WHAT DRIVES CHINESE FIRMS' PRESENCE IN LATIN AMERICA?
AN EMPIRICAL ANALYSIS OF CHINESE FOREIGN DIRECT INVESTMENT
IN LATIN AMERICA

A Thesis

submitted to the Faculty of

the Graduate School of Arts and Sciences

of Georgetown University

in partial fulfillment of the requirements for the

degree of Master of Public Policy

By

Evelyn Simoni, B.A.

Washington, D.C.

March 30, 2020

WHAT DRIVES CHINESE FIRMS PRESENCE IN LATIN AMERICA?
AN EMPIRICAL ANALYSIS OF CHINESE FOREIGN DIRECT INVESTMENT
IN LATIN AMERICA

By Evelyn Simoni

Thesis Advisor: Eliane Catilina, Ph.D.

ABSTRACT

Chinese Foreign Direct Investment in Latin America has grown significantly in recent years, posing some concerns on the political implications of an increased Chinese presence in the region. Several empirical studies have added to the understanding of what determines the locational determinant of Chinese investment, including natural resource endowments and large markets. But so far, these studies have ignored the geopolitical dimension that influences investment decision-making. This thesis examines the implications of the rise of China as a global economic power and the emergence of a bipolar Sino-American world on Chinese investment trends. Utilizing a time-series data of 14 countries over the period 2005-2018, this thesis investigates the effects of several political and economic variables on attracting Chinese capital. This research unveils that investment is attracted to Latin American countries with weaker perceived liberal democracies, providing evidence to the hypothesis of FDI as an essential part of China's economic statecraft abroad.

The research of this thesis is dedicated to my family

for their constant support and to my

husband for being my number one inspiration.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY OF TERMS

BRI   Belt and Road Initiative

CCP   Chinese Communist Party

CGIT   China Global Investment Tracker

GDP   Gross Domestic Product

IFDI   Inward Foreign Direct Investment

LAC   Latin America and The Caribbean

LATAM Latin America

MNE   Multinational Enterprise

OFDI   Outward Foreign Direct Investment

PRC   People's Republic of China

WTO   World Trade Organization

1. INTRODUCTION

China's presence in Latin America and the Caribbean (LAC) has grown significantly in the past two decades. From almost complete indifference for over 40 years since the establishment of the People's Republic of China (PRC) to opening diplomatic relations in the late 1990s, China has now become the second-biggest trade partner of the region after the United States, and its leading investor. One of the main mechanisms through which the Asian country sets foot in the continent is direct investment. After Asia, LAC is the second-largest destination for Chinese investments.

The heavy weight of the government in the Chinese economy and the particular institutions that govern its organizations under an authoritarian regime, suggests that investments abroad, from state-owned and private firms alike, will be driven by factors that exceed the logic of profit-maximization and that follow national interests. My research question addresses this issue; *(1) What political and economic factors are driving Chinese investment in Latin America?*

To answer this question, I first review the existing literature on the determinants of Chinese Outward Foreign Direct Investment (OFDI) and, to fill the gap, I introduce a new dimension, geopolitics, shaping the incentives of Sino investments in Latin America over the period 2005-2018, years for which data is available. Here, I claim that neither large markets for their products nor the presence of natural resources for their supply chain can explain by themselves what drives Chinese investment in LAC. I also acknowledge the implementation of the 12th 5-year plan in 2010 as a breaking point for Chinese firms' presence abroad, making the period 2005-2009 considerably different from 2010-2018 and arguing for the importance of updated analyses. Understanding what variables influence investment-decisions could have significant policy implications for host countries on how to deal with, and leverage from, an increasing Chinese presence in a context of growing geopolitical tension.

But also, the rise of China as a global investor is creating strains on the established international financial order set up after Bretton Woods and led by the United States. Foreign Direct Investment, in particular, plays a significant role in shaping the relationship between the developed and the developing world, as investment from developed countries, all else equal, flows towards emerging markets with stronger institutions and increased levels of democracy, considered less risky (Jensen, 2008). Combined with the standards of multilateral financial organizations, developing countries have historically faced important incentives to improve their institutions, lower corruption, and strengthen the rule of law to attract more capital. In this sense, the thesis poses the following question; *(2) To what degree does Chinese investment in LAC finance less democratic countries unable to access traditional financial international markets?* I will examine the effect that democracy and civil liberties have on the volume of investment coming from China. As China rises as the main resort for financial assistance for undemocratic countries, this could have significant repercussions on the global order and, in particular, on reshaping the role that the United States has played since the post-cold war.

The thesis put these assumptions to the test and fill the gap in the literature. I use annual investment figures at the host country level from 2005 to 2018 to examine the determinants of Chinese investment decision-making in Latin America's countries.

2. BACKGROUND

2.1. China's Outward and Inward Investment

The economic reforms of the "Open Door Initiative" that began in 1978 under Deng Xiaoping resulted in a new economic era that turned China into a main receptor of FDI. Much has been written about its central role in developing the Chinese economy, especially during the 1990s when the stock of inward investment rose from $19 billion to $300 billion in less than one decade. There is little doubt among scholars that FDI contributed to boost the export-related economy and research has shown that "per capita income growth in those regions of China where FDI is concentrated has been significantly higher than in other regions" (Graham and Wada, 2001).

However, the internationalization of Chinese companies took off only after the admission to the WTO in 2001 and the authorization in 2003 to private capitals to invest abroad, which was previously forbidden. Davies (2013) identified three stages in the development of China's OFDI; the initial phase from 1982 to 1991; the fluctuating stage from 1992 to 2000; and finally, the high growth period that began in 2001.
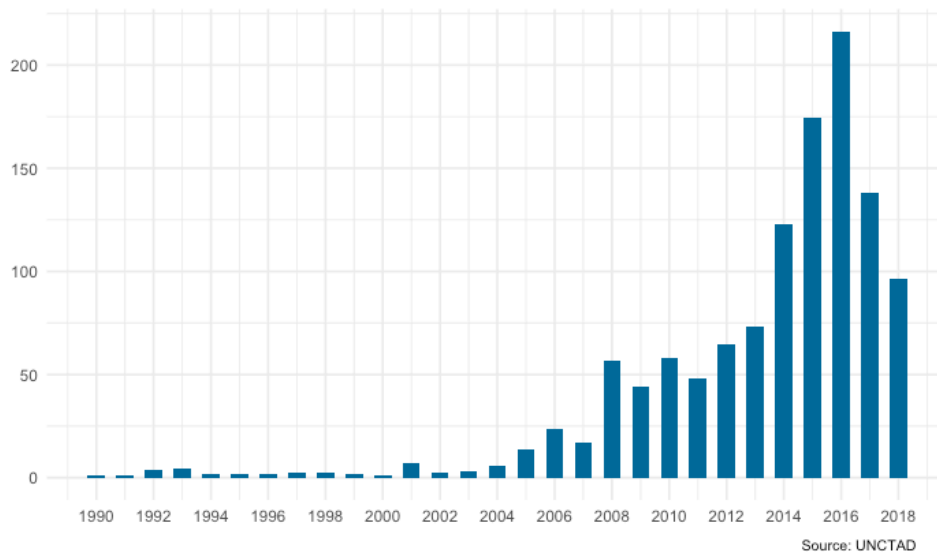

Source: UNCTAD

Figure 1. China Foreign Direct Investment Flows 1990-2018 (USD billion)

The presence of Chinese firms abroad grew significantly as a result of the "Going out" initiative included in the 10th, 11th and 12th Five-Year Plans, were OFDI was actively promoted. In this thesis I focus on the most recent phase, when the government encouraged state-owned companies to internationalize and lifted the ban on private firms to invest abroad.

Despite these initial efforts, outward investment remained quite small during the early 2000s, especially compared to inward flows. By 2005, the ratio IFDI:OFDI was around 1:6. The combination of large net FDI flows and massive trade surpluses converted China into the largest holder of foreign exchange reserves. Likewise, it made growth overdependent on global markets and on continuous fixed investment (Morrison, 2009). But when the 2008 global crisis threaten to decelerate the economic growth, as GDP growth fell from 13% in 2007 to 7.1% the following year, the government sought to reform the underlying economic structure to boost the domestic economy.

Table 1. Chinese Total Financial Flows, in millions of USD, 2005-2017.

	2005	2010	2015	2017
FDI Inflows	72,406	11,4734	135,610	136,320
FDI outflows	12,261	68,811	145,667	124,630
ratio OFDI/IFDI	*17%*	*60%*	*107%*	*91%*

Source: UNCTAD

The overall objective of the 12th Five-Year Plan introduced in 2010, was to make China's development "better balanced, coordinated and sustainable." This implied a significant reduction of surpluses in both the trade and the capital account. In October 2010, when presenting the 12th Plan, Prime Minister Wen Jiabao said:

"We must accelerate the implementation of the 'go global' strategy and guide enterprises with different kinds of ownership to invest overseas and co-operate in an orderly manner."

Along those lines, the Minister of Commerce, Chen Deming, stated in March 2011 that the plan was to steadily reach a balance between OFDI and IFDI within 5 to 10 years. Since then, investment abroad has surged apace, and in 2015 it actually surpassed inflows, as shown in table 1. Now, China, once known as a major recipient of FDI, has also become the second largest global investor (David Dollar, 2016).

More recently, evidence for the growing role that the government of China provides to outwards investments came with the launch of the Belt and Road Initiative (BRI) in 2013, in which outward investment is promoted alongside the ancient Silk Road through a series of policies and incentives. According to the World Bank, projects that are already executed, in implementation, or planned are estimated to amount to US$575 billion in the 70 BRI "corridor economies."

Gains from the BRI to these economies include a sharp increase in trade from 2.8 to 9.7 percent that could lead to growth and real income gains by about 3.4 percent. But also, risks are considerable high as one-quarter of Belt and Road corridor economies already have high debt levels. The financial risks ("the debt trap") combined with higher political pressure from China, for example regarding corridor countries' position towards Taiwan and to its expansive military presence in the South China Sea, can lead to dangerous vulnerabilities to the host countries' sovereignty. One notable example is Sri Lanka, a country strategically located in the middle of the Indian Ocean, where the local government had to sign over the Hambantota Port on a 99-year lease to China after it couldn't meet its debt commitments.

2.2. FDI and the Reconfiguration of the Global Order

The rise of China as an economic power, along with other large emerging countries like India, Russia, and Iran, implied a challenge to the established unipolar post-Cold War world, led by the United States. The "multipolar power constellation" (Gu and Humphrey, 2008), where more countries can exert geopolitical influence, generated complex, volatile and unstable relationships between nations, driving international politics away from a liberal order. It also created an array of uncertainties about the global governance structure and its institutions that were predominantly shaped by Western countries during the 20th century after the Second World War.

However, after the 2008 Great Recession, a reconfiguration towards a bipolar world appears to re-emerge. The relative strength in terms of military and technological capabilities of the United States and China is outpacing the rest of the world and widening the gap between these two giants and the other middle powers. As a consequence, the Sino-American relationship is shifting from a stable and even cooperative one, towards an increasingly antagonistic and openly competitive interaction. In a 2020 Brookings Report, Ryan Hass argues that the relationship between the two countries is deteriorating faster than at any point since 1979 when the two countries first established diplomatic relations.

In this context, the rise of China as the main creditor of the developing world implies significant geopolitical implications, as China leverages its position to pursue its national interests and to offset the United States' presence worldwide: "it is increasingly clear that decisions made in Beijing and Washington will play a major role on questions regarding geopolitical stability, global and national economic growth, emerging technology, and international values and institutions" (Brookings, 2020).

Here, we identified three possible geopolitical implications of the rising presence of Chinese firms in LAC. First, with China as the main industrial hub of the world, its demand for raw

materials, energy sources, and cheaper labor has increased significantly and will continue to do so. As a result, it increases competition between the industrialized powers to secure these strategic resources, particularly abundant in Latin America and Africa (see section 2.3).

Second, China has reached the capacity and ambition to reshape the liberal rules of the international order. Through the use of soft power, investments in developing countries set the base for China to push forward a new set of regulations that aligns better to their domestic institutions, emerging as a global rule-maker. It does this by engaging more actively in the established international institutions; Chinese nationals, for instance, already head four out of 15 agencies under the United Nations. But also, China has created new institutions such as the New Development Bank (NDB), the proposed Regional Comprehensive Economic Partnership trade agreement (RCEP), and the Asian Infrastructure Investment Bank (AIIB). All these actions are prominent components of their "institutional statecraft" (Ikenberry and Lim, 2017), which aims at accelerating the shift of power balance from the West to Asia brought about by their rising economic power.

Finally, it poses a security threat to the United States if investments and contracts precede an improvement of diplomatic relations with LATAM governments, especially those already ideologically antagonistic to the US. An increased Sino military presence would be a direct challenge to the foreign policy that the US has historically implemented towards Latin America, the Monroe Doctrine, or in other words, America for Americans. A clear example is the Chinese military-run space station in Argentina's Patagonia, which operates with little to no oversight from the local government. The project was initiated under the government of Cristina Fernández de Kirchner, well-known for her anti-American rhetoric who built strong relations with the Asian country but continued running under the presidents who succeeded her as well.

2.3. China-Latin America Trade and Flows

That LAC is the second-largest destination after Asia for Chinese investment is of particular interest. Notably, the region had historically little appeal to China given its geographical distance, and their cultural and political differences (Zhang, 2018). But Chinese FDI in Latin America is no longer a new phenomenon. Until 2010 the presence of Chinese companies in the region was very modest, mostly limited to joint ventures between state-owned oil companies in Ecuador or Venezuela, or mining activities in Peru and Chile (Zhang, 2018). But that year several large acquisitions and investment projects were announced and, since then, Chinese Multinational Enterprises (MNEs) have maintained a relevant presence in the region´s largest economies.

The first cluster of Chinese OFDI was attracted to Latin America given its abundance of natural resources and industrial raw materials such as ore, crude oil, copper, timber, and pulp. But recent years have shown a more diverse sectoral pattern in China's investment in the region, following the expansion of the Belt and Road Initiative into Latin America. Panama was the first country in the region to sign a cooperation agreement with China in 2017 and was followed by at least other 15 countries to date. The second cluster was characterized by investments in large infrastructure and public services, but more recently the third cluster represents a wider array of services such as shipping, transportation, and banking (Ludeña, 2017). Simultaneously, state-owned capital, once representing 80% of total investment in Latin America, now accounts for roughly half of it (Zhang, 2018).
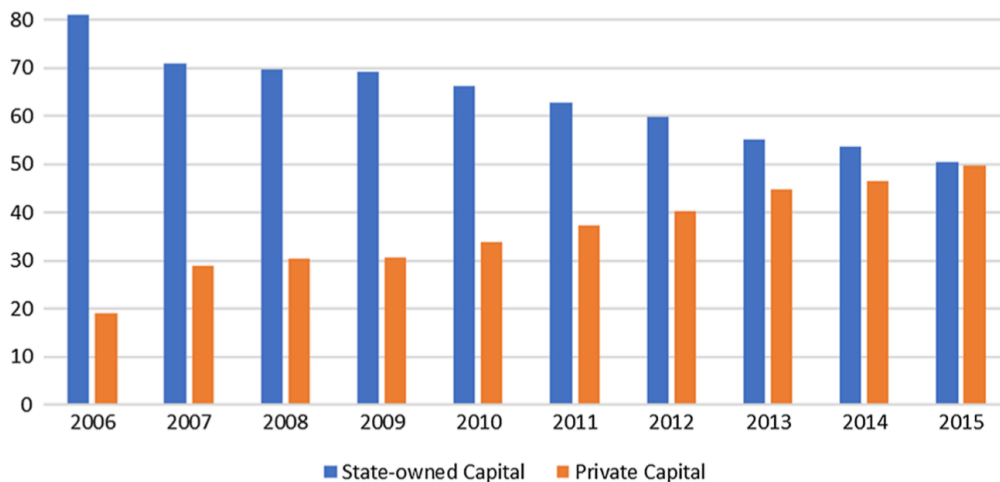
Source: MOFCOM of China, Zhang 2018.

Figure 2. Composition of Chinese Foreign Direct Investment 2006-2015.
State-owned vs Private Capital (in percent)

The increased capital flows from China to LAC are part of a broader presence in the region. To start with, Chinese investments in Latin America were preceded by an increased Sino-LAC trade. The appetite of the Asian country for agricultural and mineral commodities greatly benefited Latin American countries as demand for their products grew increasing the value of their exports. Between 2004 and 2013 commodity prices grew above 12% annually (Xia, 2017). However, as bilateral trade grew exponentially, it also became highly unbalanced evidenced by LATAM's large trade deficits, as seen in figure 3.

Bilateral trade
(US$ billion)
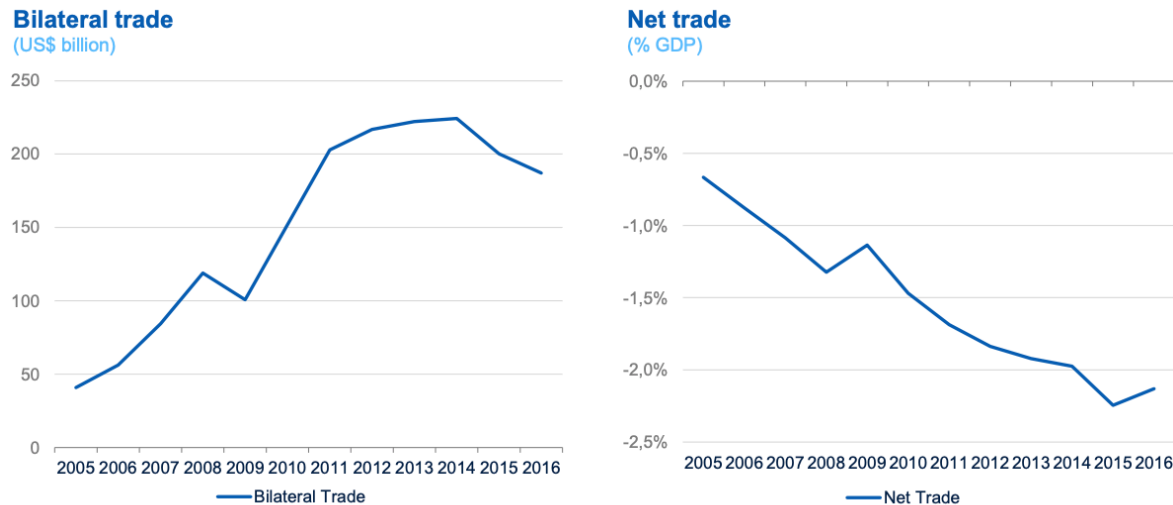
Net trade
(% GDP)

Source: BBVA Research, IMF DOT and World Bank (Xia, 2017)

Figure 3. China-Latin America Bilateral Trade and Net Trade, 2005-2016

This also led the way to deeper diplomatic relations between the regions through numerous visits of official Chinese delegations and through increased engagement with the region's multilateral organization (Dussel Peters, 2015). In 2008, for the first time, China issued a White Paper about foreign policy towards Latin America, where it established long-term goals based on the existence of "abundant raw materials," growing economic linkages, and the Five Principles of Peaceful Coexistence.

3. LITERATURE REVIEW

3.1. Internationalization of Firms: Theoretical Framework

The most influential approach to evaluate the activity of MNEs is the "eclectic paradigm" or "OLI paradigm" (Ownership, Locational and Internalization) proposed by Dunning (1973). To examine the locational determinants of international production (production financed by FDI and undertaken by MNEs), the paradigm suggests that returns to FDI can be explained by (1) its ownership advantages indicating who is going to produce abroad, (2) its locational factors influencing where to produce, and (3) its internationalization variable that explain why FDI is a better option than licensing production to foreign firms. The locational aspect of this paradigm suggests four primary motivations (Dunning, 1993):

- *Efficiency-seeking*: investment intended to reduce costs.

- *Market-seeking*: investment aimed at entering new markets abroad.

- *Resource-seeking*: investment that looks for resources unavailable at home but available at foreign countries.

- *Strategic Asset-seeking* (sometimes consider a subset of resource-seeking): investment aimed at augmenting the set of the firm's proprietary resources.

Another framework is from Fedderke and Romm (2006), who developed a policy-related theory that categorizes FDI determinants as either policy factors (including trade barriers, openness, product market regulations, corporate tax and infrastructure) or non-policy factors (including distance or geographical location of host country, size of market, factor endowments, and political and economic stability). According to Amighini et el. (2013), this approach is a more systematic method to analyze FDI determinants. But as suggested by Cuervo-Cazurra and Genc (2008), the above theories have been built to explain North-South investment and, therefore, they have evident holes to understanding emerging economies MNEs activity. The authors show that these MNEs enjoy a competitive advantage compared to developed country

MNEs in more difficult institutional environments, such as those characterizing other developing countries.

However, in the case of China, an extended theoretical framework has been applied due to its singular characteristics in comparison to those of other developing countries. In this sense, Mathews (2006) proposed an extension of the OLI paradigm based on three special features of the Asian "Dragons Multinationals:" very rapid internationalization, internationalization achieved through organizational innovations (rather than technological innovations), and the development of strategic innovations that enabled them "to exploit their latecomer and peripheral status to advantage". His framework is based on the theory that distinguish "push and pull factors" (Carvo et al., 1996; Femandez-Arias, 1996); while push factors relate to cyclical and structural conditions, pull factors are more related to economic, social, and political conditions. Mathews then argues that traditional models use push-oriented concept from Western MNEs where the firm's internationalization "is propelled by some strategic objective", rather than by a pull and push process that seems to be the reality for most Asian Pacific companies.

Buckley et al. (2007) also built a special theory to examine Chinese OFDI based on three assumptions that distinguish Chinese firms' behavior. The first is the existence of capital market imperfections: below-market rates, subsidized bank loans and FDI, and cheap capital from family-owned firms. The second is based on the specific ownership advantages of Chinese firms that relates to its vast global diaspora, which some call a "relational asset". Finally, there are significant institutional factors affecting OFDI in China, specifically the state control of the economy. For instance, the government approves each and every outward FDI project following its own objectives, this combined with currency control mechanisms has been shown to have significant effects on the allocation of OFDI (Cheung and Qian, 2009).

3.2. Empirical Studies on the Determinants of Chinese Foreign Direct Investment

Considering the increasing volume of Chinese OFDI in the developing world and its implications for global trade and capital flows, the body of empirical studies that examine the patterns of Chinese investment abroad has been relatively small. So far, empirical studies on the determinants of Chinese OFDI provided evidence supporting a number of factors that mostly attract investment from China.

Buckley et al. (2007) carried out the first comprehensive empirical study that uses panel data of approved OFDI to forty-nine countries from 1984 to 2001. They found an association between Chinese OFDI "with host market size and geographic proximity (1984–1991) and host natural resources endowments (1992–2001)." However, further empirical evidence suggests different motivations for OECD countries vis-à-vis non-OECD countries. Whereas market-seeking motivations lie behind Chinese FDI in OECD countries (Cheung and Qian, 2009; Hurst, 2011), resource-seeking motivations prevail in non-OECD countries (Pradhan, 2009; Sanfilippo, 2010).

Amighini et al. (2013) go one step further and conclude that all Chinese FDI is invariable market-seeking (the most common motivation for FDI worldwide), but different motivations depend on the specific sector of the low and high-income countries: "the resource seeking motivation is more relevant for manufacturing FDI to high-income countries with relatively high fuel abundance, and to low-income countries with primary resource abundance (other than fuels)." Amighini et al. (2013) and Chang (2014) also found that only the OECD countries attract Chinese manufacturing and service FDI as part of their strategic asset seeking strategy. This was previously examined by qualitative studies on Chinese FDI in Europe (Liu and Tian, 2008; Zhang and Filippo, 2009; Pietrobelli et al., 2011). According to these studies, Chinese companies invest abroad as a means to rapidly overcome their disadvantages in terms of technology,

knowledge and skills, to acquire brands, new and advanced management skills and to tap into pools of local knowledge.

Other findings focused on the peculiar features of Chinese investment determinants. For instance, contrary to the results from the literature on FDI from developed economies, Kolstad and Wiig (2012) concluded that the worse the institutional environment of a host country is, the more Chinese OFDI is attracted by the country's natural resources. Amighini et al. (2011) used industry-level data from China from 2003 to 2011 and found the relationship between weak governance and Chinese FDI holds especially for low-income countries.

Finally, the exploitation of relational assets has also been identified among the main determinants (Buckley et al., 2007; Song, 2011), while no evidence so far suggest efficiency seeking as an important factor for Chinese companies to invest abroad. This, however, may be changing as salaries in China increase, pushing manufacturing firms to produce abroad.

3.3. Empirical Studies on Chinese Foreign Direct Investment in Latin America

If the empirical literature of Chinese OFDI has been concise, the quantitative study of the determinants in Latin America has been even more succinct, focusing more on the economic determinants of Chinese overseas investment, while disregarding the potential influence of political considerations.

As per the economic motivations, resource-seeking of natural resources and fossil-fuels appears to be a strong indication of FDI in Latin America. In this sense, Palacios (2008 and García 2013) and van Dijk (2009) observe that Chinese firms were engaged in energy production and exports in Angola, Ecuador, Peru, Sudan, Nigeria, Venezuela, Brazil, and Bolivia. Similarly, Gonzalez-Vicente (2012) and Bastholm et al. (2009) note that Chinese FDI has specifically sought mineral resources in selected Latin American and African economies, and most visibly in Peru and Zambia. Similarly, Tuman (2016) found that "the larger the proven

reserve in the recipient, the higher the Chinese FDI flows." Moreover, consistent with previous analyzes on the matter (Broadman 2007; Chen and Lin 2008; Estrella Tolentino 2011; Voss 2011; Jenkins and de Freitas Barbosa 2012), Tuman (2016) also found that trade is a precursor to Chinese FDI in Africa, Latin America, and other developing areas.

As per the political factor, as mentioned above, Taiwan was an important factor affecting Chinese levels of investment in developing countries (Tuman, 2016). Likewise, when modeling for Chinese investment in Latin America, Zhang (2018) found that "Chinese investors tend to avoid investing into Taiwan's diplomatic allies." These results are consistent with studies on Chinese sovereign debt purchases in developing countries (Erickson et al. 2007), suggesting once again the extent of the state control over investment flows abroad and how the government uses FDI to push their geopolitical agenda in the region.

4. CONCEPTUAL FRAMEWORK AND HYPOTHESES

4.1. Rent-seeking and Resource-seeking Motivations

In line with the OLI paradigm described above, we expect Chinese OFDI in Latin America to be attracted to larger markets, proxied by GDP, and to countries with larger natural resource endowments, proxied by natural resource rents as a percentage of GDP.

> **Hypothesis 1a**: *Chinese OFDI is associated positively with host market size.*

> **Hypothesis 1b**: *Chinese OFDI is associated positively with host endowment of natural resources.*

Empirical literature on this topic have shown statistically significant levels that confirm both hypotheses (Buckley, 2007; Zhang, 2011). Regarding efficiency-seeking and strategic-asset-seeking, we do not include them in the model as determinants of Chinese investment in Latin America. Supported by what predominant literature argues, we assume that Chinese firms do not invest abroad to reduce costs given the low price of domestic labor and other inputs, and that strategic-asset-seeking appears to be a determinant only for investments in OECD countries (Amighini et al, 2013).

4.2. Political and Institutional Factors

As results from previous literature reveal (Buckley, 2007; Sanfilippo, 2010; Zhang, 2011), investments from Chinese companies behave differently to what theories of internationalization predict for MNEs from developed countries. Market-seeking and resource-seeking strategies cannot predict on their own the locational determinant of Chinese FDI in Latam, which does not follow a purely economic behavior of profit-maximization logic, that is, that investment decisions result from the combination of the volume of demand/resources with the associated (political or economic) risk of investment.

First, Chinese MNEs face at home a different institutional environment than that of other major source countries of FDI (Kolstad and Wiig, 2012). These characteristics that define the rules of the game of China also shape their firms' internationalization strategy (Scott, 2002). Beijing requires its firms to adhere to standards no higher than that of host countries, contrasting significantly from the institutions put in place by developed countries to improve incentives in developing countries to strengthen their governance. For instance, a study of the impact of the Extractive Industries Transparency Initiative (EITI) on inward FDI found that "joining the EITI increases the ratio of FDI inflows to GDP on average by around two percentage points" (Schmaljohann, 2013). Furthermore, as many scholars argue, MNEs from developing countries have ownership advantages in other developing countries with weak institutions (Buckley, 2007; Kolstad and Wiig, 2012). This is because they have grown accustomed to deal with corruption, endless bureaucratic processes, and difficult business environment in their own country, making it easier to internalize the costs of poor institutions in host countries and to compete with domestic firms than for MNEs form developed countries. We assume, therefore, that Chinese OFDI will be attracted to institutional environments similar to that of China.

Hypothesis 2a: There is a positive association between Chinese OFDI and host countries corruption levels.

Second, the thesis includes the geopolitical factor, a variable omitted so far. This is particularly important because no organization in China is beyond the orbit of the Chinese Communist Party (CCP). According to some estimates, China's public sector directly controls and owns approximately 50 percent of GDP (Szamosszegi, 2011). This heavy weight of state-owned firms in the economy is combined with the *latent network* that private firms face in the sense that "institutions within the latent network, though not necessarily controlled by the CCP directly in their day-to-day affairs, are dependent on CCP patronage and thus, subject to CCP direction" (Thorley, 2019). Regarding OFDI, the CCP uses formal and informal rules to promote

some specific form of investments that is aligned with their geo-strategic mission in the regions where they operate. The direct channel is the approval of every investment transaction. In 2017, the government issued the "*Opinions on Further Guiding and Regulating Outbound Investment.*" The Guiding Opinions promote outbound investments that align with the BRI, endorse investments in certain strategically important areas, and discourage or prohibit those transactions that the government believes are against its national interests. The government also shapes OFDI through indirect channels that take the form of both carrot and sticks. These include incentives through privileged access to raw materials and other inputs, low-cost capital and subsidies, and some forms of coercion typical of authoritarian regimes. Therefore, the extent of the state control, the "iron hand of the communist state", disproportionally influences the size, scope, and direction of OFDI in order to reflect national interests and foreign policy objectives, beyond those of economic nature.

To refine the existing literature, this research incorporates the above political dimension into the analysis of Chinese firms' presence in Latin America. We assume that Chinese FDI, contrary to what literature predicts, is attracted to countries with less liberal democratic regimes. By liberal democracy, we follow the Varieties of Democracies Project definition: "A liberal democracy is achieved by constitutionally protected civil liberties, strong rule of law, an independent judiciary, and effective checks and balances that, together, limit the exercise of executive power."

> **Hypothesis 2b***: Chinese OFDI is associated negatively with host countries level of liberal democracy.*

Two alternative causal mechanisms could explain this negative relation. First, in light of the rise of China as a global economic power and the struggle with the United States, China uses its economic tools, including FDI, to leverage their international political position and pursue

national interests in the countries where they operate, in what has been defined as "economic statecraft".

Another mechanism is that through FDI and contracts, as well as other types of loans, China presents itself as the sole financier for countries with low levels of democracy that (1) do not have access to international credit markets, (2) have been denied funds from US-led institutions and development banks, like the IMF and the World Bank, and (3) where FDI from developed countries does not naturally flow. For the latter, there are numerous studies that show that countries with weaker democratic rights attract less capital from developed countries (Rodrik, 1996). In this way, weaker democracies with financial needs will actively seek to promote Chinese direct investments.

4.3.Control Variables

In line with the extant literature, we include two variables that control for economic stability, inflation and openness to FDI. We assume that China's OFDI will be less attracted to countries with higher inflation rates that implies higher macroeconomic instability and more uncertainty to its returns-to-investment ratio. We also assume that countries that are already more open to overall international investment will attract more Chinese investment, all else equal.

> ***Hypothesis 3a****: There is a negative association between Chinese OFDI and host countries inflation levels.*
>
> ***Hypothesis 3b****: There is a positive association between Chinese OFDI and host country openness to FDI.*

5. DATA SOURCES

The dependent variable is the natural log of the annual stock of Chinese foreign direct investment in Latin America by country, in million usd. The data source is *China Global Investment Tracker* (CGIT) compiled between The Heritage Foundation and the American Enterprise Institute. The dataset only includes transactions above 100 million usd.

Previous studies on the matter use official Chinese statistics from the MOFCOM (Ministry of Commerce, PRC). But recent concerns have suggested systemic biases in the official figures. Besides, the CGIT includes a more comprehensive approach, including variables such as sector and subsector, transaction party, and a dummy variable to denote projects within the BRI initiative. Table 2 shows the hypotheses and their proxies used, the expected sign, if the variable is main or control, and the data source.

Table 2. Data Sources of the Determinants of Chinese Foreign Direct Investment

Hypothesis	Proxy	Expected Sign	Main or Control	Source
Dependent variable	FDI_ln: natural log of the annual stock of Chinese FDI			China Global Investment Tracker
Market-seeking (1a)	GDP_ln: natural log of GDP (in millions current US$)	+	Main	World Bank Development Indicators
Resource-seeking (1b)	NatRes: Natural Rents (oil, gas, coal, forest, minerals) as a percentage of GDP	+	Main	World Bank Development Indicators
Institutional Factor: Corruption (2a)	Corr: How pervasive is political corruption? (from less to more corruption)	+	Main	Varieties of Democracy (V-Dem) Project
Political Factor: Democracy (2b)	Dem: To what extent is the ideal of liberal democracy achieved? (from less to more democratic)	–	Main	Varieties of Democracy (V-Dem) Project
Inflation (3a)	INF_ln: natural log of ratio of inflation	–	Control	World Bank Development Indicators
Openness to FDI (3b)	OPEN: ratio of inward FDI to GDP	+	Control	UNCTAD

Missing Data: Between 2005 and 2018, 17 countries in LAC received investments from Chinese firms above the threshold of 100 million usd. Given the availability of information on the independent variables, the analysis left out three of them: Antigua and Barbuda, Bahamas, and Cuba. Antigua and Barbuda and Bahamas received 3 investments for a total of 1,090 million usd in the tourism sector. In Cuba, the dataset registers one investment of 500 million usd in 2005 in the metals sector by the state-owned company, Minmetals.

6. METHODS

6.1. Pooled Ordinary Least Squares

The thesis compares and contrasts the results of three econometric methods using country-specific panel data. The most straightforward technique is to run a POLS (1) regression, with the following log-linear specification for N observations and T time periods:

$$\mathbf{FDI_{ln_{i,t}}} = \propto \ + \ \beta_2 GDP_{ln_{i,t-1}} + \ \beta_3 NatRes_{i,t-1}$$

$$+ \ \beta_4 Dem_{i,t-1} \ + \ \beta_5 Corr_{i,t-1}$$

$$+ \ \beta_6 INF_{ln_{i,t-1}} \ + \ \beta_7 \ OPEN_{i,t-1} + \ \mu_i$$

for t = 2005, ..., 2018 (T: 14 periods) and i = Argentina, ..., Venezuela (N: 14 countries).

Natural logarithms are used to transform the monetary variables, FDI_ln, GDP_ln and INF_ln. We compute the lag for all the explanatory variables. This makes sense as investor's decision-making is made in advance to actual implementation (Zhang, 2018). The POLS regression clusters standard errors to account for the grouping of observations into the 14 countries.

6.1. Fixed Effects

We also compute the FE (2) model to account for the correlation between the independent variables and the time-invariant country characteristics that affect the outcome variable. Fixed Effects models are more generally used to find the determinants of FDI. Consider the linear unobserved effects model for N observations and T time periods:

$$\mathbf{FDI_{ln_{i,t}}} = \propto \; + \; \beta_2 GDP_{ln_{i,t-1}} + \; \beta_3 NatRes_{i,t-1}$$

$$+ \; \beta_4 Dem_{i,t-1} \; + \; \beta_5 Corr_{i,t-1}$$

$$+ \; \beta_6 INF_{ln_{i,t-1}} \; + \; \beta_7 \, OPEN_{i,t-1} + \; \alpha_i \; + \; \mu_i$$

for t = 2005, …, 2018 (T: 14 periods) and i = Argentina, …, Venezuela (N: 14 countries).

And α_i = unobserved time-invariant country effects. Time-invariant country effects are automatically controlled by the FE model by time demeaning the variables. This is likely to lead to more accurate standard errors than in the POLS regression.

6.1. Arellano-Bond GMM

The Arellano-Bond Generalized Methods of Moments (GMM) is a better estimator because it uses a dynamic panel data that accounts for possible reverse causality, and to address possible time-variant endogeneity by incorporating lagged values of independent and dependent variables as instruments. The Arellano-Bond GMM introduces a lagged version of the dependent variable, accounting for the fact we are using stock measures of FDI rather than annual flows.

$$\mathbf{FDI_{ln_{i,t}}} = \propto \; + \; \beta_1 FDI_{ln_{i,t-1}}$$

$$+ \; \beta_2 GDP_{ln_{i,t-1}} + \; \beta_3 NatRes_{i,t-1}$$

$$+ \; \beta_4 Dem_{i,t-1} \; + \; \beta_5 Corr_{i,t-1}$$

$$+ \; \beta_6 INF_{ln_{i,t-1}} \; + \; \beta_7 \, OPEN_{i,t-1} + \; \mu_i$$

Even if the coefficient β_1 is not of direct interest, "allowing for dynamics in the underlying process may be crucial for recovering consistent estimates of other parameters," (Bond, 2002). One problem is that Arellano-Bond estimation is intended for large-N small-T panels because

the use of lags could lead to over-identification of instruments, and our panel has a relatively small N. The central assumption of Arellano-Bond estimation that the instruments as a group are exogenous can be tested with the Hansen test. We perform the Hansen J-test of overidentifying restrictions for the selected instruments.

7. DESCRIPTIVE STATISTICS

Figure 4 clearly reveals the three stages of Chinese FDI in Latam mentioned in section 2.3. From 2005 until 2009, the region received a total of almost 14 billion usd in large investments. Except for Brazil, the largest economy in the region, Peru's, Ecuador's, and Venezuela's investment flows were high relative to their GDP. The second stage, from 2010 until 2015, was characterized by a high growth of investments into the region, with a larger proportion of investment coming from private capitals. Chinese presence increased significantly in Brazil, and to lesser extent, in Argentina, Venezuela, and Ecuador. Finally, during the last period 2016-2018, the growth of FDI was highly due to large investments flowing to Brazil, of which more than 75 percent went towards energy projects, particularly in the hydroelectricity sector.
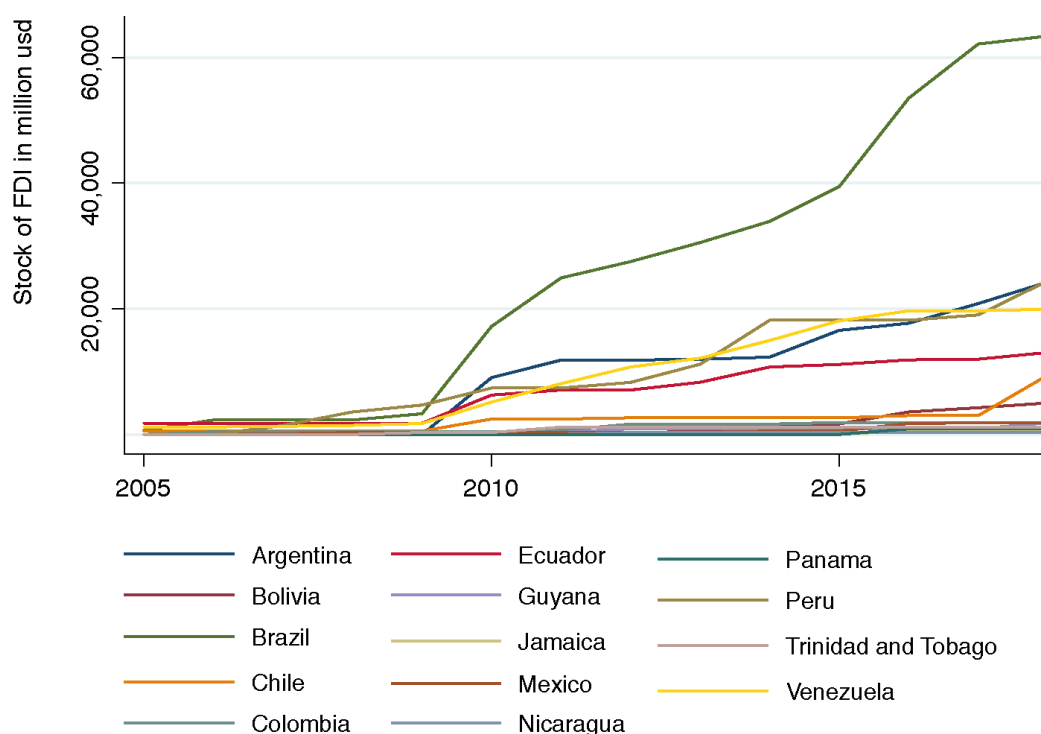

Figure 4. Annual Stock of Chinese Foreign Direct Investment in Latam by Country, for 2005-2018.

The distribution of Chinese investment changed significantly in the two periods under consideration. Peru, the sixth largest economy in LAC, received a third of all Chinese investments into the region from 2005 to 2009. With important historical links (the two countries first established formal relations during the Qing dynasty in 1875) and relative geographic proximity, it is not surprising that they got significant amounts of capitals. All of the projects in the period were in the mining sector, specifically in the copper and steel industries.

Table 3. Chinese Foreign Direct Investment by Country for Periods 2005-2009 and 2010-2018

2005-2009			2010-2018		
Country	Million usd	Share of Total	Country	Million usd	Share of Total
Peru	$4,680	34%	Brazil	$60,080	39%
Brazil	$3,300	24%	Argentina	$24,260	16%
Ecuador	$1,790	13%	Peru	$19,760	13%
Venezuela	$1,750	13%	Venezuela	$18,170	12%
Chile	$550	4%	Ecuador	$11,260	7%
Cuba	$500	4%	Chile	$8,890	6%
Colombia	$430	3%	Bolivia	$5,010	3%
Trinidad and Tobago	$320	2%	Guyana	$1,680	1%
Mexico	$310	2%	Mexico	$1,550	1%
Guyana	$170	1%	Colombia	$1,480	1%
Bahamas	$100	1%	Panama	$900	1%
TOTAL LATAM $13,900			Trinidad and Tobago	$850	1%
			TOTAL LATAM $155,620		

As per the distribution of investment per sectors, figure 5 shows that more than half of all large Chinese investments in LAC from 2005 until 2018 were in the energy and metals sector, showing strong evidence for the resource-seeking hypothesis. Investments in the agriculture sector were attracted mainly to Argentina and Brazil, and in lesser extent to Venezuela. Most of the transport sector investments were injected into the manufacturing and commercializing of vehicles, but also some important projects included large rail contracts in Argentina and infrastructure projects within the subsector of shipping mostly in Brazil and Panama. The category "other sectors" includes chemicals, finance, health, logistics. real estate, technology, tourism, and utilities.
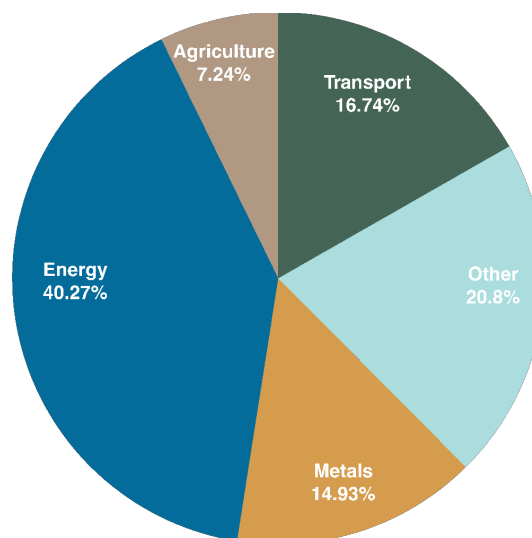

Figure 5. Chinese Foreign Direct Investment in Latin America 2005-2018 by Sector

Finally, figure 6 and 7 make a preliminary visual analysis of the two first hypotheses to gather evidence of an association between the natural resource endowment and GDP with total investments in the period 2005-2018. Even if you can't control for other variables as with more

advanced econometric methods, it is interesting to examine if there are any important outliers beforehand.

In figure 5, the association appears to be positive between market size and Chinese investment. One clear outlier is Mexico, where investments relative to its GDP are low. This is not surprising as Chinese-Mexican relations, although not hostile, are not very robust due to the close economic and political ties with its neighbor, United States, and some similarities in their sectorial export matrix that makes both economies more competitive and less complementary.
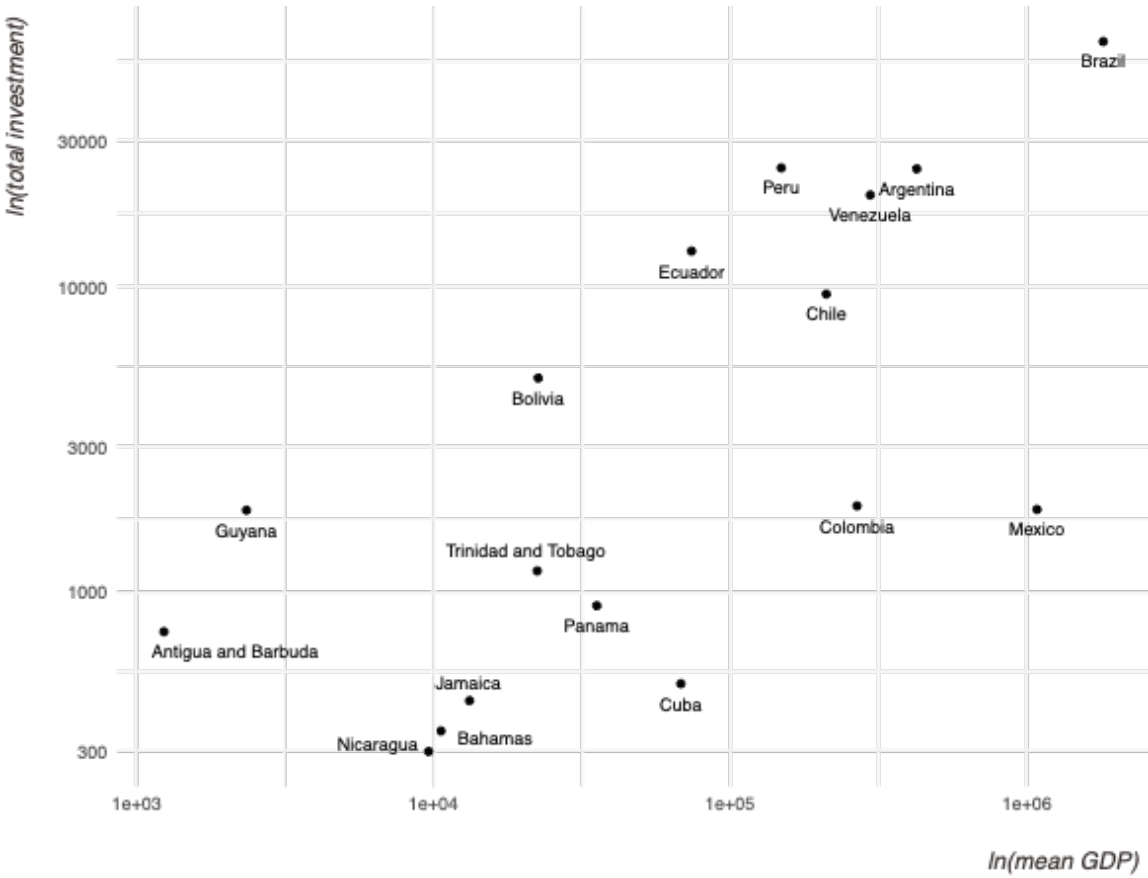

Figure 6. Is Chinese Investment Attracted to Larger Markets?

In figure 6, the association is still positive, but less noticeable than it the previous graph. Here, the two deviant cases are Argentina and Brazil. One possible explanation is that in both countries Chinese investments flow in great proportion towards the agriculture sector. But the variable we are utilizing as a proxy for natural resource endowment only contains fossil fuels, minerals, and forest rents, leaving out agricultural rents, which are particularly important in Argentina and Brazil. This will be key as we analyze the results of the regressions in the discussions' chapter.
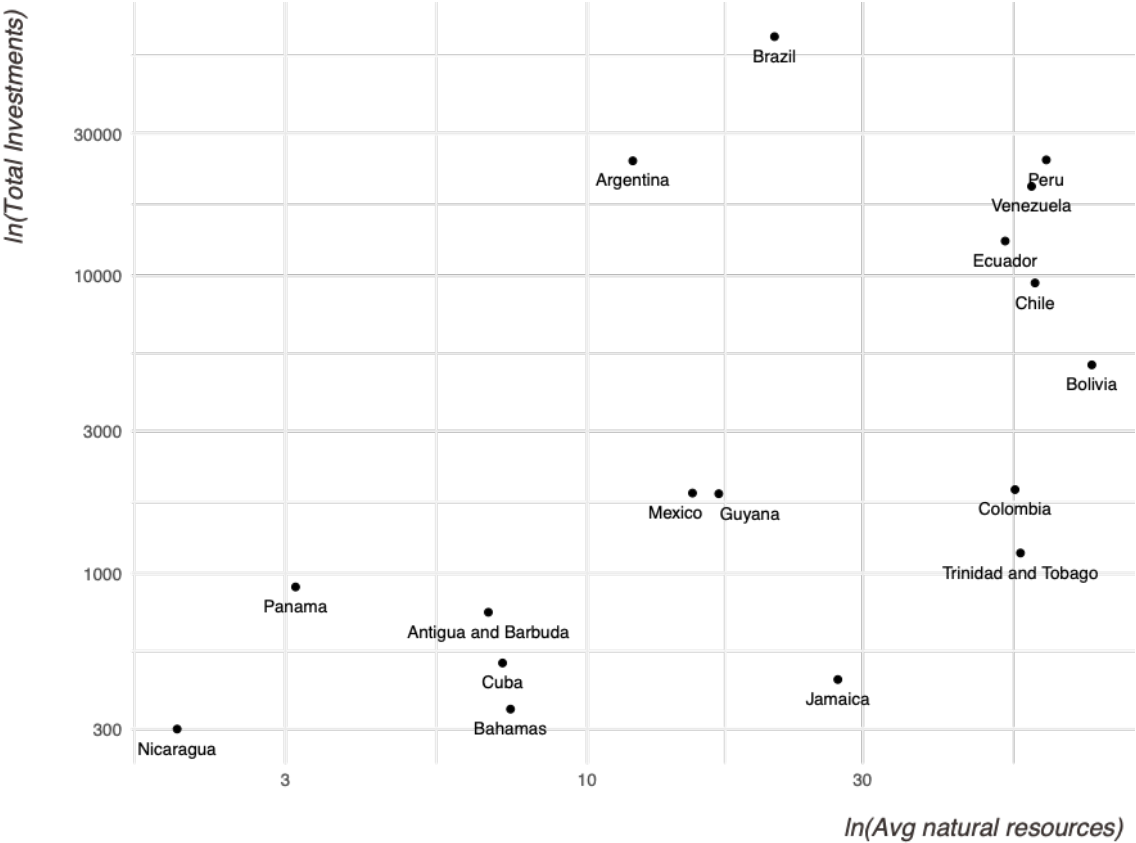

Figure 7. Is Chinese Investment Attracted to Countries with More Resources?

8. RESULTS

Table 4 below shows a positive and strong correlation between Chinese FDI in Latam with GDP and a weaker and positive correlation with natural resource rents, both with a p-value below 0.01.

As per the relationship between independent variables, democracy and corruption are strongly negatively correlated, with a p-value below 0.01. This implies that the model could have multicollinearity issues and, therefore, undermining the statistically significant of the variables in the model by increasing the standard errors of the coefficients. We will address this issue in section 8.1.

Table 4. Correlation Matrix for Specification

	FDI_ln	GDP_ln	NatRes	Dem	Corr	INF_ln	OPEN
FDI_ln	1.00						
GDP_ln	0.53*	1.00					
NatRes	0.20*	-0.19*	1.00				
Dem	-0.02	0.26*	-0.23*	1.00			
Corr	-0.04	-0.04	0.07	-0.81*	1.00		
INF_ln	0.03	0.13	0.03	-0.30*	0.24*	1.00	
OPEN	-0.34*	-0.46*	0.03	0.13	-0.09	-0.29*	1.00

* p<0.01

Table 5 shows the estimated effect of our independent variables on the natural log of the stock of FDI, using three econometric models, Pooled Ordinary Least Squares (POLS), Fixed Effects (FE) and Arellano-Bond General Method of Moments (GMM) estimation.

Table 5. Estimated Effects on Natural Log of annual Stock of Chinese Foreign Direct Investment in Latin America

	POLS (1)	Fixed Effects (2)	Arellano-Bond GMM (3)
GDP_ln	1.32***	1.4	1.33***
	(0.29)	(1.38)	(0.27)
NatRes	0.12***	0.12**	0.1**
	(0.03)	(0.04)	(0.05)
Corr	-6.94***	-0.85	-6.76***
	(1.38)	(3.98)	(2.31)
Dem	-10.21***	-2.74	-10.29***
	(1.75)	(4.67)	(3.06)
INF_ln	-0.46**	-0.24	-0.46**
	(0.2)	(0.42)	(0.19)
Open	-3.87	-1.11	-0.46
	(5.93)	(7.37)	(7.35)
Observations	196	196	196
R-squared	0.45	0.64 (between)	
Rho		0.46	
Fixed year effects		Yes	
Hansen p-value			0.59
Instruments			21

Panel data for 2005-2018 used

All dependent variables lagged one year

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The coefficients on market size (GDP_ln) and natural resource endowments (NatRes) obtained from the POLS, FE, and GMM equations are very similar and they agree with our predictions outlined by hypotheses 1a and 1b. Holding all else constant, host market size has a positive influence on Chinese FDI, with a 1% rise in GDP increasing the stock of Chinese investment by 1.32-1.4%. Similarly, a 1 percentage point increase in the natural resource rents to GDP ratio is associated with a 10-12% increase in the stock of Chinese FDI. These results are

consistent with previous literature, suggesting that both, market-seeking and resource-seeking strategies, are prevalent for Chinese firms' presence in Latin America.

As per the institutional factor, an increased level of corruption in the host country is associated with lower levels of Chinese investment. This result aligns better with the literature on MNEs derived from the OLI paradigm than with our own predictions (see hypothesis 2a in section 4.2). The interpretation is that Chinese investors in LAC are also risk-averse and would not contemplate to invest in more corrupted countries, all else constant. Another alternative hypothesis for this outcome is that the relation between Chinese investment and level of corruption is non-linear. It may be positive for some minor levels of corruption, but negative for higher levels. This makes sense as our panel data (Latin America) is a subset of all Chinese OFDI and a region characteristic by its particularly high levels of corruption (Morris and Blake, 2009).

Another major finding is that the level of democracy is an important predictor of Chinese investment, according to the POLS and GMM methods, but not in the FE equation. The result is consistent with our hypothesis, that is, a 10-percentage point increase in the perception of liberal democracy according to the Varieties of Democracies Project is associated with a decrease of the stock of Chinese FDI of almost 10%.

Finally, our control variable for macroeconomic stability is statistically significant for the POLS and GMM method and consistent with our hypothesis (number 3a) that, all else equal, Chinese investment will not be attracted to countries with higher inflation. As per the proxy used for openness of the economy to foreign investment, it does not appear as a strong predictor in any of our estimations.

When contrasting the overall results between the three estimations, it appears that POLS and GMM results are similar between each other and differ significantly from the FE model. This could be due to the presence of time-variant endogeneity. The Arellano-Bond estimation uses dynamic panel data to control for these unobservable existing trends in FDI that are

correlated with the explanatory variables. The column 3 also specifies the j-Hansen test for overidentifying restrictions, providing evidence of the validity of the choice of instruments.

8.1. Addressing Multicollinearity

To assess if the collinearity of the two variables, Dem and Corr, should be addressed we proceeded with a F-test of joint significance. The unrestricted model is our original estimation as shown in table 5 while the restricted model drops the independent variables Corr and Dem.

Table 6. F-test of Joint Significance on Democracy and Corruption

	POLS (1)	FEs (2)	GMM (3)
	Null hypothesis: $\beta_4 = \beta_5 = 0$		
F (2,13)	4.41	0.22	11.31
P-value	0.03	0.8	0.003
	Reject null	**Failed to reject null**	**Reject null**

The results shown in the correlation matrix (table 4) combined with the results from the F-test of joint significance above, suggests that the large standard errors in the Fixed Effects model could be caused by the high collinearity between Dem and Corr, making the model unable to predict the pattern of FDI.

9. DISCUSSION AND POLICY IMPLICATIONS

While previous studies have stressed out the ownership advantages that Chinese firms have investing in countries whose institutional quality are similar to their own, especially those with large natural resources, we found that this relation does not hold true in Latin America. As we argued, our results do not invalidate the hypothesis that "Chinese FDI is attracted to poorer institutional environments" but that this relationship may be non-linear, changing the sign of the slope when corruption levels are above some specific threshold. Therefore, in a subset of countries with already high levels of corruption, here the LAC countries, Chinese FDI is not attracted to weaker institutional environments, but the opposite. However, a more comprehensive study on the matter is necessary to ascertain this conclusion.

The main finding of our analysis is that, holding all else constant, Chinese investments in Latam are associated with lower levels of perceived liberal democracy. This is a significant addition to the existing literature, and suggests that even after controlling for corruption, democracy is still a strong predictor for Chinese FDI. These findings are consistent with increasing concerns about the non-economic and strategic factors driving the infrastructure projects under the BRI. According to this view, Chinese "economic statecraft" aims at reinforcing authoritarian trends, consolidating strategic allies and building a Sino-centered network that defies the United States global leadership.

However, our results do not corroborate directionality. Another alternative causal mechanism that explains the negative relationship between Chinese investments and liberal democracies, is that less democratic regimes sought to ally with China in order to attract investments and finance their large projects as they cannot access traditional financial markets. In this sense, China is perceived by these regimes as an alternative financier to the US-led multilateral organizations, like the World Bank and IMF, which tend to avoid lending to countries whose institutional framework differ significantly from the liberal and pro-market

values. Under his hypothesis, China is ideologically neutral when investing abroad and thus Chinese firms will be present in less democratic countries.

This result has important geopolitical implications. Either by actively promoting and investing in non-democratic regimes, or by financially sustaining them due to their non-discriminatory policy, China's FDI could be inhibiting democratization processes in Latin America. If reaffirmed in future studies, our results highlight the need for a coordinated response that offsets this trend. The best approach is a multilateral revision of the current global structure in which developed countries constraint the funds to those developing countries aligned to their ideological set of values. The rise of China combined with other developing countries becoming more powerful in the global economy, bolsters the need to renegotiate a new set of rules and institutions under which China agrees to operate, but that still promotes democratic institutions, debt sustainability, and social and environmental standards.

10. CONCLUSION

The results of this research suggest that the determinants of Chinese Foreign Direct Investment in Latin America are both economic and political in nature. The main conclusion is that profit-maximization logic does not predict Chinese firms' behavior abroad by itself, and that while market size and natural resource endowments are strong determinants of Chinese investment in the region, they fail to explain a large percentage of the variability of investment levels across LATAM countries. These results are consistent with previous literature on the matter that have argued that Chinese FDI differ from FDI from developed countries, a phenomenon that reflects the specific institutional and cultural characteristics of the Asian country and the strong weight of the government in the economy.

The contribution of this thesis is to include a new dimension shaping FDI that has been missing in the literature before; geopolitics and how the rising tension between China and the United States affects how the Asian country set foots in Latin America. The significance of perceived democracy as a strong predictor of FDI is consistent with the more recent image of China's sophisticated economic statecraft abroad, under which economic power is being used to leverage their political presence abroad and achieve their foreign policy goals.

However, there are some limitations to these results. First, statistical modeling was done at the country level, which ignores sectorial discrepancies. Second, a study that examines the differences between investments patterns from state-owned and private firms will provide more precise evidence of the political nature of Chinese FDI determinants. Finally, a qualitative study of the deviant cases, such as Mexico, could provide further insight about the causal mechanisms and the directionality factor.

11. REFERENCES

Amighini, Alessia A. and Rabellotti, Roberta and Sanfilippo, Marco. *China's Outward FDI: An Industry-Level Analysis of Host Country Determinants*. CESifo Working Paper Series No. 3688. (2011)

Bastholm, Anders and Kragelund, Peter. *State Driven Investments in Zambia: Combining Strategic Interests and Profits. In The New Presence of China in Africa*. Amsterdam: Amsterdam University Press. (2009)

Buckley, Peter, Clegg, Jeremy, Cross, Adam, Liu, Xin, Voss, Hinrich and Zheng, Ping. *The Determinants of Chinese Outward Foreign Direct Investment*. Journal of International Business Studies 38: 499–518. (2007)

Cuervo-Cazurra, Alvaro and Genc, Mehmet. *Transforming disadvantages into advantages: developing-country MNEs in the least developed countries*. Journal of International Business Studies. vol. 39, issue 6, 957-979 (2008)

Davies, Ken. *China Investment Policy. An Update*. OECD Working Papers. (2013)

Dunning, John. *Towards an Eclectic Theory of International Production: Some Empirical Tests*. Journal of International Business Studies (1980)

Dunning, J. H. *Globalization and the new geography of foreign direct investment*. Oxford Development Studies (1998)

Erickson, Daniel and Chen, Janice. *China, Taiwan, and the Battle for Latin America*. Fletcher Forum of World Affairs 31: 69–89. (2007)

Fedderke, Johannes and Romm, A.T. *Growth impact and determinants of foreign direct investment into South Africa, 1956-2003*. Economic Modelling (2006)

Gonzalez-Vicente, R. *Development dynamics of Chinese resource-based investment in Peru and Ecuador*. Latin American Politics and Society, 55(1), 46–72. (2013)

Graham, Edward and Wada, Erika. *Foreign Direct Investment in China: Effects on Growth and Economic Performance*. PIIE Working Paper (2001).

Gu, Jing, Humphrey, John and Messner, Dirk. *Global Governance and Developing Countries: The Implications of the Rise of China*. World Development. (2008)

Ikenberry, John and Lim, Darren. *China's emerging institutional statecraft The Asian Infrastructure Investment Bank and the prospects for counter-hegemony*. Brookings Institute. (2017)

Jensen, Nathan, Biglaiser, Glen, Li, Quan, Malesky, Edmund, Pinto, Pablo, Pinto, Santiago and Staats, Joseph. *Politics and Foreign Direct Investment*. Ann Arbor: University of Michigan Press (2012)

Kolstad, Ivar and Wiig, Arne. *What determines Chinese outward FDI?* CMI Working Paper WP 2009: 3. (2009).

Liu, X., Wang, C., & Wei, Y. *Causal links between foreign direct investment and trade in China*. China Economic Review (2001).

Mathews, John. *Dragon multinationals: New players in 21st century globalization*. Mgsm working papers in management. MGSM WP 2005-15 (2005)

Morris, Stephen and Blake, Charles. *Introduction: Political and Analytical Challenges of Corruption in Latin America*. In Corruption & Democracy in Latin America, edited by Charles H. Blake and Stephen D. Morris. Pittsburgh, PA: University of Pittsburgh Press. (2009)

Morrison, Wayne. *China and the Global Financial Crisis: Implications for the United States*. Congressional Research Service. (2009)

Sanfilippo, Marco. *Chinese FDI to Africa: What Is the Nexus with Foreign Economic Cooperation?* African Development Review (2010)

Szamosszegi, Andrew and Cole Kyle. *An Analysis of State-Owned Enterprises and State Capitalism in China.* Washington, DC: US-China Economic and Security Review Commission (2011).

Thorley, Martin. *Huawei, the CSSA and beyond: Latent networks and Party influence within Chinese institutions.* The Asia Dialogue (2019)

Tuman, John and Shirali, Majid. *The Political Economy of Chinese Foreign Direct Investment in Developing Areas.* Foreign Policy Analysis (2017)

Xia, Le. *China's role in Latin America: Participation and Consequences.* Asia Chief Economist, BBVA Research (2017)

Zhang, Xiang. *The socioeconomic geography of Chinese outward foreign direct investment in Latin America.* GeoJournal (2018).