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The Impact of BITs and DTTs on FDI Inflow and Outflow: Evidence from China*

Abstract: This paper examines the impact of both China's bilateral investment treaties (BITs) and double tax treaties (DTTs) simultaneously on China's bilateral Foreign Direct Investment (FDI) inflows and outflows. Using China bilateral FDI flow data from 1985 to 2010, we find that the cumulative number of bilateral investment treaties (BITs) China signed has a positive (though not always statistically significant) but minor impact on both China's FDI inflows and outflows. The effect of a dummy BIT using dyadic data is always significant and positive for China's FDI inflows, while negative but not always significant for China's FDI outflows. We also find evidence that the cumulative number of double tax treaties (DTTs) tends to promote China's FDI inflows and outflows in most equations with weighted cumulative BITs. However, tax treaty dummies do not reveal any robust effect on FDI flow. Generally, BITs and DTTs are more inclined to affect China's FDI inflows than to affect China's FDI outflows.

Keywords: Bilateral Investment Treaties; Double Tax Treaties; Foreign Direct Investment; China

JEL Classification: F14; C23; F21

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1. Introduction

China has been one of the largest recipients for global foreign direct investment (FDI) since the 21th new century. Annual realized FDI inflows have grown from 1.9 billion US dollars in 1985 to 118.7 billion US dollars in 2013 (see Figure 1). By 2013, China had accumulated a FDI stock of US$ 1.344 trillion[1], well ahead of other large developing and transition economies such as Brazil, India, and Russia. Meanwhile, China's FDI outflows have taken off as a result of the government's adoption and promotion of a "go global" policy aimed at establishing the country's investors as international players following China's entry to the WTO in 2001. Although China's outward direct investment (ODI) stock is still small relative to the inward FDI stock, growth in China's outward FDI flows has become significant in recent years, growing from less than $100 million in the 1980s to $107.84 billion in 2013 (see Figure 1), and the cumulative FDI abroad (stock) had reached $660.48 billion by the end of 2013[2], making China the fifth largest originator of ODI by value.

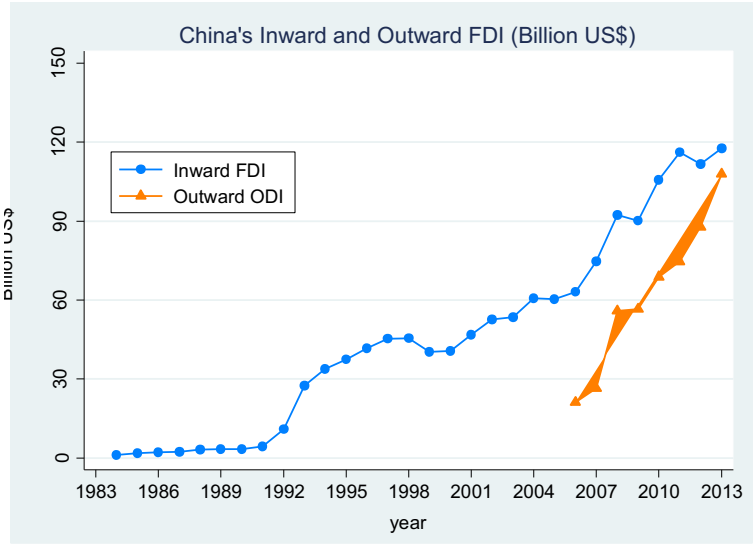

Figure 1: China's Inward and Outward Foreign Direct Investment

Source: Chinese Statistics Yearbook (CSY) Online: http://data.stats.gov.cn.

Bilateral investment treaties (BITs) and double tax treaties (DTTs) are the two most widely used types of international agreements for both protecting foreign investors and providing such investment nondiscriminatory treatment and from double taxation. BITs are agreements between two countries for the reciprocal encouragement, promotion and protection of investments in each other's territories by companies based in either country. DTTs are aiming to avoid double taxation on income earned in any two different countries, and stimulating FDI between countries. Under a DTT agreement, a credit is usually allowed against the tax levied by the country in which the taxpayer resides for taxes levied in th e other treaty country and as a result the tax payer pays no more than the higher of the two rates.

[1] Data gets from the Chinese Statistics Yearbook (CSY) online: http://data.stats.gov.cn.
[2] Data gets from the Chinese Statistics Yearbook (CSY) online: http://data.stats.gov.cn.

BITs and DTTs are presumed to have a positive influence on the flow of FDI between countries bound in BIT or DTT. Whether BITs and DTTs increase FDI inflows has been studied and debated for the past decades for a number of developing countries. By the end of 2014, China had already concluded 130 BITs (106 in force)[3] and 107 DTTs (including double taxation arrangement with Hong Kong and Macau), making China the largest contracting party to BITs and DTTs among developing countries. Given China's large FDI involvement, this suggests assessing separately whether China's BITs and DTTs play an important role in attracting FDI inflows, besides other determinants such as market size, labor endowment, etc. There is also an issue of whether China's BITs and DTTs have symmetrical effects on China's outward FDI.

To our knowledge, this is the first empirical study examining the impact of both China's bilateral investment and double tax treaties simultaneously on both China's FDI inflows and outflows. We find that the cumulative number of bilateral investment treaties China signed has a negative but minor impact on China's FDI inflows, but a positive (though not always statistically significant) impact on China's FDI outflows. The effect of a dummy BIT using dyadic data is always significant and positive for China's FDI inflows, while negative but not always significant for China's FDI outflows. We also find evidence that the cumulative number of double tax treaties tends to promote China's FDI inflows and outflows, especially when the cumulative number of BITs is weighted. However, tax treaty dummies do not reveal any robust effect on FDI flow. Generally, bilateral investment treaties and double tax treaties are more inclined to affect China's FDI inflows than to affect China's FDI outflows.

2. Background: BITs, DTTs and FDI

2.1 BITs and DTTs

A bilateral investment treaty (BIT) is an agreement establishing the terms and conditions for private investment by nationals and companies of one state in another state. Treaties typically cover the following areas: scope and definition of investment, admission and establishment, national treatment, most-favored-nation treatment, fair and equitable treatment, compensation in the event of expropriation or damage to the investment, guarantees of free transfers of funds, and dispute settlement mechanisms, both state-state and investor-state.

Conventionally, the declared goals of BITs include: investment protection, market and investment liberalization and investment promotion. It is the third of these goals i.e. investment promotion that this paper evaluates. By providing that national companies of either party to the treaty may invest under the same conditions and be treated in the same way in the territory of the other, a BIT defines a symmetric relationship between the two contracting countries and provides a stable legal environment that supports foreign investment in the host country. But whether and to what extent a BIT, relative to other key determinants of FDI flows such as the market size and labor endowment of the host country, promote investment is left open (Salacuse and Sullivan, 2005).

The DTTs are bilateral agreements between two states. A primary objective is to eliminate double taxation, which is achieved by: allocating taxing rights to one or other state for specified categories of income or gains (including in some cases how much each state may tax); or if both states are entitled to tax the income or gains, specifying whether double taxation should be eliminated and, if so, which state should provide relief against

[3] The data gets from UNCTAD International Investment Agreement Database (http:// www.unctad.org/iia).

double taxation (and the method by which it should do this either by exempting income or gains taxed by the other state or by giving credit for tax paid to the other state when assessing the amount of tax it will collect). DTTs will typically provide mechanisms for resolving disputes and provide a measure of protection for taxpayers against the treaty partners applying their domestic tax rules less favorably in relation to residents of the counterparty state compared with their treatment of their own residents (Clayson et al. 2008).

DTTs perform four primary functions. The first is to standardize tax definitions and define the tax jurisdictions of treaty partners. The second is to reduce transfer pricing and other forms of tax avoidance. The third is linked to information exchange and the last is that they affect the actual taxation of MNEs through lowered withholding rates on interests, dividends and royalties. (Blonigen and Davies, 2004). The impacts of the last of these depends on the tax treatment in the home country; and whether a foreign credit is provided or whether taxed foreign income is exempt from domestic taxation. If the former and foreign tax rates are below domestic rates, a tax treaty has little effect via its rate reduction. Also if the MNEs engaged in FDI are more concerned with reducing their tax burdens through transfer pricing, tax treaties (with the second and third goals) may reduce incentives for FDI activity instead of increasing them. On the other hand, a tax treaty (with the first and the fourth functions) may promote investment by reducing uncertainty about the overseas tax environment. Therefore, the net effect of tax treaties on FDI is open and depends on which goal of the tax treaty dominates.

2.2 Overview of World BITs, DTTs and FDI Flows

The first BIT was signed between Germany and Pakistan in 1959. Throughout the 1970s and 1980s, BITs slowly spread, with roughly 20 treaties being signed annually mainly between European and developing countries. With the decision of the US to adopt BITs as a foreign investment protection device their number started to increase sharply. When the block of developing countries decided to give up their struggle for a "New International Economic Order", including the right of host states to expropriate foreign companies' investments in the natural resource sector, the number of BITs rose even further since developing countries started to compete in capturing a share of global FDI flows, facing the dilemma of either signing BITs that privileged the contracting party exporting FDI or possibly losing FDI to other countries increasing their competitive advantage (Berger, 2008).

Worldwide, the number of bilateral investment treaties and double tax treaties has increased in recent decades. There were approximately 386 BITs in 1989, however a decade later in 1999, their number had grown to 1,857[4]. In 2010, the total stock of BITs in the world was 2807; and at the end of 2013, world total BITs had reached 2902[5]. The number of double tax treaties in force has risen from 100 in the 1960s to 2976 by the end of 2010[6].

[4] See M. Malik, Recent Developments in Regional and Bilateral Investment Treaties in Second Annual Forum of Developing Country Investment Negotiators, 3-4 November 2008 Marrakech, Morocco (2008)

[5] Data are from the United Nations Committee of Trade and Development (UNCTAD) International Investment Agreements database

[6] See UNCTAD World Investment Report 2011.

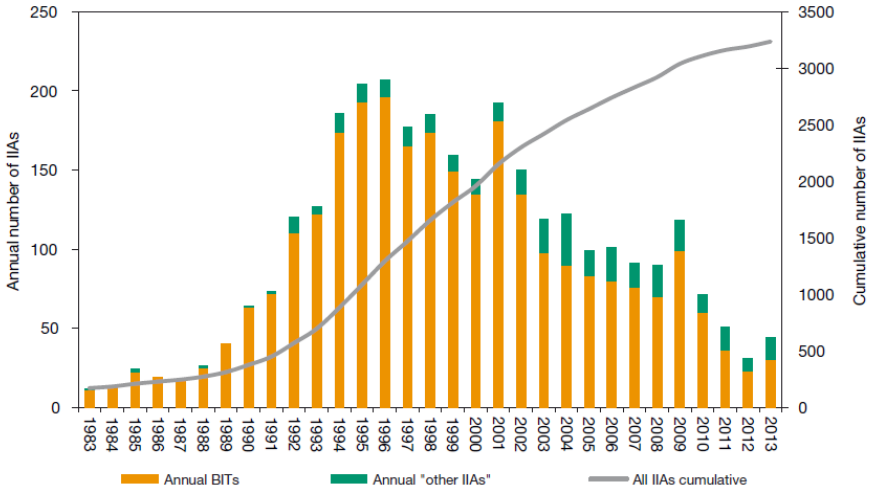

Figure 1: Trends in BITs and Other IIAs Signed, 1983-2013

Note: IIAs denotes International Investment Agreements.

Source: UNCTAD International Investment Agreement Database.

During the same period, FDI has been spurred by the widespread liberalization of FDI policies, combined with advances in information and communication technologies and competition among firms. Inflows of FDI have grown at an unprecedented rate, expanding from approximately $40 billion at the beginning of the 1980s, to $200 billion in 1990, to the historical highest $1.97 trillion in 2007 while dropping to $1.2 trillion in 2009 and reaching $1.45 trillion in 2013. The simultaneous growth in FDI and the growth of BITs and DTTs suggest a potential positive relation.

2.3 BITs, DTTs and FDI Activity in China

BITs in China began in 1982 when China and Sweden signed China's first such agreement. China signed the first income and capital type of double tax treaty with Japan in 1983[7]. During the 1992 to 1996, the number of BITs China concluded increased at a very high rate, and another 8 and 10 new BITs were signed by China in year 2001 and 2005 respectively. Year 1986, 1994 to 1996 saw a fast growth for the number of DTTs China signed. The Figure 2 shows the fast-growing period of China's BITs and DTTs coincide with growth of China's FDI inflows and outflows, which also indicate a potential positive relationship between BITs, DTTs and FDI activity.

[7] There are some transportation treaties China concluded with Argentina, France, Japan, South Africa, UK and the US during the period between 1975 and 1982.

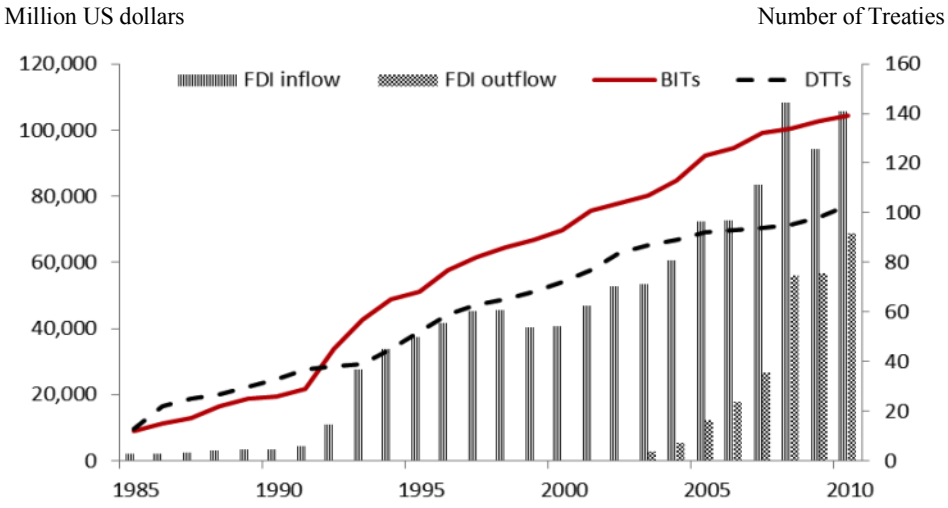

Figure 2: BITs, DTTs and FDI Flows of China, 1985-2010

Source: authors' calculation based on UNCTAD International Investment Agreements database (http:// www.unctad.org/iia)

In terms of geographic distribution, most of China's FDI activities are concentrated in Asia and Europe, with more than 60% and nearly 20% of China's cumulative inward and outward FDI stock involving Asia and Europe, respectively. The number of the BITs China signed is more evenly distributed among continents, except for North America, where substantial FDI actually is not covered by any existing bilateral investment protection agreement (e.g. China and the United States, China and Canada). This (large amount of FDI activity without BIT) is also the case for Cayman Islands and the British Virgin Island. For DTTs, the geographic distribution is similar to that of FDI activity, except for an expanding share for Europe. Unlike the case of BITs, both Canada and the U.S. signed a DTT with China. As a worldwide tax haven, Cayman Islands and the British Virgin Islands are still outside of the partner list of DTTs that China has concluded (Figure 3).

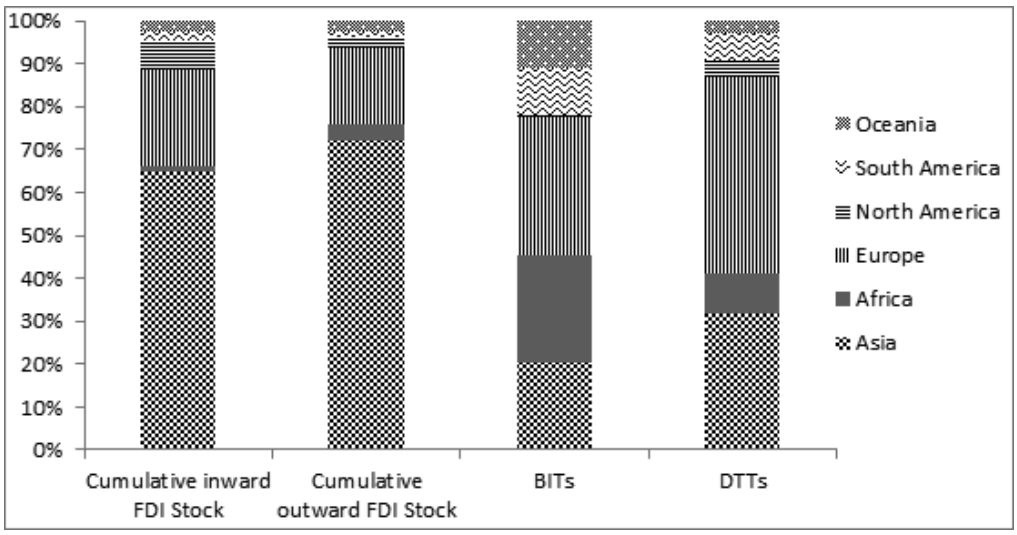

Figure 3: The geographic distribution of BITs, DTTs and FDI of China, by end 2010

Source: authors' calculation based on UNCTAD International Investment Agreements database (http:// www.unctad.org/iia)

2.4 Empirical Studies on the Effect of BITs and DTTs on FDI

In the literature, different approaches are used empirically to model the effects of BITs and DTTs on FDI. Most are dyadic analysis taking bilateral FDI as the dependent variable in a panel setting to examine whether the existence of a BIT or DTT (in form of dummy variable) will lead to higher FDI flows, while other studies use models with the aggregate FDI inflows of individual host country as the unit of observation and examine whether the total number of BITs or DTTs affect aggregate FDI inflows into the host country.

Dyadic analyses have yielded mixed results as to the impacts of BITs on FDI. Most of them find little if any statistically significant increase in FDI inflows as a result of BITs. Vandervelde et al. (1998) found a positive coefficient for BITs in most of their statistical models, but the estimated effect was marginal and statistically not significant at conventional levels. Hallward-Driemeier (2003) raised further doubts about the effectiveness of BITs. The paper uses bilateral FDI outflows from 20 OECD countries to 31 developing countries, the data covers the years of 1980 to 2000, capturing the surge in the number of BITs ratified, the estimated coefficient for BITs was actually negative and insignificant. This conclusion was echoed in related work by UNCTAD (2003). Similar results can also be found in Tobin and Rose-Ackerman (2005), their datasets were compiled from a variety of sources and contain a different number of observations for different variables, the data sets use panel data form the first BIT signed in 1959 through 2000 for low and middle-income countries to take into account the dynamic nature of some of the data, and to control for some of the statistical problems inherent in cross sectional analyses, the interaction term between BIT and a measure of political risk shows a conditional positive effect on FDI activity. However, Salacuse and Sullivan (2005) found that signing a BIT with the US is associated with higher FDI inflows, whereas the number of BITs signed with other OECD countries is statistically insignificant. Haftel (2008) uses a data set that includes 132 developing countries from 1977 to 2004 to perform empirical analysis, and also has provided qualified support for Salacuse and Sullivan's argument by showing that ratified (rather than merely signed) U.S. BITs boost U.S. FDI into developing country signatories.

Empirical studies on bilateral double tax treaties are less, compared to BIT, and more negative in assessment of impact. Blonigen and Davies (2004) found large and statistically negative effects of treaties established in 1980s and 1990s (so called new treaties in the paper) on US FDI. Using OECD data, Blonigen and Davies (2005) also suggested that new treaties (during the 1983-1992 period) did not encourage FDI and might have actually reduced FDI activity. Egger et al. (2006) also found a negative effect of newly implemented DTTs in a difference-in-differences analysis of two years prior to and two years after treaty conclusion using dyadic FDI data over the period 1985 to 2000.

Although there are fewer empirical studies using monadic models, most of them, in contrast to dyadic analyses, find positive findings on the impact of BITs and DTTs on aggregate FDI. Gross and Trevino (2005) found the number of BITs signed by a country to be positively and statistically significantly correlated with aggregated FDI inflows into that country. Neumayer and Spess (2005) employed a larger panel data over the period 1970 to 2001 covering up to 119 countries and found a positive and statistically significant effect for BITs on FDI inflows. As for the effect of DTTs, Neumayer (2007) found developing countries with more DTTs with major capital-exporting developed countries have a higher overall FDI stock and share of stock and receive more FDI inflows as well as a higher share of inflows.

Most of these existing studies focus on FDI flows from developed countries to developing countries and the

different approaches tend to lead to different conclusions. Most analyses using a dyadic approach find no or negative effect while most monadic studies do find an effect for BITs or DTTs on FDI.

Above mentioned researches all explore the effects of BITs or DTTs on inward or outward FDI, they are related to the topic of this paper, especially for some of the studies include China as one of the developing host countries. But these researches are not only focus on China, and mostly are exploring only BITs or DTTs effects on FDI inflows to developing countries. Meanwhile, empirical research methodology in this paper are somewhat the same as these related papers. Therefore, there are few empirical studies on the effects of BITs and DTTs on China's FDI outflows[8]. Since China is continuously strengthening its position as a source of outward foreign investment as well as the biggest FDI recipient in the world, an analysis on the impact of BITs and DTTs on China's inbound and outbound FDI is of significance.

3. Research Design

3.1 Empirical Framework

In order to examine how BITs and DTTs might affect FDI flows, a theoretical framework is required to describe the determinants of FDI. There are different frameworks used for the determinants of bilateral FDI flows, among which the gravity model and the knowledge-capital model by Carr, Markusen and Maskus (2001) are the most widely used. The standard gravity model from empirical trade analysis (e.g. Tinbergen, 1962; Pöyhönen, 1963; Anderson, 1979; Helpman and Krugman, 1985; Deardorff, 1995; Feenstra et al., 2001; Eaton and Kortum, 2002; Anderson and Wincoop, 2003) has been extended to the study on FDI flows between countries (Hejazi and Safarian, 1999, 2001; Beaven and Estrin 2004). The general idea of using a gravity model to describe determinants of FDI flows is based on the arguments that the amount of bilateral resource flow will positively depend on size of source/destination countries which reflects potential supply/demand, and negatively on transportation costs.

The knowledge-capital model established by Carr, Markusen and Maskus (CMM) is grounded in the formal theories of multi-national enterprise (MNE) model, which allows for both the horizontal and vertical FDI. Horizontal FDI is captured by the sum of two countries' real GDP and the squared difference between the two countries' real GDP in CMM model, since larger and more similar-sized markets better support the higher fixed costs associated with setting up production across countries and will lead to greater horizontal FDI activity. Vertical FDI in the CMM model is related to differences in the two countries' relative endowments of skilled and unskilled labor, and is represented by three variables, i.e. the skill difference between the home and host country, the interaction term between skill difference with the difference in GDP and the interaction term between the square of skill difference and trade openness in the host country[9].

We use gravity model as our main regression methodology to estimate the impacts of BIT and DTT that China has signed on its FDI inflows and outflows, which is the same as most existing literatures did. In order to check the robustness of empirical results, we also use the knowledge-capital model as a comparison. Both gravity models and knowledge-capital models of FDI have precise micromodel foundations for FDI flow, and are often

[8] To our knowledge, Buckley et al (2008) is the only one evaluating the impact of BITs and DTTs on China's outbound FDI.
[9] See Carr, Markusen and Maskus(2001), Blognigen and Davies (2004,2005) for detailed explanation.

used methods for empirical analysis.

3.2 Variables

Our dependent variables are the annual bilateral FDI inflows into China and outflows from China between China and its investment partner economies. These are converted to constant 2005 US$ using the U.S. GDP Deflator[10]. The measure of FDI flow is typically natural logged to capture elasticity responses (percent change), but in our case, there are some observations where FDI inflows from a given country to China or opposite outflows are negative. We exclude observations for which the dependent variable takes on a zero or negative value where the log does not exist. By doing this the observation number is reduced by separately 2 and 77 for China's FDI inflows and outflows. These negative observations are rare and mainly in small countries, like Angola in 2008, Argentina in 2009, Azerbaijan in 2007 and 2008, Bulgaria in 2009, Bahamas in 2003 and 2008, Belize in 2010, Bermuda in 2007 and 2008, and etc. We think this treatment will not give influence to the empirical results.

Our main explanatory variables reflect the development of China's BITs and DTTs. Previous studies using the gravity or CMM model either include a BIT dummy or a DTT dummy as an explanatory variable. In our study, we include both dummies simultaneously to avoid omitted variable bias. In addition, instead of including just one DTT dummy variable as is usually done, we classify tax treaties into three dummies based on their content. The International Bureau of Fiscal Documentation categorizes tax treaties in the following manner: income/capital tax treaties; social security treaties, administrative assistance, inheritance/gift, and transportation tax treaties[11]. We use two major categories from this classification, which constitute the vast majority of treaties China signed. These are 1) income and capital treaties and 2) income tax treaties. This allows for more differentiation between tax treaties since different treaties imply different degrees of integration between countries. For instance, from the point of view of foreign investors, a country with an income and capital tax treaty might be more attractive than a country with just an income tax treaty.

Furthermore, the cumulative number of China's BITs and DTTs are also included in our study due to possible positive spill-over effects from signing a BIT/ DTT. In concluding a BIT/DTT, the signatory developing country explicitly commits only to protect FDI under signatory developed country law, but also implicitly signals its willingness to protect all foreign investment. A single dyadic design may therefore underestimate the effect that signing a BIT/DTT has on FDI inflows or outflows.

Our other control variables are similar to the ones used in the standard gravity and CMM model under these two frameworks. Besides the conventional determinants of FDI, such as market size (natural log of real GDP of FDI source and host country), physical distance (natural log of physical distance between the capital cities of the two countries), ethnic distance (common language dummy) and institution maturity (OECD dummy) in gravity models and five variables representing horizontal and vertical FDI in the CMM model, we also control for bilateral real effective exchange rates defined as the nominal bilateral exchange rate (calculated indirectly via the individual exchange rate with US dollar) multiplied by the major trading partner price index and divided by the

[10] See Aisbett (2009) for detailed discussion on the advantages and disadvantages of different dependent variables(e.g. FDI stocks, FDI flow, affiliate sales,).

[11] Coupe et al (2009), "The effect of Tax and Investment Treaties on Bilateral FDI Flows to Transition Economies", in Sauvant and Sachs, eds.,*The effect of Treaties on Foreign Direct Investment: Bilateral Investment Treaties, Double Taxation Treaties, and Investment Flows* (New York: Oxford University Press).

Chinese price index.

China adopted a managed floating regime of RMB exchange rate in 2005. The Chinese yuan was kept fixed to the US dollar under the dollar peg system before 21 July 2005, but fluctuated against other major trade partners' currencies. After the announcement of Chinese exchange rate system reform, it began to fluctuate against the US dollar as well as other major trade partners' currencies. By the end of 2011, the RMB/US dollar exchange rate had appreciated by 30.2%. The bilateral real exchange rate may also be an important determinant of China's FDI inflows and outflows.

Consistent with other econometric studies, data for all economic explanatory variables (GDP, exchange rate) are lagged one year to mitigate potential reverse causality problems. This treatment is also based on the argument that investors were reacting to known information from the year before. Ideally, reverse causality problems could be more comprehensively tackled by instrumental variable regressions. However, practically all economic explanatory variables are potentially subject to reverse causality and it proved too difficult to find adequate and valid instruments.

The baseline specification we use is as follows:

For the gravity model:

$$\ln FDI_{ijt} = \alpha_0 + \alpha_1 \ln GDP_{it-1} + \alpha_2 \ln GDP_{jt-1} + \alpha_3 \ln DIS_{ij} + \alpha_4 COMLANG + \alpha_5 OECD + \alpha_6 BRER_{ijt-1} + \alpha_7 BITS_t + \alpha_8 DTTS_t + \alpha_9 BIT_{ijt} + \alpha_{10} ICT_{ijt} + \alpha_{11} IT_{ijt} + \varepsilon_{ijt} \quad (1)$$

For the Carr et al. (2001) model:

$$\ln FDI_{ijt} = \beta_0 + \beta_1 \sum GDP_{ijt-1} + \beta_2 GDPDIFSQ_{ijt-1} + \beta_3 SKDIFF_{ijt-1} + \beta_4 SKDIFF_{ijt-1} * GDPDIFF_{ijt-1} + \beta_5 (SKDIFF_{ijt})^2 * T\_OPEN_{jt-1} + \beta_6 BRER_{ijt-1} + \beta_7 BITS_t + \beta_8 DTTS_t + \beta_9 BIT_{ijt} + \beta_{10} ICT_{ijt} + \beta_{11} IT_{ijt} + \varepsilon_{ijt} \quad (2)$$

Table 1: Variables description

Variable	Description
	Dependent Variable
Ln FDI_{ij}	Logarithm of FDI flow measure in 2005 US dollar (thousand) from country I (source) to country j (host).
	Main Independent Variables
BIT	Dummy, taking 1 after the BIT between country i and j has been signed
BITS	Cumulative number of BITs China had signed by year t
ICT	Dummy, taking 1 after the income and capital tax treaty between country i and j has been signed
IT	Dummy, taking 1 after the income tax treaty between country i and j has been signed
DTTS	Cumulative number of DTTs China had signed by year t
	Gravity Control Variables
GDP	Real GDP measured in 2005 US $(thousand)
DIS	Logarithm of Physical distance in kilometers between capital cities of country i and j
COMLANG	Dummy, taking 1 for countries or areas share the same language(dialect) as China

OECD	Dummy, taking 1 for OECD members
BRER	Bilateral real exchange rate (LCU per RMB), adjusted by the price index
	Carr et al.(2001) Control Variables
∑GDP	Logarithm of sum of GDP_i and GDP_j
GDPDIFSQ	$Ln[(gdpi-gdpj)^2]$
SKDIFF	$Ln(tert.edu.\ enr._i)-Ln(tert.edu.\ enr._j)$
SKDIFF*GDPDIFF	$[Ln(tert.edu.\ enr._i)-Ln(tert.edu.\ enr._j)]*(lnGDP_i-lnGDP_j)$
T_OPEN	Trade share in GDP
$(SKDIFF)^2$*T_OPENj	$[Ln(tert.school\ enr._i)-Ln(tert.school\ enr._j)]^2$*trade share in GDP of host country j.

3.3 Data

Our main data source is a panel dataset of bilateral FDI inflows and outflows reported by China with its 173 investment partner countries (areas) for the period 1985-2010 from the CEIC database. Data on real GDP, trade openness, official exchange rate with US dollar and inflation measured by consumer price index are from World Bank World Development Indicators 2012. We rely on the UNESCO higher education statistics for data on enrolment in tertiary education to calculate skilled labor difference. Data on the bilateral investment and taxation treaties China signed are from UNCTAD IIA Database. Distance and common language data come from CEPII gravity dataset. Table 2 provides summary descriptive information on variables.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	Min	Max	Observations
Dependant Variables					
$lnFDI_{ict}$	8.899192	3.023741	2.209742	17.81497	N = 2004
$lnFDI_{cit}$	8.890661	2.57395	2.22025	17.38747	N = 907
Independent Variables					
$BITS_t$	77.84615	42.14702	12	139	N=4498
$DTTS_t$	61.53846	27.55892	13	103	N=4498
BIT_{ict}	0.413962	0.492597	0	1	N=4498
ICT_{ict}	0.258115	0.437646	0	1	N=4498
IT_{ict}	0.052023	0.222098	0	1	N=4498
Gravity controls					
$lnGDP_{it-1}$	16.53674	2.398509	10.39391	23.30156	N = 4040
$lnGDP_{ct-1}$	20.80379	0.726538	19.84888	22.23811	N =4325
lnDIS	8.966571	0.556845	6.697034	9.867705	N =4446
OECD	0.196532	0.397419	0	1	N =4498
COMLANG	0.028902	0.167549	0	1	N =4498
Carr et al.(2001) controls					
$∑GDP_{t-1}$	20.96992	0.793977	19.84888	23.64005	N=4482
$GDPDIFSQ_{t-1}$	41.551	1.795706	28.96584	46.11524	N=4482
$SKDIFF_{it-1}$	-4.35317	2.243205	-11.6661	1.494677	N=2642
$SKDIFF_{ct-1}$	4.353167	2.243205	-1.49468	11.66614	N=2642
SKDIFF*GDPDIFFt-1	20.08008	18.11525	-1.33435	107.1482	N=2540
$(SKDIFF)^2*T\_OPEN_{ct-1}$	1083.444	1177.448	.0065505	8471.337	N=2571
$(SKDIFF)^2*T\_OPEN_{it-1}$	2137.38	2615.445	.0038188	26272.41	N=2398
Other controls					

$lnBRER_{t-1}$	0.875151	2.827776	-8.665509	12.60468	N = 3067

Source: by authors.

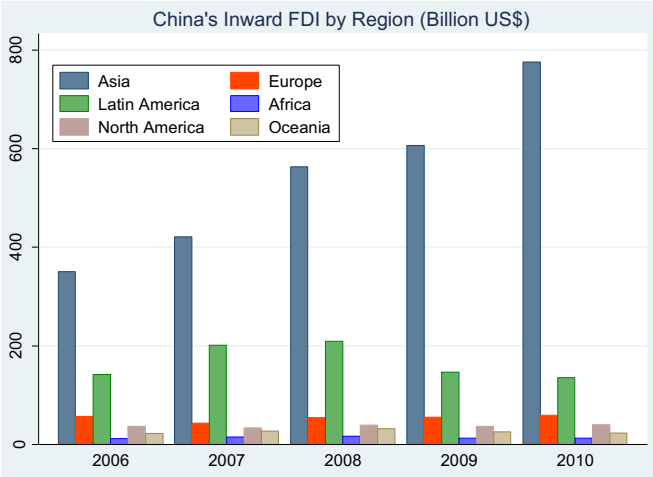

Figure 4: China's Inward FDI by Region

Source: CEIC Database.

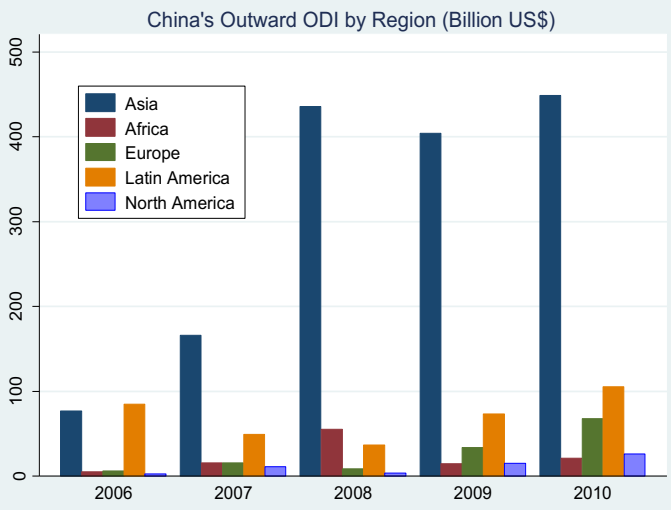

Figure 5: China's Outward ODI by Region

Source: CEIC Database.

Figure 4 and Figure 5 report China's inward and outward FDI data by continents in recent years. We find that Asian, Latin America and Europe are China's main inward and outward FDI source regions. The Asia is China's largest FDI source region.

4. Empirical Results

4.1 Estimation technique

We have conducted panel data fixed effects analyses for both gravity and CMM models, as there are factors affecting bilateral FDI relationship that are not captured by our explanatory variables and that are time-invariant. A

fixed country- pair and year effects specification could help to control for unobserved characteristics that affect FDI activity between China and each individual investment partner. We thus include a binary variable for each bilateral country pairing and year in addition to our control variables. The binary fixed effect country-pair variables estimate the aggregate effect of time-invariant characteristics that raise or lower FDI activity for that bilateral pairing versus average effects, and the binary fixed effect time variables are included to control for global business cycles and trends in world FDI or other omitted time-variant factors that affect all country-pairs in the same way.

Further, we create a weighted measure of BITs, which reflects the relative importance of different states as the FDI source. We calculate our measure "weighted BITs" in two ways. First, we use the ratio of lagged one year of FDI outflows of source country to that of host country as the proxy for the importance of FDI source country. Therefore, the weighted BITs variable is:

$$BITs\_OFDI = (\sum_{i=1}^{n-j}[BIT_{ijt} \times \frac{OFDI_{it-1}}{OFDI_{jt-1}}]) \quad (3)$$

where BITs_OFDI is our measure of weighted cumulative BIT, BIT is a dichotomous indicator variable coded 1 if a BIT exist between country i and j in year t (zero otherwise), the subscript i signifies the FDI source country as the (potential) signatory of a BIT with country j, and subscript j signifies the FDI host country for which the weighted BITs measure is recorded, while n is the universe of all sample countries in year t. The other way to calculate the weighted count BITs is to use the ratio of lagged one year of source country GDP per capita to that of host country GDP per capita to capture the relative important position in international investment activities. Therefore the alternative weighted BITs variable is:

$$BITs\_PGDP = (\sum_{i=1}^{n-j}[BIT_{ijt} \times \frac{PGDP_{it-1}}{PGDP_{jt-1}}]) \quad (4)$$

4.2 Results of gravity model

Table 3 presents our LSDV empirical estimation results on China inbound FDI. In Columns 1 and 2 cumulative BIT is unweighted while Columns 3 to 6 report the impact of two kinds of weighted BITs on China's FDI inflows. The country-pair and time effects always enter significantly in regressions for China's FDI inflows. The fit of these equations increases dramatically from 47% in pooled OLS regression[12] to 84%.

Table 3: Fixed Effects Results from gravity model on China's FDI Inflows

VARIABLES	(1) lnFDIic	(2) lnFDIic	(3) lnFDIic	(4) lnFDIic	(5) lnFDIic	(6) lnFDIic
BITS	0.0546**	0.0486*				
	(0.0231)	(0.0249)				
BITs_OFDI			0.00087***	0.000414		
			(0.000243)	(0.000339)		
BITs_PGDP					0.00383***	0.000940
					(0.00100)	(0.000674)
DTTS	-0.0378	-0.0508	0.0435***	0.0196*	0.0756***	0.0288*
	(0.0306)	(0.0406)	(0.00745)	(0.0115)	(0.0152)	(0.0153)
BIT	0.606***	0.866***	0.606***	0.866***	0.606***	0.866***

[12] The pooled OLS regression result is available on request.

	(0.200)	(0.219)	(0.152)	(0.169)	(0.152)	(0.169)
ICT	0.332	0.888***	0.332	0.888***	0.332	0.888***
	(0.327)	(0.317)	(0.227)	(0.260)	(0.227)	(0.260)
IT	0.114	0.107	0.114	0.107	0.114	0.107
	(0.235)	(0.255)	(0.184)	(0.212)	(0.184)	(0.212)
$lnGDP_{it-1}$	0.127	0.324*	0.127	0.324*	0.127	0.324*
	(0.173)	(0.188)	(0.155)	(0.180)	(0.155)	(0.180)
$lnGDP_{ct-1}$	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)
lnDIS	0.426**	0.390*	0.426	0.390	0.426	0.390
	(0.207)	(0.209)	(0.577)	(0.578)	(0.577)	(0.578)
OECD	5.096***	4.687***	5.152***	4.445***	5.152***	4.445***
	(1.392)	(1.031)	(0.763)	(0.890)	(0.763)	(0.890)
COMLANG	5.152***	4.445***	5.096***	4.687***	5.096***	4.687***
	(0.720)	(0.773)	(1.412)	(1.387)	(1.412)	(1.387)
$LnBRER_{ict-1}$		0.0856*		0.0856*		0.0856*
		(0.0499)		(0.0474)		(0.0474)
Country effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
Observation	1,904	1,586	1,904	1,586	1,904	1,586
R-squared	0.842	0.843	0.842	0.843	0.842	0.843

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

When the number of cumulative bilateral investment treaties is not weighted, the conventional control variable for market size of source country in gravity model is a statistically significant positive factor only when the bilateral real exchange rate enters in the equation, and the GDP of China is dropped.

A surprising result is that the coefficient of distance has a positive sign and is statistically significant, which is contrary to the traditional prediction that distance may be a negative determinant for international investment. Castellani et al. (2011) found controlling for institutional and psychic distance[13], in particular language and religious differences, the negative effect of geographic distance vanishes, especially in case of R&D FDI. Our LSDV results go further with the coefficient of distance having a positive sign and statistically significant. The investment cost is more related to the fixed cost of setting up branches than variable transportation cost in trade, therefore, when making the decision on approach of market entry, multinational enterprises might have a stronger incentive to invest rather than export when the distance is long enough. This might help explain the positive coefficient of distance on bilateral investment flows.

Representing institutional maturity and psychic distance, OECD and common language seem to be important factors affecting China's FDI inflows. OECD members and country (area) sharing the same language (dialect) as China on average have 4.7% and 4.4% higher annual FDI activities in China, respectively.

The cumulative number of BITs China signed has a significant positive coefficient, which is minor if compared to the coefficient of the BIT dummy. This is because cumulative BITs only have spill-over effect on bilateral investment flow, which is not as direct and explicit as a BIT between the two related parties. And when the bilateral real exchange rate is taken into account, the positive impact of BIT increases by nearly 20%. The cumulative number of DTTs China signed has non-significant and negative effect while the ICT and IT dummy has non-significant and positive effect. However, if the bilateral real exchange rate is entered in the explanatory

[13] Psychic distance is the sum of factors preventing the flow of information from and to the market. Examples include differences in language, education, business practices, culture, and industrial development.

variables, the ICT dummy becomes a significant positive factor for FDI inflows to China.

For the regression with weighted BITs, the coefficients of gravity controls and dummy treaty variables have almost the same sign and similar magnitude to those of columns 1 and 2, except that the distance now is not a significant factor. However, the coefficients of the cumulative number of treaties, vary a lot with those in unweighted BITs equations, where both FDI outflows weighted and GDP per capita weighted BITS have a much smaller positive impact on bilateral FDI flows, while the cumulative number of DTT now turn out to be a significant positive factor.

Table 4 reports the LSDV results on China outbound FDI. Similarly, columns 1 and 2 cumulative BIT is unweighted while Columns 3 to 6 represents the impact of two kinds of weighted BITs on China's FDI outflows. The country-pair and time effects always enter significantly in regressions for China's FDI inflows. The country-pair and time fixed effects increase the fit of the equations from 33% in pooled OLS regression to 75%.

When China's FDI outflows are evaluated, common language and bilateral real exchange rate variables become positive and significant determinants of China's FDI outflows. With much greater magnitude of the coefficient than that for China's FDI inflows, a 1% increase in a bilateral real exchange rate will promotes China's FDI outflows by 0.4%, suggesting that China's outward FDI is more or less currency appreciation driven. Unlike its positive impact on China's FDI inflows, the distance and OECD dummy now deter China's FDI outflows which are consistent with the early stage of China's outward FDI (resource-acquiring and cost sensitive). Among the main explanatory treaty variables we control for, only the cumulative BITs seems to play a minor positive role in promoting China's FDI outflows.

Table 4: Fixed Effects Results from Gravity Model on China's FDI Outflows

VARIABLES	(1) lnFDIci	(2) lnFDIci	(3) lnFDIci	(4) lnFDIci	(5) lnFDIci	(6) lnFDIci
BITS	0.0644***	0.0781***				
	(0.0170)	(0.0179)				
BITs_OFDI			-1.10e-08	3.54e-09		
			(2.98e-08)	(3.23e-08)		
BITs_PGDP					0.0200***	0.0220***
					(0.00598)	(0.00649)
DTTS	0.0728**	0.0281	0.194***	0.180***	-0.0137	-0.0483
	(0.0315)	(0.0336)	(0.0194)	(0.0233)	(0.0561)	(0.0603)
BIT	-0.634**	-0.486	-0.634**	-0.486	-0.634**	-0.486
	(0.306)	(0.355)	(0.306)	(0.355)	(0.306)	(0.355)
ICT	-0.0712	-0.114	-0.0712	-0.114	-0.0712	-0.114
	(0.425)	(0.426)	(0.425)	(0.426)	(0.425)	(0.426)
IT	0.653	-0.0312	0.653	-0.0312	0.653	-0.0312
	(0.489)	(0.528)	(0.489)	(0.528)	(0.489)	(0.528)
$lnGDP_{it-1}$	0.256	0.428	0.256	0.428	0.256	0.428
	(0.337)	(0.375)	(0.337)	(0.375)	(0.337)	(0.375)
$lnGDP_{ct-1}$	0	0	0	0	0	0
	(0)	(0)	(0)	(0)	(0)	(0)
lnDIS	-0.445***	-0.451***	-0.445***	-0.451***	-0.445***	-0.451***
	(0.110)	(0.112)	(0.110)	(0.112)	(0.110)	(0.112)
OECD	-2.191*	-2.092	-2.191*	-2.092	-2.191*	-2.092
	(1.309)	(1.483)	(1.309)	(1.483)	(1.309)	(1.483)
COMLANG	4.781***	4.456***	4.781***	4.456***	4.781***	4.456***

	(1.492)	(1.385)	(1.492)	(1.385)	(1.492)	(1.385)
$LnBRER_{ict-1}$		0.408***		0.408***		0.408***
		(0.119)		(0.119)		(0.119)
Country effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
Observation	879	750	879	750	879	750
R-squared	0.746	0.756	0.746	0.756	0.746	0.756

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

When the cumulative BITs is weighted by the ratio of FDI outflows in the previous year, the cumulative number of BIT is not a significant factor any more, while the cumulative number of DTT turns out to have a positive impact on China's FDI outflows. If we replace the weight with the ratio of GDP per capita, things reverse as weighted cumulative BITs now is a significant though minor factor to promote FDI, and cumulative DTT has non-significant and negative impact.

4.3 Results from a CMM Model

Table 5 reports the results from a CMM model specialization with China's inbound FDI as the dependant variable also using fixed effects regression techniques. In Columns 1 and 2, cumulative BIT is unweighted while Columns 3 to 6 measure the impact of two kinds of weighted BITs on China's FDI inflows. The difference between equations with the unweighted BIT and weighted BIT focuses on the coefficient of cumulative number of BITs and DTTs.

Based on the theoretical predictions and with CMM (2001) as well as Markusen and Maskus (2002), the correlation between ∑GDP and the FDI activity is expected to be positive, while that between GDPDIFSQ and FDI is supposed to be negative. Given the vertical FDI motives that exist in CMM knowledge-capital model, CMM predict a correlation between the three more complicated control variables and FDI activity from source to the host country. These are positive for SKDIFF, negative for SKDIFF*GDPDIFF and positive for $(SKDIFF)^2$*T_OPENj, respectively.

Table 5: Fixed Effects Results from CMM model on China's FDI Inflows

VARIABLES	(1) lnFDIic	(2) lnFDIic	(3) lnFDIic	(4) lnFDIic	(5) lnFDIic	(6) lnFDIic
BITS	0.0535**	0.0477				
	(0.0268)	(0.0316)				
BITS_OFDI			0.00105**	-8.53e-05		
			(0.000520)	(0.000458)		
BITS_PGDP					0.00409*	0.000316
					(0.00213)	(0.00253)
DTTS	-0.0465	-0.0245	0.0354*	0.0338*	0.0696**	0.0374
	(0.0380)	(0.0585)	(0.0181)	(0.0176)	(0.0323)	(0.0361)
BIT	0.436*	0.560**	0.436*	0.560**	0.436*	0.560**
	(0.239)	(0.255)	(0.239)	(0.255)	(0.239)	(0.255)
ICT	0.155	0.867**	0.155	0.867**	0.155	0.867**
	(0.395)	(0.394)	(0.395)	(0.394)	(0.395)	(0.394)
IT	-0.0247	0.0940	-0.0247	0.0940	-0.0247	0.0940
	(0.308)	(0.365)	(0.308)	(0.365)	(0.308)	(0.365)
$\sum GDP_{t-1}$	0.0931	-0.670	0.0931	-0.670	0.0931	-0.670
	(0.486)	(0.550)	(0.486)	(0.550)	(0.486)	(0.550)

$GDPDIFSQ_{t-1}$	0.0819***	0.0896**	0.0819***	0.0896**	0.0819***	0.0896**
	(0.0303)	(0.0446)	(0.0303)	(0.0446)	(0.0303)	(0.0446)
$SKDIFF_{i\,t-1}$	0.225	0.783**	0.225	0.783**	0.225	0.783**
	(0.242)	(0.307)	(0.242)	(0.307)	(0.242)	(0.307)
SKDIFF	0.0360	0.0747	0.0360	0.0747	0.0360	0.0747
$*GDPDIFF_{t-1}$	(0.0426)	(0.0495)	(0.0426)	(0.0495)	(0.0426)	(0.0495)
$(SKDIFF)^2$	0.000141	-1.88e-05	0.000141	-1.88e-05	0.000141	-1.88e-05
$*T\_OPEN_{c\,t-1}$	(0.000164)	(0.000254)	(0.000164)	(0.000254)	(0.000164)	(0.000254)
$lnBRER_{ict-1}$		0.244***		0.244***		0.244***
		(0.0743)		(0.0743)		(0.0743)
Country effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
Observations	1,010	826	1,010	826	1,010	826
R-squared	0.867	0.884	0.867	0.884	0.867	0.884

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1.

In the fixed effects estimation results for China's FDI inflows, among treaty variables BIT dummy and ICT dummy seem to promote China's FDI inflows as expected. Two CMM variables appear to perform well as the significant positive factor. The sign and magnitude of the coefficient for skill differences indicates that difference in skilled labor abundance between investment source and host countries is the greatest drive for MNEs vertical FDI activities in China. The horizontal FDI incentive represented by squared difference between the host and source countries' real GDP does not follow the theoretical prediction to have a negative sign, it has a significant positive impact on China's FDI inflows instead. This also indicates the vertical FDI dominates China's inbound FDI. Besides, the bilateral real exchange rate also works as a positive determinant of China's FDI inflows. This could be explained by the continuous expectation for China's RMB appreciation.

When cumulative number of BITs is weighted, the sign and magnitude of the coefficient for cumulative number of BITs and DTTs is changed if compared to those in equations with unweighted BITs. When the cumulative number of BITs takes the weight as the ratio of FDI outflows lagged 1 year, its coefficient decrease and become a non-significant factor, while the cumulative number of DTTs changes to be a significant positive determinant. The coefficient for cumulative BITs and DTTs is similar in the scenario with the ratio of GDP per capita as the weight.

The results measuring the impact of explanatory variables on China's bilateral FDI outflows suggest that neither the CMM control variables nor the bilateral real exchange rate is a significant determinant of China's bilateral FDI outflows. Although the unweighted cumulative number of BITs and cumulative number of DTTs in FDI outflows weighted equations seem to have positive impacts on China's FDI outflows, we cannot reject the null hypothesis that the impact is actually zero.

Table 6 Fixed Effects Results from CMM model on China's FDI Outflows

VARIABLES	(1) lnFDIci	(2) lnFDIci	(3) lnFDIci	(4) lnFDIci	(5) lnFDIci	(6) lnFDIci
BITS	0.0452*	0.0840***				
	(0.0244)	(0.0255)				
BITS_OFDI			-1.80e-08	4.99e-09		
			(3.46e-08)	(4.01e-08)		
BITS_PGDP					0.0102	0.0190*
					(0.0102)	(0.0111)
DTTS	0.0855	0.0348	0.180***	0.206***	0.0743	0.00882

	(0.0519)	(0.0616)	(0.0537)	(0.0652)	(0.0782)	(0.0897)
BIT	-0.715**	-0.500	-0.715**	-0.500	-0.715**	-0.500
	(0.356)	(0.413)	(0.356)	(0.413)	(0.356)	(0.413)
ICT	-0.210	-0.306	-0.210	-0.306	-0.210	-0.306
	(0.540)	(0.512)	(0.540)	(0.512)	(0.540)	(0.512)
IT	0.379	-0.432	0.379	-0.432	0.379	-0.432
	(0.690)	(0.740)	(0.690)	(0.740)	(0.690)	(0.740)
	0.491	0.195	0.491	0.195	0.491	0.195
ΣGDP_{t-1}	(0.890)	(1.001)	(0.890)	(1.001)	(0.890)	(1.001)
$GDPDIFSQ_{t-1}$	0.0370	-0.0103	0.0370	-0.0103	0.0370	-0.0103
	(0.0520)	(0.0627)	(0.0520)	(0.0627)	(0.0520)	(0.0627)
$SKDIFF_{c\ t-1}$	0.309	-0.282	0.309	-0.282	0.309	-0.282
	(0.589)	(0.709)	(0.589)	(0.709)	(0.589)	(0.709)
SKDIFF	-0.181	-0.125	-0.181	-0.125	-0.181	-0.125
$*GDPDIFF_{t-1}$	(0.112)	(0.106)	(0.112)	(0.106)	(0.112)	(0.106)
$(SKDIFF)^2$	0.000391*	0.000283	0.000391*	0.000283	0.000391*	0.000283
$*T\_OPEN_{i\ t-1}$	(0.000203)	(0.000199)	(0.000203)	(0.000199)	(0.000203)	(0.000199)
$lnBRER_{ict-1}$		0.469		0.469		0.469
		(0.687)		(0.687)		(0.687)
Country effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
Observations	590	508	590	508	590	508
R-squared	0.764	0.778	0.764	0.778	0.764	0.778

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

5. Conclusions

This study examines the impact of both China's bilateral investment and double tax treaties simultaneously on China's FDI activity, especially on China's FDI outflows. Using China bilateral FDI flow data, we find that both unweighted and weighted cumulative number of bilateral investment treaties China signed has a positive (though not always statistically significant) but minor impact on both China's FDI inflows and outflows. The effect of a dummy BIT using dyadic data is always significant and positive for China's FDI inflows, while negative but not always significant for China's FDI outflows. This indicates that most investment treaties China signed before 2001 aimed at attracting FDI to China, a purpose accomplished fairly well, but they do not serve to promote China's FDI outflows. We also find evidence that the cumulative number of double tax treaties tends to promote China's FDI inflows and outflows in most equations with weighted cumulative BITs. However, tax treaty dummies do not reveal any robust effect on FDI flow. Generally, bilateral investment treaty and double tax treaty are more inclined to affect China's FDI inflows than to affect China's FDI outflows.

China has signed a lot of bilateral investment treaties and double tax treaties with other countries, and now is negotiating bilateral investment treaties with the United States and Europe Union. So how these bilateral investment treaties and double tax treaties influence China's inward and outward foreign direct investment is an important topic for the policy side. Our paper use recent data and consider the effects of bilateral investment treaties and double tax treaties at the same time. Meanwhile, we focus the discussion of bilateral investment treaty and double tax treaty effects on China, which is rare in the literature.

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