0.169 (0.404)	-0.612*** (0.165)	-0.820** (0.318)	0.258 (0.8032)
R^2	0.7549	0.6180	0.7076	0.3279	0.1960	0.4619	0.8192	0.6766	0.8032
Pseudo log-likelihood	-1696.88	-615.47	-482.07	-307.47	-159.66	-138.12	-681.09	-308.77	-225.43
Ramsey (p-value)	0.173	0.162	0.186	0.112	0.153	0.107	0.114	0.096	0.106
Observations	1551	846	705	726	396	330	825	450	375

Notes: 1. Robust standard errors are reported in parentheses; 2. *, **, *** denote significance at 10%, ***, 5% and * 1% level, respectively; 3. Results are conducted with the use of the STATA 14.

Source: calculated by authors.

Table 5. PPML estimations for the interaction between sister-city partnership and BRI on outward FDI and CMA.

	CMA accomplishment				CMA announcement		
	OFDI Model 1	Model 2 Full	Model 3 SOE	Model 4 POE	Model 5 Full	Model 6 SOE	Model 7 POE
SC_{it-1}	0.012*** (0.004)	0.006*** (0.001)	0.001 (0.001)	0.004** (0.001)	0.007*** (0.001)	0.009*** (0.003)	0.006*** (0.001)
BRI_{it-1}	0.482*** (0.061)	0.195* (0.111)	0.172 (0.180)	0.267* (0.138)	0.501*** (0.121)	0.272** (0.118)	0.247* (0.153)
$BRI_{it-1} \times SC_{it-1}$	-0.003*** (0.001)	-0.008** (0.004)	-0.010 (0.008)	-0.007* (0.004)	-0.014** (0.007)	-0.004** (0.002)	-0.010** (0.005)
INF_{it}	-0.026 (0.011)	-0.045* (0.022)	-0.013 (0.019)	-0.060 (0.038)	-0.038** (0.019)	-0.013 (0.018)	-0.036 (0.033)
INS_{it}	0.544*** (0.169)	0.625*** (0.183)	0.254* (0.156)	0.865** (0.265)	0.661*** (0.221)	0.254* (0.145)	0.523*** (0.197)
CD_i	-0.028 (0.066)	-0.123** (0.060)	-0.178 (0.121)	-0.144* (0.081)	-0.144** (0.069)	-0.179** (0.067)	-0.164** (0.063)
ER_{it}	-0.069** (0.031)	0.009 (0.016)	-0.006 (0.040)	-0.007 (0.009)	0.008 (0.017)	-0.006 (0.040)	-0.003 (0.016)
$\ln POP_{it}$	0.264*** (0.068)	0.490*** (0.057)	0.785*** (0.131)	0.639*** (0.065)	0.753*** (0.083)	0.311*** (0.066)	0.596*** (0.052)
$\ln GDP_{it}$	0.529*** (0.108)	0.326*** (0.111)	0.365*** (0.114)	0.695*** (0.168)	0.747*** (0.154)	0.188* (0.103)	0.577*** (0.118)
$\ln CGDP_t$	0.229 (0.184)	0.101 (0.111)	0.042 (0.189)	0.035 (0.094)	0.055 (0.086)	0.042 (0.189)	0.076 (0.131)
$\ln DIS_i$	-0.448** (0.219)	-0.328* (0.158)	-0.593** (0.254)	-0.774*** (0.142)	-0.265* (0.156)	-0.593** (0.254)	0.756*** (0.122)
R^2	0.2586	0.6801	0.1350	0.6655	0.6535	0.3026	0.4106
Pseudo log-likelihood	-1786.29	-1276.36	-612.09	-675.99	-853.89	-946.71	-1161.53
Ramsey (p-value)	0.092	0.314	0.159	0.126	0.073	0.191	0.086
Observations	1551	1551	1551	1551	1551	1551	1551

Notes: 1. Robust standard errors are reported in parentheses; 2. *, **, *** denote significance at 10%, ***, 5% and * 1% level, respectively; 3. Results are conducted with the use of the STATA 14.

Source: calculated by authors.

host country can increase investment from China as the institutional barrier is lowered by the BRI and Chinese investors tend to invest more in these countries. The coefficient of sister-city partnership is statistically significant and positive, which is consistent with previous estimation results. Yet, the effect of interaction between the BRI and sister-city partnership is insignificant. Models 2–4 present the results for the Chinese firms' CMA accomplishments. The coefficients of BRI are positive and statistically significant at 10%, showing a positive effect on CMA accomplishments in full sample shown in model 2. This positive effect is mainly driven by the effect on POEs' CMA accomplishments shown in model 4 as there is no significant relationship between SOEs' CMA accomplishments and sister-city partnership.

Somewhat surprisingly, we do not find a significant relationship between BRI and SOEs' CMA accomplishments. Our understanding is straightforward. The BRI is a less political-oriented home institution than expected and China does not mainly rely on Chinese SOEs to achieve its political goals overseas. Instead, this global-China policy is more market-oriented, from which the POEs benefit in terms of the promotion of focuses more on creating a favorable cooperation environment that also promotes large amount of CMA from Chinese POEs that are market-oriented. For the impact of the interaction between BRI and sister-city partnership, we spot an unexpectedly negative effect on CMA accomplishments. We interpret this as more sister cities are located in the non-Belt Road countries, thereby displaying a complementary rather

Table 6. PPML estimations for the effect of sister-city partnership according to different tiers of Chinese cities.

	Model 1	Model 2	Model 3	Model 4	Model 5
$Super_{it-1}$	0.024** (0.011)				
$Tier1_{it-1}$		0.016** (0.008)			
$Tier2_{it-1}$			0.022** (0.009)		
$Tier3_{it-1}$				0.027*** (0.020)	
$Tier4_{it-1}$					0.059** (0.026)
BRI_{it-1}	0.209*** (0.042)	0.272*** (0.066)	0.442*** (0.097)	0.276*** (0.074)	0.441*** (0.104)
$BRI_{it-1} \times Super_{it-1}$	-0.017 (0.019)				
$BRI_{it-1} \times Tier1_{it-1}$		-0.014** (0.006)			
$BRI_{it-1} \times Tier2_{it-1}$			-0.016** (0.007)		
$BRI_{it-1} \times Tier3_{it-1}$				-0.005 (0.014)	
$BRI_{it-1} \times Tier4_{it-1}$					-0.017*** (0.005)
INF_{it}	-0.010 (0.009)	-0.014 (0.011)	-0.024** (0.011)	-0.016** (0.008)	-0.023** (0.010)
INS_{it}	0.157*** (0.053)	0.164** (0.069)	0.172** (0.64)	0.168** (0.064)	-0.169** (0.072)
CD_i	-0.113 (0.136)	-0.114 (0.072)	-0.094 (0.080)	-0.118 (0.081)	-0.109 (0.078)
ER_{it}	-0.072 (0.075)	-0.075* (0.040)	-0.077** (0.039)	-0.076* (0.039)	-0.075* (0.038)
$\ln POP_{it}$	0.610*** (0.085)	0.611*** (0.087)	0.524*** (0.084)	0.578*** (0.085)	0.571*** (0.081)
$\ln GDP_{it}$	0.941*** (0.124)	0.941*** (0.0.125)	0.885*** (0.123)	0.919*** (0.124)	0.856*** (0.122)
$\ln CGDP_t$	0.261 (0.195)	0.265 (0.197)	0.236 (0.183)	0.231 (0.179)	0.228 (0.182)
$\ln DIS_i$	-0.223 (0.172)	-0.212 (0.183)	-0.216 (0.151)	-0.208 (0.198)	-0.183 (0.183)
R^2	0.3406	0.2355	0.2849	0.2913	0.2720
Pseudo log-likelihood	-4307.67	-4709.32	-4639.93	-4171.57	-4670.67
Ramsey (p-value)	0.149	0.151	0.173	0.088	0.634
Observations	1551	1551	1551	1551	1551

Notes: 1. Dependent variable, volume of outward FDI; 2. Robust standard errors are reported in parentheses; 3. *, **, *** denote significance at 10%, 5% and * 1% level, respectively; 4. All tiers of cities are separately estimated due to high correlation; 5. Results are conducted with the use of the STATA 14.

Source: calculated by authors.

than a supplementary relationship between the BRI and sister-city partnership. Similarly, the results in models 5–7 again show that sister-city partnership has a positive effect on the Chinese firms' CMA announcements. Comparable to its impact on CMA accomplishments, the impact of BRI on CMA announcements is stronger and more statistically significant. Interestingly, we find that the effect of sister-city and BRI turns to be statistically positive for SOEs. One possible explanation is that SOEs tend to show greater willingness to invest abroad under the propaganda of Chinese government but invest less given that they have better financial access and stronger protection from the government.

Thus far, we only consider the total number of sister-city relationships between China and its partner countries. As a robustness check, we capture the heterogeneity effect of the Chinese cities by classifying the cities according to different tiers. High tiers of cities have greater population, more developed institutions, more attractiveness to visitors and higher level of cultural inclusiveness than the lower tiers of cities. As shown in Table 6, we find that all tiers of Chinese cities twinning with their sister cities have a positive effect on the outward FDI. For example, the coefficient of super cities is positive and statistically significant at 5%, indicating that the establishment of sister city partnership between a foreign city and a super city in China leads to increase of the Chinese outward FDI. The effect is the consistent with the results for other tiers of Chinese cities. Comparatively, we find that such an effect is more pronounced in tier 4 and tier 5 cities. A possible explanation for this is that the tier 4 and tier 5 cities are relatively less developed and more sub-culturally remote from the international cities and countries. The effect of sister-city partnership in these culturally remote cities serves more importantly to close such a cultural gap and promote the outward FDI more saliently. A fuller understanding this estimation, however, should also depend on the information and types of their sister cities as well. Unfortunately, the data constraints prevent us from pursuing this avenue further. We also confirm that the Chinese outward FDI has been driven by the BRI as the coefficients of BRI are statistically significant and positive, which is in line with the previous estimations. However, the interaction term between BRI and the different tiers of cities are mostly insignificant except the case for the tier 4 cities. As for the control variables, the coefficients largely maintain the expected sign.

5. Conclusions

Extant research has explicitly recognized the importance of the compatible environment in the context of globalization. Sister-city partnership has long been developed for the establishment of such favorable environment to facilitate international investment. On the basis of a panel data set that covers 66 Belt Road countries and 75 non-Belt Road countries from 2006 to 2017, this paper investigates the impact of sister-city relationship between China and its partner countries as well as its interactive effect with Chinas' recent global home institution, BRI on the Chinese outward FDI. In line with previous literature (Du & Zhang, 2018; Li et al., 2019; O'Toole, 2001; Ramasamy & Cremer, 1998; Yu et al., 2019), we find consistent evidence that both sister-city partnership and BRI both promote the Chinese outward FDI. In turn, our study extends the literature in these realms by showing that the positive effect of BRI and sister-city partnership is rather complementary than supplementary to each other either because their interaction is statistically insignificant or negative in some cases. These findings are robust to the heterogeneity of sister-city partnership pairwise the Chinese cities when we take the tier levels into accounts. Further, we find that the positive effect of BRI is more pronounced in POEs rather than SOEs, which suggests that BRI at this stage may be more market-oriented and less political-oriented.

Our hope is that this study can serve as the first step towards a better understanding for the role of sister-city partnership and home country institution on home

country's outbound investments. As we provide a fuller framework based on a country level dataset, future research could elaborate our study by exploring the mechanisms through which that the sister-city partnership promotes the outward investments based on a case study from a city level or firm level case-study. By doing so, they can control the characteristics of the sister cities in host countries.

Our research also leads to thoughtful policy implications. First, the policy makers should hold more open attitudes towards the establishment of sister-city partnerships and towards the BRI strategy so as to strengthen the bilateral cooperation in the new era of globalization. Second, they may also be aware of the complementary relationship between sister-city partnership and the BRI to implement relevant policies for the issues caused by the cultural distance. Third, both SOEs and POEs should be encouraged to invest overseas not only to the Belt Road countries but also to the non-Belt Road countries.

Note

1. That is, $CD_i = \sum_{k=1}^4 [(H_{ki} - H_{kc})^2 / V_k] / 4$. Where H_{ki} represents the k th cultural dimension value for country i ; H_{kc} represents the k th cultural dimension value for China. V_k represents the variance of the k th cultural dimension values.

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