Modes of Foreign Direct Investment and Patterns of Trade: Why Do Multinational Enterprises Come To China?*

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November 2010

Abstract

This paper investigates the link between patterns of trade and modes of foreign direct investment (FDI) by utilizing exports, imports, and inward FDI data for China over the period 1998 to 2007. We construct a modified gravity equation to find the main modes of inward FDI into China with considering spatially interdependent third country effect. The problem of endogeneity is controlled by applying the system generalized method of moments (GMM) estimation technique. We find that there is no evidence of statistically significant substitutability and complementarity between bilateral trade and FDI in the aggregate data. On the contrary, the trade-diverting third country effect of inward FDI is proven to be strong. As we decompose the aggregate trade goods into final and intermediate goods, we find that there is strong evidence of vertical FDI for importing intermediate goods from the home country and exporting final goods back to the home country. However, the motivation of vertical FDI has been diminishing and the modes of export-platform and complex vertical FDI have begun to emerge. This implies that China has imported intermediate inputs from the home country of FDI, produced final goods or parts and components, and exported them back to the home country. Recently, however, we have noticed that there has been a diversion trend of the vertical linkage from home country to third countries. This indicates that the main mode of inward FDI into China has been shifting from "home export base" to "third country export base".

Keywords: *patterns of trade, foreign direct investment, multinational enterprises, China*

JEL Classification: F21, F23

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* Paper to be presented at the third GEP Conference in China on *Enterprise and Labour Market Adjustment in China's Transition* organized by Leverhulme Centre for Research on Globalisation and Economic Policy (GEP) at the University of Nottingham, Ningbo, China, November 9-10, 2010.

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I. INTRODUCTION

Attracting foreign direct investment (FDI) has been recognized as an effective strategy for economic growth and prosperity. In particular, developing countries like China have been able to grow fast by sourcing capital globally. Why do some countries attract more FDI than others? More specifically, why do multinational enterprises (MNEs) come to China? In order to answer the question, MNEs' motivations to go to a specific host country should be clarified. Different motivations, such as market size of host country, transaction cost between host and home country, and differences in factor prices across countries, determine the modes of FDI. The conventional classification of the modes of FDI includes horizontal, vertical, export-platform, and complex vertical FDI. Blonigen (2005) classifies the four modes of FDI and calculates composition of sales of US affiliates abroad to identify the motive of US outward FDI in 1999.[1]

Existing empirical literature[2] on modes of FDI has provided the relationship between FDI and market size, trade cost, factor price, infrastructure, legal system, etc., but has not been successful in finding the main mode of inward FDI into a specific host country. Some have examined whether there is any evidence of a specific mode of FDI. For example, Bergstrand and Egger (2009) present a well-balanced study by both theoretically and empirically investigating the vertical mode of FDI. By modeling a three country knowledge-and-physical-capital model and by testing it with various specifications for bilateral foreign affiliate sales and bilateral trade data from United Nations Conference on Trade and Development (UNCTAD) for 1986-2000 among 36 countries, their empirical findings highlight that differences in relative factor endowment between host and home country explain MNEs' motivation for vertical FDI. However, their study may not explain the main mode of FDI for a specific host country because they do not examine all the modes of inward FDI into the host country.

Most of empirical experiments of FDI determinants have been confined to US or Japanese MNEs' outward investment data because decomposition of foreign affiliate sales by

[1] The main mode of the US outward FDI is shown to be horizontal FDI. The share of local sales in host country by horizontal FDI is 67.4 percent, the share of sales back to the United States by vertical FDI is 10.4 percent, the share of sales to unaffiliated parties in other foreign countries by export-platform FDI is 9.8 percent, and the share of sales to related affiliates in other foreign countries by complex vertical FDI is 12.5 percent.

[2] For a very informative survey on the determinants of FDI patterns, see Blonigen (2005).

destination is available only from US and Japanese firm data.[3] This approach, again, may not clearly characterize the host country specific characteristics of FDI.

In addition, existing studies have estimated effects on sales of foreign affiliates, mainly focusing on exports of final goods. These studies may not precisely distinguish modes of FDI. Although the analysis of the export sales direction of foreign affiliates may identify the mode of FDI, it has some limitations. Modes of FDI are closely related to not only bilateral exports but also bilateral imports. Furthermore, modes of FDI affect not only trade of final products but also trade of intermediate products. Geishecker, Nielsen, and Pawlik (2008) attempt to resolve this limitation by decomposing tradable goods into final and intermediate goods. However, they examine the linkage between foreign capital's share of total capital and export performance to find evidence of MNEs' export-platform activity in Polish manufacturing industries during the period 1994-2002.

Regarding the selection of the case study, China has been chosen because it is the largest recipient of FDI and its economy has performed remarkably well through participation in complex trade and FDI activities. This study will examine production and trade patterns resulting from differentiated modes of FDI determined by MNEs' complex strategies in China. Much of the literature has recognized that complex vertical FDI should be examined in a multilateral context not in a bilateral context. However, little work has been done in this relatively new approach to the Chinese economy. Quite a few empirical examinations have been conducted for the mode of inward FDI into China,[4] but most of them are out of date and fail to resolve the aforementioned limitations.

This research is an attempt to resolve these limitations. This paper investigates the

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[3] For the US outward FDI, see Blonigen, Davies, Waddell, and Naughton (2007); Baltagi, Egger, and Pfaffermayr (2007); and Ekholm, Forsid, and Markusen (2007). For the Japanese outward FDI, see Hayakawa and Matsuura (2009).

[4] Zhang and Song (2000) find significantly positive linkage between inward FDI and provincial manufacturing export performance by using panel data estimation in the period 1986-1997. Zhang (2001) argues that a liberalized FDI regime and market size have attracted huge inward FDI into China by using cross-section and panel data during 1987-1998. However, he notes that China has not fully utilized its market size for inward horizontal FDI because of restrictive FDI regime. On the contrary, Cheng and Kwan (1999) estimate determinants of FDI in 29 Chinese regions by using panel data covering 1985 to1995. They find that both market size and good infrastructure positively contributed to attract more FDI, but wage cost had a negative effect on FDI. Buckley and Meng (2005) also argue that the proportion of market-oriented FDI in total inward FDI in China's manufacturing industry during 1992-2002 was higher than that of export-oriented FDI and showed an increasing trend as the Chinese government has moved toward a more liberalized FDI policy.

link between patterns of trade and modes of FDI by utilizing exports, imports, and inward FDI data for China covering 10 years from 1998 to 2007. The tradable goods are decomposed into final and intermediate goods to clarify the modes of FDI. In addition, this paper examines not only bilateral patterns of trade between home countries and China but also the third country effect of FDI[5] by considering spatial interdependence.[6] As a modeling framework, we construct a modified gravity equation with various specifications, and the problem of endogeneity of FDI is controlled by applying the system generalized method of moments (GMM) estimation technique.

This paper is organized as follows. Section II briefly describes relations between trade and FDI in general and China in particular. Section III specifies gravity equations, relevant estimation techniques, and data used and summarizes empirical findings on the main modes of inward FDI into China. Section IV concludes this research.

II. TRADE AND FDI

1. Modes of FDI and Patterns of Trade

There are two scopes of international production networking between host and home (investing) countries of FDI: bilateral linkage between two countries and multilateral linkage between more than three countries. The international production networking can be activated by four different modes of FDI for MNEs' motives for investment: (i) horizontal FDI for host market access, (ii) vertical FDI for cheap factor inputs available in host country,[7] (iii) export-platform FDI for third country market access,[8] and (iv) complex vertical FDI for multilateral production network building, which has recently attracted more attention regarding third

[5] Yeaple (2003) theoretically proves that the cross-country dependencies become more important as we consider MNEs' complex integration strategies, the third country effect. OECD (2009) describes various linkages between patterns of trade and modes of FDI focusing on vertical trade linked with complex vertical FDI.

[6] For more detailed survey on spatial interdependence, see Blonigen, Davies, Waddell, and Naughton (2007).

[7] For textbook-like studies of FDI focusing on traditional horizontal and vertical FDI, see Navaretti and Venables (2004).

[8] For the export-platform FDI, see Ekholm, Forslid, and Markusen (2007) and Ito (2010).

country effect as a part of export-platform FDI.[9]

The modes of FDI have a close linkage with host countries' patterns of trade. Table 1 predicts an expected change in patterns of trade for a host country by the four modes of FDI. We expect that *horizontal FDI* reduces host country's import demand for final products from investing country substituting for trade. By fragmenting the production process, *vertical FDI* is expected to create more bilateral trade between host and home country. We expect that host country's exports of both final and intermediate goods back to home country and host country's import demand for intermediate goods from home country increase. For the mode of *export-platform FDI*, exports of both final goods and intermediate goods from host country to third countries are expected to rise. The imports of intermediate goods from home to host country may increase, but we exclude this effect to clarify the difference between vertical FDI and export-platform FDI. As an export-platform FDI that considers the third country effect of comparative advantages in various locations, the *complex vertical FDI* deepens multilateral linkages among affiliates of MNEs. The deepening interdependence among the affiliates affects patterns of trade by creating more exports of intermediate goods from host country to third countries and diverting imports of intermediate goods from home to third countries. We ignore the expected increase in the exports of final goods from host to home to distinguish complex vertical FDI from the export-platform FDI.

2. Trade and Investment in China

Inward FDI has played an important role in the remarkable economic performance of the Chinese economy over the past three decades.[10] China has become the largest recipient of FDI and has continued to serve as the world's manufacturing factory. Table 2 highlights the recent economic performance of the Chinese economy with a focus on its openness. We find that the active foreign participation in the Chinese economy can be counted as one of the most important reasons behind its remarkable economic performance. As shown in Table 2, fast growing exports, imports, inward FDI, and outward FDI have contributed to the miraculous GDP growth. In particular, foreign funded enterprises cover more than 50 percent of the Chinese total trade and about 80 percent of its total capital accumulation. Furthermore,

[9] For the complex vertical FDI, see Baltagi (2007) and Blonigen, Davies, Waddell, and Naughton (2007).

[10] Whalley and Xin (2010) estimate that inward FDI contributed 3.4 percentage points to the Chinese GDP growth rate in 2004.

the trade by foreign funded enterprises has grown faster than total trade. The Chinese investment policy is now moving toward an outward-oriented strategy as shown in the growth rates of outward FDI and the share of outward FDI to GDP in Table 2.

There is another important observation to highlight. Regarding the Chinese participation in international production networking, we find that the close bilateral linkage between trade and inward FDI into China has been weakening as shown in Table 3 and Figure 1. From the bilateral trade and investment relations listed in Table 3, we find that the Chinese trade share with major investing countries has decreased over time. The bold-lettered share of exports and imports in each year measures the third country effect of FDI. It may signal that the mode of FDI for China is shifting from vertical FDI to export-platform FDI. Figure 1 also supports this argument. The bilateral correlation between trade and FDI over time has been weakening since 1998. For example, the correlation coefficient of FDI on total trade fell from 0.64 in 1998 to 0.57 in 2003 to 0.51 in 2007.

III. PATTERNS OF TRADE AND MODES OF INWARD FDI INTO CHINA: A GRAVITY REGRESSION ANALYSIS

1. Model Specifications

A. A Modified Gravity Equation of FDI

The basic empirical model that investigates the nature of inward FDI into China is a modified version of a conventional gravity model of bilateral trade flows specified as follow,[11]

$$(1) \qquad Y_{it}^{k} = \alpha + \beta\, GDP_{it} + \gamma' Z + \delta\, FDI_{it} + \eta\, Year_t + \varepsilon_{it}$$

where i denotes China's bilateral partner for trade and investment, t denotes time, and k denotes type of goods–final or intermediate.

[11] Bergstrand and Egger (2009) describe the gravity equation as a workhorse for the study of FDI-related empirical experiments.

- Y is a dependent variable, which is export of final goods (X^F), export of intermediate goods (X^I), import of final goods (M^F), or import of intermediate goods (M^I),[12]
- GDP is real GDP,
- Z is a set of gravity variables that include distance, border, common language, colony, island, and land locked dummy,
- FDI is inward FDI stock,
- $Year$ denotes a set of binary variables, which is unity in the specific year t.

All variables are specified in natural log form, except for dummy variables. The characteristics of China are not included because the host country is always China. However, the characteristics vary over time. The time-series variation is controlled by including year dummies.

B. Specifications for Multilateral Linkages with Considering Spatial Interdependence: Third Country Effect of FDI

Recently, empirical studies on FDI explicitly account for spatial interdependence of FDI, indicating that FDI decisions across various host countries are not independent. Blonigen, Davies, Waddell, and Naughton (2007) examine spatial interactions in empirical FDI models using data on US outward FDI activity. Although the results are sensitive to the sample countries, they show that the estimated relationships of traditional determinants of FDI are robust to the inclusion of spatial interdependence. Using US outward FDI stock data for manufacturing and non-manufacturing industries, Baltagi, Egger, and Pfaffermayr (2007) study the third country effects by considering not only bilateral determinants, but also spatially weighted third country determinants of FDI. They find that the third country effects are significant, though they cannot definitively identify whether export-platform or complex vertical FDI is more dominant.

We adopt the concept of spatial interdependence between a host country of FDI and

[12] For more precise analysis of the link between patterns of trade and modes of FDI, the export and import of final and intermediate goods by foreign funded enterprises in China should be considered. However, the data are not available. This is why most of empirical studies mentioned earlier utilize US or Japanese outward FDI rather than inward FDI, ignoring host country specific effect. We use the total export and import of final and intermediate goods as a proxy because over 50 percent of exports and imports have been performed by foreign funded enterprises in China since 2000 as shown in Table 2.

geographically close third countries for bilateral trade effect of FDI. The spatial interdependence of FDI decisions across various host countries implies in turn that FDI from various source countries is not independent. Following the spatial lag model, the geographical proximity $w(d_{ij})$, the element of the spatial lag weighting matrix (W), is defined as inverse of distance between country *i* and country *j* as follow, $w(d_{ij}) = 1/d_{ij}$.

Since the relative distance, not the absolute distance, does matter, the weighting matrix W is row standardized so that each row in W sums to one. Furthermore, since we analyze only inward FDI into China, we consider only bilateral distance between home country *i* and host country China. Thus, d_i denotes distance between country *i* and China. Then, the geographical proximity is defined as $w(d_i) = w_i = 1/d_i$.

To allow the spatial interdependence of FDI, we modify our basic empirical model with spatially lagged dependent variable, *w*FDI*. In particular, the nature of FDI does not remain constant, but shows significant changes over time. In order to identify such a considerable evolution of FDI and its impact on trade, we allow the interaction of FDI with a linear time trend. Thus, our modified empirical model is expressed as the following equation.

$$(2) \qquad Y_{it}^{k} = \alpha + \beta\, GDP_{it} + \gamma' Z + \delta_1(w_i * FDI_{it}) + \delta_2\, trend + \delta_3\, trend * w_i * FDI_{it} + \eta\, Year_t + \varepsilon_{it}$$

Equation (2), however, shows only bilateral relation between home country *i* and China, so that it does not estimate complex integration strategies of MNEs. In order to explore the effect that FDI from other third countries to China has on trade between China and country *i*, we introduce spatially weighted third-country FDI. Thus, Equation (2) is modified as follow,

$$(3) \qquad Y_{it}^{k} = \alpha + \beta\, GDP_{it} + \gamma' Z + \delta_4(\Sigma_{j \neq i}\, w(d_j) * FDI_{jt}) + \delta_5\, trend + \delta_6\, trend * (\Sigma_{j \neq i}\, w(d_j) * FDI_{jt}) + \eta\, Year_t + \varepsilon_{it}$$

The spatial lag coefficients (δ_4 and δ_6) capture the impact of FDI from third countries on bilateral trade between China and country *i*.

2. Estimation Techniques: Omitted Variable Bias and Endogeneity of FDI

The error term in Equations (1), (2), and (3) consists of three components, $\varepsilon_{it} = \delta_i + \mu_t$

$+ v_{it}$, where μ_t shows time effects that can be controlled by year dummies in the equations. However, there is still unobserved country specific effects δ_i. In this case, ordinary least squares (OLS) estimation suffers from omitted variables bias. The standard solution to this problem is to use the fixed effects estimator that eliminates the term δ_i.

The second econometric issue is the endogeneity of FDI. When exports are regressed on some measure of FDI, this may raise the endogeneity problem of FDI. The best way to deal with the endogeneity problem is using the instrumental variables techniques. However, it is difficult to select appropriate instruments. Arellano and Bover (1995) and Blundell and Bond (1998) suggest a system GMM estimator that combines the level equation with the first-differenced equation and employs both lagged levels and differences as instruments. Performing the Monte Carlo investigation, Kukenova and Monteiro (2009) show that, while the simultaneity bias of the spatial lag is relatively low, the endogeneity bias is serious if it is not corrected. Thus, they propose to apply system GMM that corrects for the endogeneity of the lagged dependent variable and other potentially endogenous variables. Furthermore, it controls for time-invariant country specific effects δ_i, since it employs not only the level equation but also the first-differenced equation.

3. Data

The gravity regression analysis in this study uses annual data featuring a panel structure by covering 180 countries for 10 years from 1998 to 2007.[13] The number of observations varies per year. Summary statistics for the main data used in the estimations are presented in Table 4. Out of total trade, 41.2 percent is trade in final goods and 58.8 percent is trade in intermediate goods. Export share is almost evenly distributed over the two goods. Unlike the export structure, China has been mostly importing intermediate goods (94.8 percent of total imports).

The trade flows data for this study are drawn from the United Nations' Comtrade data for final and intermediate goods classified with the broad economic classification (BEC) three-digit level and International Monetary Fund's *Direction of Trade Statistics* for aggregate values. The data for real GDP at purchasing power parity are from the World Bank's *World*

[13] Our sample period starts from 1998 because this is right after the East Asian financial crisis, and the UN Comtrade data has started to report the data with free of missing since 1998.

Development Indicators. Data on FDI stock are obtained from registered capital of foreign funded enterprise by country in *China Statistical Yearbook* and *China Trade and External Economic Statistical Yearbook*. Distance data come from Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) and other gravity variables are from the US Central Intelligence Agency's *World Factbook*.

4. Empirical Results

We employ a modified gravity model of bilateral trade flows to estimate the trade effects of inward FDIs. The model is based on the concept that trade between two countries, like the gravitational force between two masses, is a function of the country's size (*GDP*) and the distance (*Dist*) between them. Thus, the model estimates normal trade flows and then assesses whether the inward FDI will change those flows.

We expect a positive coefficient for *GDP* and a negative coefficient for *Dist*. A positive coefficient for FDI or distance-weighted [$w(d_i)$] FDI indicates that the inward FDI tends to generate more trade between China and its bilateral trading partner *i*. The model adds an inward FDI from third country *j* [sum of FDI or sum of distance-weighted {$w(d_j)$} FDI from third countries] to China. A positive (negative) coefficient of the variable indicates that the inward FDI from *j* as a home of FDI to China tends to increase (decrease) trade between China and the trading partner *i* as a third country. We define the negative effect (negative coefficient) as the third country effect of inward FDI from *j* on the trade with country *i*. Traditional country-pair specific variables, such as colonial ties, common land border, common languages, island, and land locked dummies are included as control variables. We also control for year effects of common global shocks by adding year dummy variables. The interaction terms with trend indicate dynamic paths of the corresponding variables over time.

A. Trade Effect of Inward FDIs into China in General

Tables 5 and 6 summarize the trade effect of inward FDI into China with two different estimation techniques: fixed effect and random effect estimation.[14] As we interpret the

[14] There are two different estimation techniques in the panel setting: random effects and fixed effects. The random effects estimation assumes that the individual country pair effect is a random variable. In contrast, the fixed effects method assumes the presence of unobserved

random effects on total exports in columns (5) ~ (8) in Table 5, the conventional variables behave the way the model predicts. The bilateral exports are expected to have a significantly positive relation to market size (*GDP*) and a significantly negative relation to bilateral distance (*Dist*) and landlocked dummy. However, the adjacency, colony dummy, and common language dummy are all insignificantly or less significantly positive. The island dummy has a less significantly negative relation to the bilateral exports. This indicates that the market size and distance matter for promoting the bilateral exports, but other transaction costs do not matter. Unlike the effect on exports, the random effects on imports in columns (5) ~ (8) of Table 6 indicate that most of the gravity variables representing the transaction cost do not matter, excluding the colony dummy representing historical background.

From columns (1) and (2) in Table 5 of the fixed effect estimation covering aggregate exports, estimated coefficient on the bilateral FDI both without and with considering the spatial effect is not statistically significant to the Chinese aggregate exports. Moreover, the bilateral linkage between FDI and aggregate exports is weakening as we interpret the interaction terms with trend. However, there is a significant third country effect as in columns (3) and (4), and we find that the third country effect is getting stronger over the period. In particular, as China receives more FDI from third country *j*, bilateral exports to country *i* will significantly decrease with considering the distance-weighted spatial effect (-3.577) compared to the estimated coefficient (-0.031) of the simple sum of FDI coming from third countries.

In the case of aggregate imports reported in columns (1) ~ (4) in Table 6, the response pattern of the Chinese imports to inward FDI is similar to the case of exports. Bilateral inward FDI to China does not affect imports from the home country, and the linkage is weakening over the period. For the third country effect estimated in columns (3) and (4), the bilateral imports from country *i* to China will decrease as China receives more FDI from third countries, and the linkage has been strengthened over the period.

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country-specific factors. The fixed effects estimation can help to alleviate potential specification errors from omitted variables, a cause of an endogeneity problem, such as the "relative distance term" that Polak (1996) introduces and Anderson and van Wincoop (2003) emphasize. The generally accepted way of choosing between fixed and random effects is performing the Hausman specification test (Hausman, 1978), which compares the fixed to random effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model. We conducted the Hausman test and found that the null hypothesis is rejected. Thus, our empirical analysis will focus more on the results from the fixed effect estimation.

In sum, there is no statistically significant relationship, either substitutable or complementary, between bilateral trade and FDI in the Chinese manufacturing industry during the period 1998-2007; that is, we do not find any strong evidence of horizontal or vertical motives of inward FDI into China in the aggregate data. On the contrary, the trade-diverting third country effect of inward FDI into China is proven to be strong.

B. Trade Effect of Inward FDI into China by Types of Goods

In order to answer why MNEs come to China by analyzing trade patterns over the sample period, we re-estimate impacts of inward FDI on the Chinese trade pattern by types of tradable goods, that is, exports and imports of final goods and intermediate goods with country *i*. We conduct two estimation techniques: country fixed effect and system GMM estimation.[15]

In the system GMM estimation, lagged exports and imports and FDI variables such as FDI stock and distance-weighted FDI stock are treated as endogenous. The validity and consistency of the system GMM estimator depend on two assumptions: (i) the lagged value of the dependent variable and other explanatory variables are valid instruments and (ii) the error terms do not show serial correlation. The Sargan test of over-identifying restrictions checks the validity of used instruments. However, the distribution of the Sargan test is not known when the disturbances are heteroskedastic. Since we employ robust estimations that the disturbances are heteroskedastic, the Sargan test is not reported. In order to check whether there is no serial correlation in the first-differenced disturbances, the Arellano-Bond tests are performed. The tests for second order correlation are rejected in all specifications, suggesting that the equations are appropriately specified.

Exports of Final Goods: From column (5) in Table 7, we find that a 10 percent increase in FDI from bilateral partner country *i* creates 0.4 percent more bilateral exports of final goods from China to the investing country *i*. The positive trade creating effect is strongly significant when we consider the distance between bilateral partners of FDI as shown in column (6). It is evidence of vertical FDI. However, the positive linkage has been weakened over the period.

[15] The country fixed effects estimation helps to alleviate potential specification errors from omitted variables. The system GMM estimation corrects for the endogeneity problem and controls for time-invariant country specific effects. In this session, we interpret the empirical results based on the system GMM estimation.

In addition to the direct linkage, columns (7) and (8) indicate that the third country effect on the Chinese exports of final goods is not very significant but is expected to strengthen. This means that there is no evidence of export-platform FDI or complex vertical FDI because the inward FDI from country *j* does not create additional exports to country *i,* which is treated as a third country in this specification.

Exports of Intermediate Goods: Table 8 summarizes the impact of inward FDI on the pattern of intermediate exports. An increase in distance-weighted FDI from bilateral partner country *i* induces more bilateral exports of intermediate goods from China to the investing country *i*, more evidence of vertical FDI, and the positive linkage has been weakened over the period. Compared to the exports of final goods, the third country effect on Chinese exports of intermediate goods is stronger (-7.195 compared to -2.203). Moreover, the third country effect has been strengthened. It also means that there is no evidence of export-platform FDI.

Imports of Final Goods: From columns (5) and (6) in Table 9, we find that a 10 percent increase in FDI from bilateral partner country *i* creates 2.1 percent more bilateral imports of final goods to China from country *i*, and the increase in distance-weighted FDI is also import creating. This finding strongly supports the assertion that there is no evidence of horizontal FDI.

Imports of Intermediate Goods: Table 10 summarizes the impact of inward FDI on the pattern of intermediate imports. From column (6), we find that an increase in distance-weighted FDI from bilateral partner country *i* induces more bilateral imports of intermediate goods to China from the country *i,* and the positive linkage has been weakened over time. This indicates the possibility of vertical FDI and export-platform FDI. Columns (7) and (8) indicate that there will be no significant third country effect on the imports of intermediate goods, although the third country effect has been strengthened. It indicates that there is no evidence of complex vertical FDI.

C. Clarification of Modes of Inward FDI into China

Table 11 summarizes the relations between patterns of Chinese trade and modes of inward FDI into China based on the expected effect of different modes of inward FDI on

patterns of trade in Table 1. We find that the inward FDI to China enhances significantly more bilateral trade (both exports and imports) of final goods and intermediate goods, but this is expected to weaken over the period. In addition, we find that the third country effects on exports of final and intermediate goods and imports of intermediate goods are not very significant but are expected to strengthen over the period.

In sum, we find strong evidence of vertical FDI of importing intermediate goods from the home country to China and exporting final goods back to the home country, but no evidence of horizontal, export-platform, or complex vertical FDI. However, the most important mode of vertical FDI into China is losing its dominance over the period, and the modes of export-platform and complex vertical FDI have taken more attention.

IV. CONCLUDING REMARKS

We conducted a modified gravity regression analysis in order to find main modes of inward FDI into China during the period 1998-2007 by estimating linkages between patterns of trade and inward FDI with considering distance-weighted third country effect. The problem of endogeneity was controlled by applying system GMM estimation technique.

We found that there is no evidence of statistically significant substitutability and complementarity between bilateral trade and FDI in the aggregate data. On the contrary, the trade-diverting third country effect of inward FDI to China is proven to be strong. As we decomposed the aggregate trade data into final and intermediate goods, we found that there is strong evidence of vertical FDI into China but no evidence of horizontal, export-platform, or complex vertical FDI. However, the motivation of vertical FDI has been diminishing, and the modes of export-platform and complex vertical FDI have begun to emerge.

This implies that China has imported intermediate inputs from the home country of inward FDI, produced final goods or parts and components, and exported them back to the home country. Recently, however, we have noticed that there has been a diversion trend of the vertical linkage from the home country to third countries. This indicates that the modes of inward FDI to China have been shifting from “home export base” to “third country export base”.

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Table 1. Patterns of Trade and Modes of FDI in General

Patterns of Trade		Modes of FDI	Bilateral Linkages		Multilateral Linkages	
			Horizontal	Vertical	Export-platform	Complex Vertical
Exports	Final goods	Home		+		
		3rd Country			+	
	Intermediate goods	Home		+		
		3rd Country			+	+
Imports	Final goods	Home	-			
		3rd Country				
	Intermediate goods	Home		+		
		3rd Country				+

Note: + (-) refers to the positive (negative) trade effect expected from the corresponding FDI.

Table 2. Trade and FDI in China: Overview

	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Value (100 Million US Dollars)										
GDP (Current)	7,280.1	11,984.8	13,248.0	14,538.3	16,409.7	19,316.4	22,570.7	27,168.7	35,055.3	45,327.9
GDP (Constant 2000)	7,927.9	11,984.8	12,979.5	14,160.7	15,576.7	17,150.0	19,088.0	21,512.1	24,566.8	26,925.3
Total Trade	2,808.6	4,742.9	5,096.5	6,207.7	8,509.9	11,545.5	14,219.1	17,604.0	21,737.3	25,632.6
Exports	1,487.8	2,492.0	2,661.0	3,256.0	4,382.3	5,933.2	7,619.5	9,689.4	12,177.8	14,306.9
Imports	1,320.8	2,250.9	2,435.5	2,951.7	4,127.6	5,612.3	6,599.5	7,914.6	9,559.5	11,325.6
Trade Balance	167.0	241.1	225.5	304.3	254.7	320.9	1,020.0	1,774.8	2,618.3	2,981.3
Trade by Foreign Funded Enterprises	1,098.2	2,367.1	2,591.0	3,302.4	4,721.7	6,631.8	8,316.4	10,362.7	12,551.6	14,099.2
Exports	468.8	1,194.4	1,332.4	1,699.9	2,403.1	3,386.1	4,441.8	5,637.8	6,953.7	7,904.9
Imports	629.4	1,172.7	1,258.6	1,602.5	2,318.6	3,245.7	3,874.6	4,724.9	5,597.9	6,194.3
Trade Balance	-160.7	21.7	73.7	97.3	84.4	140.4	567.3	912.9	1,355.8	1,710.6
Inward FDI	375.2	407.1	468.8	527.4	535.0	606.3	724.1	727.2	835.2	1,083.1
Outward FDI	20.0	9.2	68.9	25.2	28.5	55.0	122.6	211.6	224.7	521.5
Number of Registered Enterprises (households)	233,564	203,208	202,306	208,056	226,373	242,284	260,000	274,863	286,232	434,937
Total Investment	6,390.1	8,246.8	8,750.1	9,818.9	11,173.5	13,112.0	14,639.9	17,076.0	21,088.0	23,241.3
Registered Capital	3,991.2	4,839.5	5,057.9	5,521.2	6,226.4	7,285.0	8,120.3	9,465.0	11,554.0	13,005.5
Capital from Foreign Investors	2,568.8	3,372.0	3,596.8	4,020.0	4,657.8	5,580.0	6,319.3	7,406.0	9,211.0	10,388.5

Table 2. Trade and FDI in China: Overview (Continued)

	1995	2000	2001	2002	2003	2004	2005	2006	2007	2008
Growth Rate (%)										
GDP			8.3	9.1	10.0	10.1	11.3	12.7	14.2	9.6
Total Trade			7.5	21.8	37.1	35.7	23.2	23.8	23.5	17.9
Exports			6.8	22.4	34.6	35.4	28.4	27.2	25.7	17.5
Imports			8.2	21.2	39.8	36.0	17.6	19.9	20.8	18.5
Trade by Foreign Funded Enterprises			9.5	27.5	43.0	40.5	25.4	24.6	21.1	12.3
Exports			11.5	27.6	41.4	40.9	31.2	26.9	23.3	13.7
Imports			7.3	27.3	44.7	40.0	19.4	21.9	18.5	10.7
Inward FDI			15.1	12.5	1.4	13.3	19.4	0.4	14.9	29.7
Outward FDI			651.9	-63.4	13.4	92.6	123.0	72.6	6.2	132.1
Number of Registered Enterprises			15.1	12.5	1.4	13.3	19.4	0.4	14.9	29.7
Total Investment			651.9	-63.4	13.4	92.6	123.0	72.6	6.2	132.1
Registered Capital			-0.4	2.8	8.8	7.0	7.3	5.7	4.1	52.0
Capital from Foreign Investors			6.1	12.2	13.8	17.3	11.7	16.6	23.5	10.2
Share (%)										
Trade by Foreign Funded Enterprises to Total Trade	39.1	49.9	50.8	53.2	55.5	57.4	58.5	58.9	57.7	55.0
Exports	31.5	47.9	50.1	52.2	54.8	57.1	58.3	58.2	57.1	55.3
Imports	47.7	52.1	51.7	54.3	56.2	57.8	58.7	59.7	58.6	54.7
Trade Balance	-96.2	9.0	32.7	32.0	33.1	43.7	55.6	51.4	51.8	57.4
Inward FDI to GDP	4.9	3.2	3.3	3.4	2.9	2.8	3.5	2.9	3.9	3.3
Outward FDI to GDP	0.3	0.1	0.5	0.2	0.0	0.1	0.5	0.8	0.5	1.2
Capital by Foreign Investors to Total Registered Capital	64.4	69.7	71.1	72.8	74.8	76.6	77.8	78.2	79.7	79.9

Sources: National Bureau of Statistics of China (http://www.stats.gov.cn/english/statisticaldata/yearlydata/)
World Bank (http://databank.worldbank.org/ddp/home.do?Step=1&id=4)
UNCTAD, *Handbook of Statistics,* 2009.

Table 3. Trade and FDI in China: Country of Origin and Destination

	Rank	1995		2000		2005		2008	
Exports (Destination)	1	Hong Kong	24.2	United States	20.9	United States	21.4	United States	17.6
	2	Japan	19.1	Hong Kong	17.9	Hong Kong	16.3	Hong Kong	13.3
	3	United States	16.6	Japan	16.7	Japan	11.0	Japan	8.1
	4	Korea	4.5	Korea	4.5	Korea	4.6	Korea	5.2
	5	Germany	3.8	Germany	3.7	Germany	4.3	Germany	4.1
	6	Singapore	2.4	**Netherlands**	**2.7**	**Netherlands**	**3.4**	**Netherlands**	**3.2**
	7	**Netherlands**	**2.2**	United Kingdom	2.5	**United Kingdom**	**2.5**	**United Kingdom**	**2.5**
	8	Taiwan	2.1	Singapore	2.3	Singapore	2.2	**Russia**	**2.3**
	9	United Kingdom	1.9	Taiwan	2.0	Taiwan	2.2	Singapore	2.3
	10	**Italy**	**1.4**	**Italy**	**1.5**	**Russia**	**1.7**	**India**	**2.2**
Imports (Origin)	1	Japan	22.0	Japan	18.4	Japan	15.2	Japan	13.3
	2	United States	12.2	Taiwan	11.3	Korea	11.6	Korea	9.9
	3	Taiwan	11.2	Korea	10.3	Taiwan	11.3	Taiwan	9.1
	4	Korea	7.8	United States	9.9	United States	7.4	United States	7.2
	5	Hong Kong	6.5	Germany	4.6	Germany	4.7	Germany	4.9
	6	Germany	6.1	Hong Kong	4.2	**Malaysia**	**3.0**	**Australia**	**3.3**
	7	**Russia**	**2.9**	**Russia**	**2.6**	Singapore	2.5	**Malaysia**	**2.8**
	8	Singapore	2.6	**Malaysia**	**2.4**	**Australia**	**2.5**	**Saudi Arabia**	**2.7**
	9	**Italy**	**2.4**	Singapore	2.2	**Russia**	**2.4**	**Brazil**	**2.6**
	10	**Canada**	**2.0**	**Australia**	**2.2**	**Thailand**	**2.1**	**Thailand**	**2.3**
FDI inflow (Origin)	1	Hong Kong	53.4	Hong Kong	38.1	Hong Kong	29.8	Hong Kong	44.4
	2	Japan	8.5	United States	10.8	Virgin Islands	15.0	Virgin Islands	17.3
	3	Taiwan	8.4	Virgin Islands	9.4	Japan	10.8	Singapore	4.8
	4	United States	8.2	Japan	7.2	Korea	8.6	Japan	4.0
	5	Singapore	4.9	Taiwan	5.6	United States	5.1	Cayman Islands	3.4
	6	Korea	2.8	Singapore	5.3	Singapore	3.7	Korea	3.4
	7	United Kingdom	2.4	Korea	3.7	Taiwan	3.6	United States	3.2
	8	Macao	1.2	United Kingdom	2.9	Cayman Islands	3.2	Samoa	2.8
	9	Germany	1.0	Germany	2.6	Germany	2.5	Taiwan	2.1
	10	Virgin Islands	0.8	France	2.1	Samoa	2.2	Mauritius	1.6

Notes: (1) Figures are ratio (%) to total.

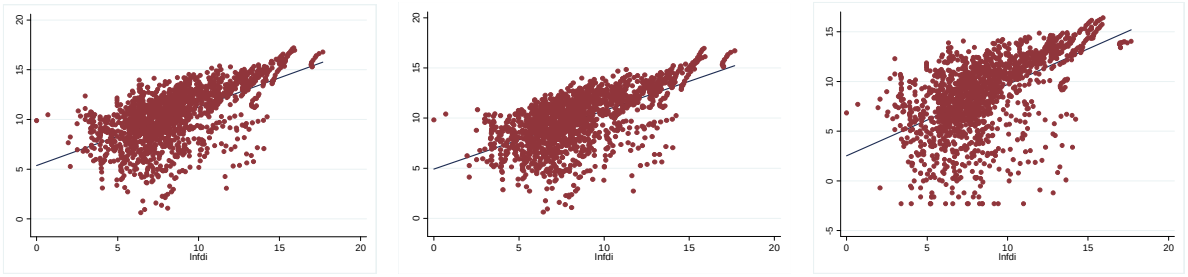
(2) Bold-lettered countries listed in export destination and import origin are not in the top 10 ranked FDI origin.

Source: National Bureau of Statistics of China. http://www.stats.gov.cn/english/statisticaldata/yearlydata/

Figure 1. Trade and FDI: Bilateral Relations Between China and Home Countries

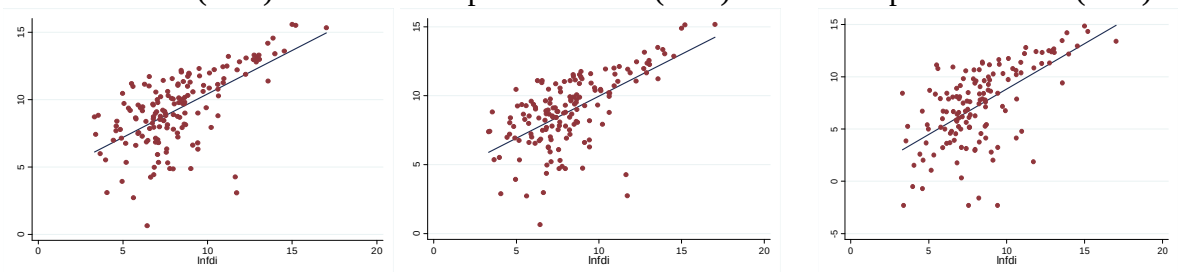
1998-2007

Trade and FDI (0.59) Exports and FDI (0.58) Imports and FDI (0.72)



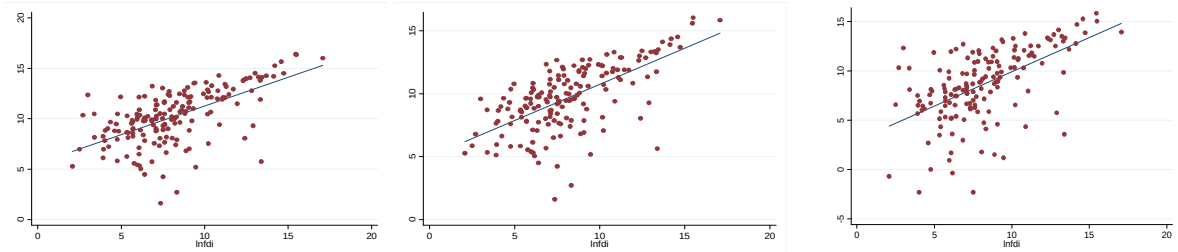
1998

Trade and FDI (0.64) Exports and FDI (0.61) Imports and FDI (0.87)



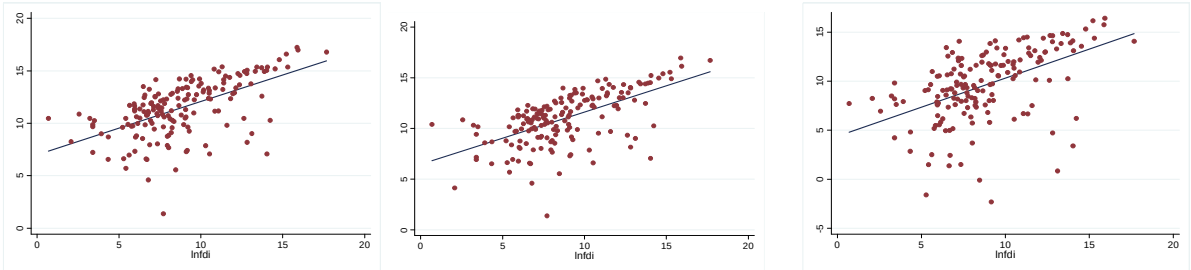
2003

Trade and FDI (0.57) Exports and FDI (0.57) Imports and FDI (0.70)



2007

Trade and FDI (0.51) Exports and FDI (0.51) Imports and FDI (0.59)



Note: Figures in parenthesis are estimated coefficients of *ln (FDI)* on *ln (Trade, Exports, or Imports)*

Table 4. Summary Statistics

Variable	Observations	Mean (100 Million US Dollars)	Share (%)
Trade (Exports + Imports)		11,755.7	100.0
Final Goods		4,837.6	41.2
Intermediate Goods		6,918.1	58.8
Exports		9,539.5	100.0
Final Goods	1724	4,722.1	49.5
Intermediate Goods	1737	4,817.4	50.5
Imports		2,216.2	100.0
Final Goods	1389	115.6	5.2
Intermediate Goods	1636	2,100.6	94.8
FDI	1668	4,315.6	

Table 5. Impact of FDIs on Total Exports

Dependent Variable: $ln\ X^{total}$	Fixed Effect				Random Effect			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ln\ X^{total}(-1)$	0.487 (0.025)***	0.482 (0.025)***	0.494 (0.023)***	0.491 (0.023)***	0.891 (0.010)***	0.896 (0.010)***	0.881 (0.010)***	0.889 (0.009)***
ln GDP	1.009 (0.138)***	1.138 (0.137)***	0.941 (0.138)***	1.061 (0.137)***	0.087 (0.010)***	0.090 (0.010)***	0.097 (0.010)***	0.099 (0.010)***
ln FDI	0.010 (0.016)				0.026 (0.010)**			
$w(d_i)$*ln FDI		-1.290 (2.154)				0.587 (0.470)		
Σ *ln FDI*			-0.031 (0.010)***				-0.027 (0.008)***	
$\Sigma_j w(d_j)$ *ln FDI*				-3.577 (1.732)**				-0.963 (0.487)**
trend (1998=1)	0.159 (0.016)***	0.132 (0.009)***	-4.665 (1.663)***	-1.583 (0.504)***	0.085 (0.013)***	0.066 (0.006)***	-3.179 (1.664)**	-0.912 (0.536)*
*trend*ln FDI*	-0.004 (0.001)***				-0.003 (0.001)**			
*trend**$w(d_i)$*ln FDI*		-0.174 (0.060)***				-0.096 (0.095)		
*trend**Σ *ln FDI*			0.004 (0.001)***				0.003 (0.001)**	
*trend**$\Sigma_j w(d_j)$ *ln FDI*				0.230 (0.060)***				0.117 (0.062)*
Distance					-0.073 (0.025)***	-0.073 (0.034)**	-0.065 (0.026)**	-0.045 (0.035)
Border					0.009 (0.047)	0.003 (0.047)	0.008 (0.057)	0.004 (0.048)
Colony					0.040 (0.131)	0.051 (0.134)	0.082 (0.139)	0.077 (0.143)
Common language					0.116 (0.083)	0.157 (0.084)*	0.139 (0.087)	0.165 (0.089)*
Island					-0.054 (0.031)*	-0.039 (0.030)	-0.057 (0.032)*	-0.040 (0.031)
Land locked					-0.062 (0.029)**	-0.060 (0.029)**	-0.074 (0.029)**	-0.067 (0.029)**
Obs.	1,372	1,372	1,457	1,457	1,372	1,372	1,457	1,457
R-sq	0.89	0.88	0.91	0.90	0.98	0.98	0.98	0.98

Note: Robust standard errors are in parentheses. Intercept and year dummies are included but not reported. *, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively.

Table 6. Impact of FDIs on Total Imports

Dependent Variable: $ln\ M^{total}$	Fixed Effect				Random Effect			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ln\ M^{total}(-1)$	0.255 (0.026)***	0.264 (0.026)***	0.253 (0.025)***	0.259 (0.026)***	0.778 (0.016)***	0.778 (0.016)***	0.783 (0.015)***	0.781 (0.015)***
ln GDP	0.835 (0.389)**	1.403 (0.386)***	0.989 (0.378)***	1.47 (0.374)***	0.256 (0.029)***	0.161 (0.027)***	0.255 (0.029)***	0.259 (0.027)***
ln FDI	0.065 (0.049)				0.022 (0.033)			
$w(d_i)$*ln FDI		1.561 (6.444)				2.091 (1.459)		
Σ *ln FDI*			-0.069 (0.032)**				-0.017 (0.027)	
$\Sigma_j w(d_j)$ *ln FDI*				-2.149 (5.183)				-2.373 (1.455)
trend (1998=1)	0.359 (0.047)***	0.207 (0.025)***	-21.493 (4.914)***	-5.016 (1.402)***	0.062 -0.042	0.055 (0.020)***	-0.75 (5.289)	-0.267 (1.606)
*trend*ln FDI*	-0.017 (0.004)***				-0.001 (0.004)			
*trend**$w(d_i)$*ln FDI*		-0.551 (0.176)***				-0.066 (0.184)		
*trend**Σ *ln FDI*			0.015 (0.003)***				0.001 (0.004)	
*trend**$\Sigma_j w(d_j)$ *ln FDI*				0.579 (0.168)***				0.067 (0.186)
Distance					-0.058 (0.078)	0.086 (0.109)	-0.045 (0.079)	0.12 (0.108)
Border					-0.143 (0.145)	-0.111 (0.146)	-0.235 (0.142)*	-0.192 (0.143)
Colony					0.893 (0.412)**	0.762 (0.418)*	0.995 (0.418)**	0.829 (0.425)*
Common language					0.389 (0.257)	0.308 (0.254)	0.461 (0.257)*	0.337 (0.258)
Island					0.031 (0.101)	0.047 (0.097)	0.037 (0.103)**	0.05 (0.099)
Land locked					-0.052 (0.087)	-0.038 (0.088)	-0,050 (0.087)	-0.034 (0.087)
Obs.	1,279	1,279	1,337	1,337	1,279	1,279	1,337	1,337
R-sq	0.79	0.75	0.78	0.75	0.89	0.89	0.89	0.89

Note: Robust standard errors are in parentheses. Intercept and year dummies are included but not reported. *, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively.

Table 7. Impact of FDIs on Exports of Final Goods

Dependent Variable: $ln\ X^F$	Country Fixed Effect				System GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ln\ X^F(-1)$	0.567 (0.023)***	0.565 (0.023)***	0.553 (0.022)***	0.554 (0.022)***	0.669 (0.047)***	0.689 (0.054)***	0.707 (.059)***	0.732 (0.059)***
ln GDP	0.789 (0.141)***	0.918 (0.140)***	0.841 (0.138)***	0.965 (0.138)***	0.299 (0.077)***	0.235 (0.080)***	0.211 -0.139	0.211 -0.144
ln FDI	0.009 (0.017)				0.038 (0.023)*			
$w(d_i)$*ln FDI*		-2.410 (2.232)				2.340 (0.882)***		
Σ *ln FDI*			-0.020 (0.010)**				-0.025 (0.13)*	
$\Sigma_j w(d_j)$ *ln FDI*				-0.939 (1.748)				-2.203 (2.508)
trend (1998=1)	0.128 (0.016)***	0.097 (0.009)***	-5.962 (1.711)***	-1.960 (0.510)***	0.117 (0.018)***	0.092 (0.010)***	-2.929 (2.287)	-1.159 (0.318)
*trend*ln FDI*	-0.004 (0.001)***				-0.004 (0.002)**			
trend$w(d_i)$*ln FDI*		-0.180 (0.062)***				-0.170 (0.044)***		
*trend*Σ ln FDI*			0.004 (0.001)***				0.002 (0.002)	
trend$\Sigma_j w(d_j)$ ln FDI*				0.230 (0.060)***				0.159 (0.047)***
Obs.	1,358	1,358	1,438	1,438	1,358	1.358	1,438	1.438
R-sq	0.92	0.9	0.92	0.92				
AR(1)					0.00	0.00	0.00	0.00
AR(2)					0.62	0.61	0.89	0.91

Note: Robust standard errors are in parentheses. Intercept and year dummies are included but not reported. *, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively. Instrument used for level equation in system GMM estimation is ΔX^F_{it-1} and difference of the FDI variables (ΔFDI_{it-1}, $\Delta wFDI_{it-1}$). Additional instrument for differenced equation is X^F_{it-2} and the FDI variables (FDI_{it-2} and $wFDI_{it-2}$). The distribution of the Sargan test is not known under the assumption of the robust estimation that the disturbances are heteroskedastic, so the Sargan test is not reported.

Table 8. Impact of FDIs on Exports of Intermediate Goods

Dependent Variable: $ln\ X^I$	Country Fixed Effect				System GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ln\ X^I(-1)$	0.422 (0.023)***	0.415 (0.024)***	0.462 (0.023)***	0.456 (0.024)***	0.433 (0.091)***	0.434 (0.094)***	0.445 (0.072)***	0.438 (0.079)***
ln GDP	1.311 (0.143)***	1.421 (0.142)***	1.193 (0.152)***	1.281 (0.151)***	0.725 (0.184)***	0.736 (0.215)***	0.830 (0.256)***	0.874 (0.263)***
ln FDI	-0.009 (0.017)				0.02 (0.029)			
$w(d_i)$*ln FDI*		-3.005 (2.287)				2.847 (1.565)*		
Σ *ln FDI*			-0.027 (0.011)**				-0.034 (0.023)	
$\Sigma_j w(d_j)$ *ln FDI*				-4.243 (1.964)**				-7.195 (3.284)*
trend (1998=1)	0.158 (0.016)***	0.140 (0.010)***	-2.437 (1.876)	-1.455 (0.569)**	-0.499 (0.201)**	-0.540 (0.247)**	0.522 (4.273)	3.761 (3.195)
*trend*ln FDI*	-0.003 (0.001)*				-0.004 (0.002)*			
trend$w(d_i)$*ln FDI*		-0.166 (0.064)**				-0.170 (0.068)**		
*trend*Σ ln FDI*			0.002 (0.001)				0.003 (0.003)	
trend$\Sigma_j w(d_j)$ ln FDI*				0.226 (0.068)***				0.229 (0.008)***
Obs.	1,368	1.368	1.451	1.451	1,368	1,368	1,451	1.451
R-sq	0.85	0.83	0.87	0.87				
AR(1)					0.01	0.00	0.00	0.00
AR(2)					0.60	0.59	0.19	0.20

Note: Robust standard errors are in parentheses. Intercept and year dummies are included but not reported. *, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively. Instrument used for level equation in system GMM estimation is ΔX^I_{it-1} and difference of the FDI variables (ΔFDI_{it-1} and $\Delta wFDI_{it-1}$). Additional instrument for differenced equation is X^I_{it-2} and the FDI variables (FDI_{it-2} and $wFDI_{it-2}$). The distribution of the Sargan test is not known under the assumption of the robust estimation that the disturbances are heteroskedastic, so the Sargan test is not reported.

Table 9. Impact of FDIs on Imports of Final Goods

Dependent Variable: $ln\ M^F$	Country Fixed Effect				System GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ln\ M^F(-1)$	0.204 (0.031)***	0.206 (0.031)***	0.223 (0.031)***	0.229 (0.031)***	0.506 (0.071)***	0.494 (0.078)***	0.475 (0.069)***	0.404 (0.075)***
ln GDP	-0.034 (0.581)	0.291 (0.572)	-0.357 (0.569)	-0.084 (0.567)	0.448 (0.254)*	0.525 (0.417)	0.704 (0.387)*	0.448 (0.429)
ln FDI	0.094 (0.062)				0.21 (0.094)**			
$w(d_i)$*ln FDI*		3.999 (7.684)				5.723 (3.338)*		
Σ *ln FDI*			0.002 (0.043)				-0.097 (0.077)	
$\Sigma_j w(d_j)$ *ln FDI*				3.883 (6.763)				-38.586 (16.887)**
trend (1998=1)	0.265 (0.062)***	0.184 (0.033)***	-11.775 (6.440)*	-1.245 (1.578)	0.014 (0.111)	0.061 (0.033)*	9,811 (14.822)	1.739 (2.274)
*trend*ln FDI*	-0.008 (0.005)*				0.003 (0.010)			
*trend**$w(d_i)$*ln FDI*		-0.208 (0.191)				0.056 (0.164)		
*trend**Σ *ln FDI*			0.008 (0.005)*				-0.005 (0.010)	
*trend**$\Sigma_j w(d_j)$ *ln FDI*				0.096 (0.193)				0.366 (0.210)*
Obs.	1,013	1,013	1,046	1,046	1,013	1,103	1,046	1,046
R-sq	0.66	0.74	0.11	0.47				
AR(1)					0.00	0.00	0.00	0.00
AR(2)					0.15	0.16	0.08	0.09

Note: Robust standard errors are in parentheses. Intercept and year dummies are included but not reported. *, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively. Instrument used for level equation in system GMM estimation is ΔM^F_{it-1} and difference of the FDI variables (ΔFDI_{it-1}, $\Delta wFDI_{it-1}$). Additional instrument for differenced equation is M^F_{it-2} and the FDI variables (FDI_{it-2} and $wFDI_{it-2}$). The distribution of the Sargan test is not known under the assumption of the robust estimation that the disturbances are heteroskedastic, so the Sargan test is not reported.

Table 10. Impact of FDIs on Imports of Intermediate Goods

Dependent Variable: $ln\ M^I$	Country Fixed Effect				System GMM			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$ln\ M^I(-1)$	0.232 (0.027)***	0.235 (0.027)***	0.216 (0.027)***	0.216 (0.027)***	0.377 (0.104)***	0.384 (0.101)***	0.361 (0.079)***	0.357 (0.079)***
ln GDP	0.620 (0.520)	1.321 (0.506)***	0.730 (0.527)	1.296 (0.514)**	0.466 (0.228)**	0.536 (0.327)	1.156 (0.422)***	0.998 (0.437)**
ln FDI	0.158 (0.066)**				0.127 (0.098)			
$w(d_i)$*ln FDI*		11.322 (8.533)				7.442 (3.206)**		
Σ *ln FDI*			-0.124 (0.045)***				-0.061 (0.088)	
$\Sigma_j w(d_j)$ *ln FDI*				-11.985 (7.357)				-13.856 (13.569)
trend (1998=1)	0.399 (0.064)***	0.228 (0.034)***	-21.849 (6.942)***	-5.666 (1.895)***	0.304 (0.081)***	0.182 (0.041)***	2.327 (17.392)	-2.418 (1.776)
*trend*ln FDI*	-0.020 (0.005)***				-0.016 (0.007)**			
trend$w(d_i)$*ln FDI*		-0.760 (0.228)***				-0.444 (0.225)**		
*trend*Σ ln FDI*			0.016 (0.005)***				0.000 (0.011)	
trend$\Sigma_j w(d_j)$ ln FDI*				0.787 (0.229)***				0.465 (0.227)**
Obs.	1,201	1,201	1,253	1,253	1,201	1.201	1,253	1,253
R-sq	0.73	0.69	0.71	0.68				
AR(1)					0.00	0.00	0.00	0.00
AR(2)					0.61	0.59	0.54	0.58

Note: Robust standard errors are in parentheses. Intercept and year dummies are included but not reported. *, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively. Instrument used for level equation in system GMM estimation is ΔM^I_{it-1} and difference of the FDI variables ($\Delta\sum FDI_{it-1}$ and $\Delta\sum wFDI_{it-1}$). Additional instrument for differenced equation is M^I_{it-2} and the FDI variables ($\sum FDI_{it-2}$ and $\sum wFDI_{it-2}$). The distribution of the Sargan test is not known under the assumption of the robust estimation that the disturbances are heteroskedastic, so the Sargan test is not reported.

Table 11. Summary Result from System GMM Estimations: Why Do MNEs Come To China?

Patterns of Trade		Modes of FDI	Bilateral Linkages		Multilateral Linkages	
			Horizontal	Vertical	Export-platform	Complex Vertical
Exports	Final goods	Home		+ Yes*** but Weakening***		
		3rd Country			+ No* but Strengthening***	
	Intermediate goods	Home		+ Yes* but Weakening**		
		3rd Country			+ No* but Strengthening***	+ No* but Strengthening***
Imports	Final goods	Home	- No*			
		3rd Country				
	Intermediate goods	Home		+ Yes** but Weakening**		
		3rd Country				+ No but Strengthening**

Notes: + (-) refers to the positive (negative) trade effect expected from the corresponding FDIs.
Yes (No) if the expected sign is satisfied (dissatisfied).
*, **, and *** indicate that the estimated coefficients are statistically significant at 10 percent, 5 percent, and 1 percent, respectively.