How much can foreign multinationals affect the Chinese economy?
A dynamic general equilibrium analysis of Japanese FDI

María C. Latorre [*]

and

Nobuhiro Hosoe [†]

April 9, 2014

Abstract

We analyze the impacts of a sharp fall of foreign direct investment (FDI) by the largest investor in China, namely Japan, that occurred after the financial crisis in 2009. The study is conducted by means of a three-region (Japan, China, and the rest of the world (ROW)) recursive dynamic computable general equilibrium (CGE) model with multinational enterprises (MNEs) driven by FDI. Our simulation experiment showed that the FDI fall would cause price rises of Japanese affiliates' goods and a depreciation of the Renminbi. These two forces with the FDI fall would heavily reduce exports and production of Japanese MNE affiliates, while increasing those in Chinese manufacturing. This, however, does not mean that China would be a gainer, because it would experience a contraction in its service sector. Its losses in its service sector would exceed the gains in the manufacturing sectors. Therefore, China would lose due to the FDI fall in total.

JEL classification codes: C68, F21, F23, F17

[*] Universidad Complutense de Madrid, Dpto. Economía Aplicada II, Campus de Somosaguas, 28223, Pozuelo de Alarcón, Madrid, Tel: +34 91 394 39 57, Fax: 34 91 394 24 57, E-mail: mmunozla@ucm.es, Corresponding author.

[†] National Graduate Institute for Policy Studies, 7-22-1 Roppongi, Minato, Tokyo 106-8677, Japan, Tel: +81-3-6439-6129, Fax: +81-3-6439-6010, E-mail: nhosoe@grips.ac.jp.

1. Introduction

In the *World Investment Prospect Survey* by UNCTAD, China always appeared as the world's most attractive destination of foreign direct investment (FDI) in 2008-2012.[1] Among many countries, Japan is the largest economy investing in China, accounting for 7.3% of the total cumulative FDI flows, preceding the U.S. (5.8%) and several major European countries (e.g., Germany, UK and France together account for 4.1%).[2] This large FDI has been a powerful engine accelerating the Chinese economy (Kim et al., 2003; Dean et al., 2009). However, after the financial crisis in 2009, the FDI inflow fell sharply (Figure 1). The mechanism boosting Chinese GDP and exports was anticipated to work oppositely in turn and to affect its macroeconomy adversely. This concern is often pointed (e.g., Whalley and Xin, 2010; and Zhang, 2013), but only few studies have measured the magnitude of the negative impacts on the macroeconomy and output of industries that have committed to accepting FDI heavily.

Figure 1: Japanese FDI flows in China 2001-2010 (in millions of nominal US dollars)
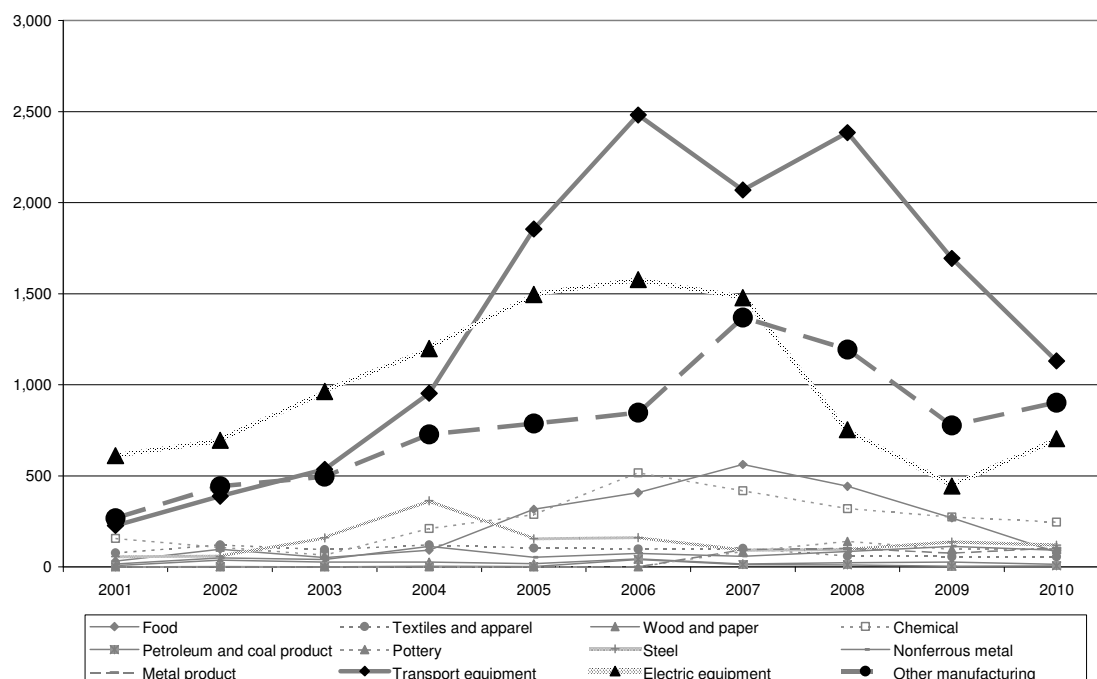
Source: Compiled by the authors based on METI data.

Japanese multinational enterprises (MNEs) in China are predominant in manufacturing

---

[1] "China" refers to mainland China unless otherwise specified.
[2] A large part of cumulative FDI inflows to China stem from Hong Kong (35%) and "other (undefined)" (33.5%) (Xing, 2010). Although Hong Kong appears as the largest FDI donor to China, most of its FDI originally comes from different countries. Thus, it is hard to know who the ultimate investor is (Ramstetter, 2011).

sectors (Greaney and Li, 2009; Dean et al., 2009). FDI concentrates especially in three sectors of transport equipment, electric equipment and other manufacturing (Figure 1). They steadily increased before the crisis and then decreased sharply. The sharp FDI fall affected especially these major FDI host sectors. Its negative impact can affect various activities of these sectors, in terms of production, employment and foreign trade (Markusen, 2002).

Moreover, the impact of the FDI fall did not affect the Chinese economy alone. A tight linkage between China and Japan has been rapidly developed by the steadily growing FDI from Japan. MNE affiliates and local firms compete and/or interdepend with each other in input markets (material, cheap labor and capital goods) and output markets (domestic sales and exports), whose pattern widely differs by sector. Baldwin-Okubo (2013) diagrams visualize their different patterns by sector (Figures 2 and 3). For example, the position of food in Figure 2 (at the top right corner) indicates typical horizontal FDI with heavy dependence on the host economy for input sourcing and output sales. In contrast, the position of the electric equipment sector (close to the southwest corner) indicates export-platform FDI, where input is sourced mostly abroad and output is also sold mostly abroad. Japanese MNE affiliates work as a part of global supply chains. The position of the transport equipment sector in Figure 2 also indicates horizontal FDI, where the majority of input is sourced locally and output is mostly sold in the Chinese local market. This type of FDI was made by Japanese automobile companies in North America.

In these diagrams, many sectors are located in the center. Their patterns of competition and interdependence between the host and donor countries are not as clear as what the simple dichotomy of, say, vertical vs. horizontal FDI tells us. The impact of the FDI fall can be propagated in a complex manner between China and Japan and among sectors. Therefore, we need to employ a framework that can distinguish and describe different technologies and activities of MNE affiliates and local firms, and to quantify the ultimate impacts of the FDI fall on the macroeconomy.

Figure 2: Sales/Sourcing Patterns of Japanese MNE Affiliates to/from China
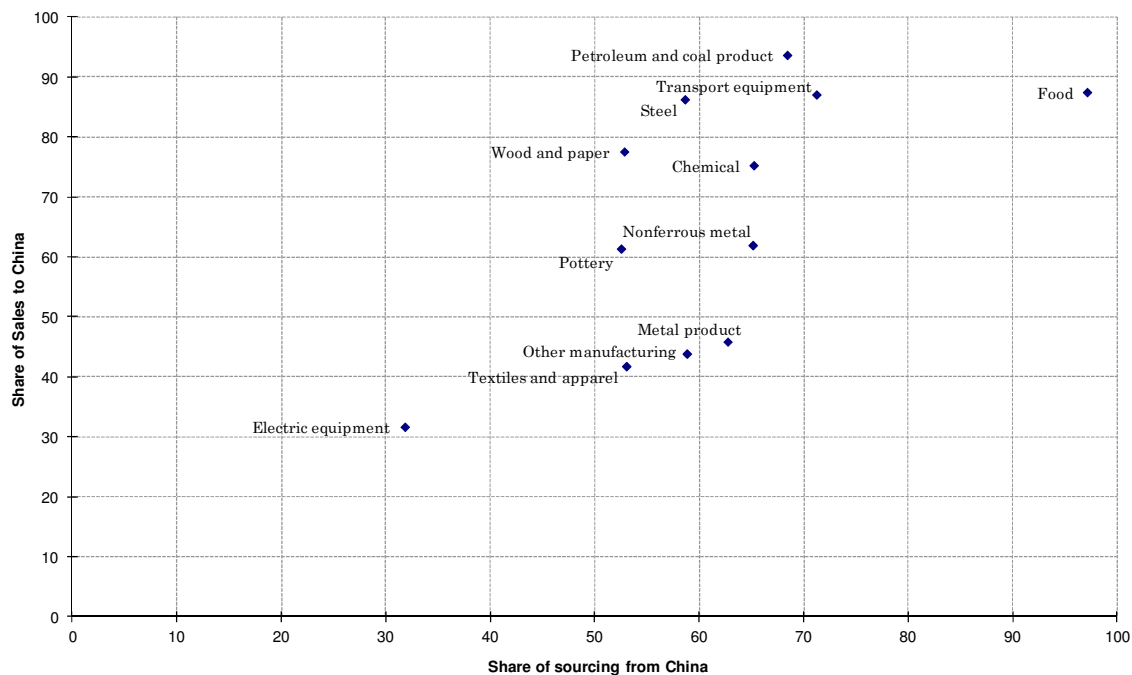
Source: Compiled by the authors based on METI data.

Figure 3: Sales/Sourcing Patterns of Japanese MNE Affiliates to/from Japan
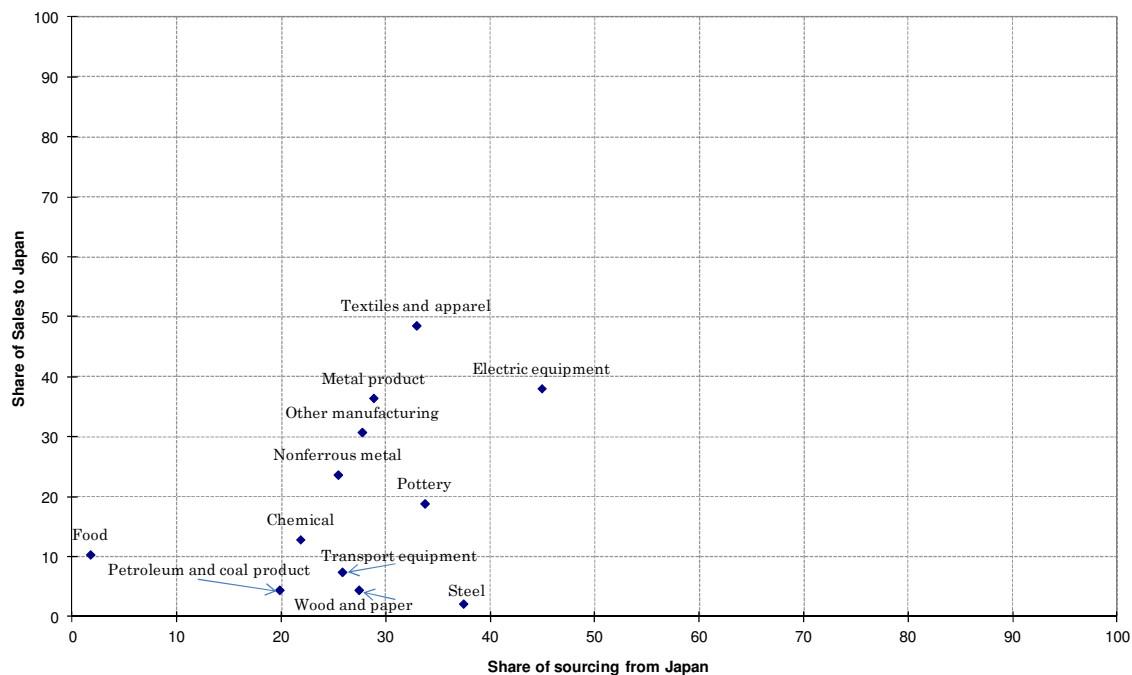
Source: Compiled by the authors based on METI data.

While the fall of FDI inflow in China is marked (Figure 1) and the potential effects of the decrease in FDI could be *a priori* very vast (Lipsey, 2002; Barba Navaretti and Venables, 2004;

Latorre, 2009), its impact has not been examined well either empirically or quantitatively considering both macro and microeconomic impacts comprehensively. This is partly because the literature of FDI has concentrated on the cause and result of their expansion, which has been prominent in the last decade in Asia. Armstrong (2009) studied determinants of Japanese FDI in China but not its impact to the Chinese economy. Xing (2006) found that the devaluation of Renminbi (RMB) substantially increased Japanese FDI to China. Locational attractiveness for Japanese FDI has been examined in many studies (e.g., Blaise, 2005; Cassidy Andreosso-O'Callaghan, 2006; Cheng, 2007; Kawai, 2009). Tanaka and Hashiguchi (2012) used firm-level data and measured technological spillovers from MNE affiliates to their nearby local firms in China. From a macroeconomic perspective, Whalley and Xin (2010) decomposed the GDP growth of China and found a substantial contribution of FDI inflow to the growth. Hosoe (2014) analyzed the impact of a power crisis in Japan on its FDI to China with a dynamic world trade CGE model and found that FDI would be intensified in power consuming sectors. Gómez Plana and Latorre (2014) studied impacts of deinvestment in Spain with a static single country CGE model with FDI. However, given the unique pattern of FDI in Asia as pointed by Baldwin and Okubo (2013) and Petri (2012), we cannot directly apply the implication of that Spanish case to this Chinese case.

In this study, we tried to answer the following two main questions. The first one is how the fall of FDI from Japan to China has transformed these domestic economies in terms of, especially, industrial composition and competition between local firms and MNE affiliates. The second question is how much the evolution of FDI has changed the comparative advantages of their industries and the resulting trade patterns between them. The effects of the reduction of Japanese FDI flows in China have been studied with a world trade and recursive dynamic CGE model, calibrated to the GTAP database version 8 (Hertel, 1997). The presence and activities of Japanese MNE affiliates in China, in terms of sourcing of input and sales of output, is described with their rich and detailed survey dataset by METI, which is used complementarily to model MNEs in our CGE model. With a numerical experiment, we found the FDI fall would directly cause contraction of Japanese MNE affiliates' output and that Chinese local firms would take over their role in manufacturing. This, however, does not mean China would be the gainer because its service sector would be adversely affected. In contrast, Japan would reduce manufacturing output by its MNE

affiliates in China and local firms but increase service output to finally gain in GDP.

The rest of the paper is organized as follows. The next section explains the model used in our analysis. Section 3 describes the data and the simulation run. The main results are discussed in section 4, followed by the concluding Section 5.
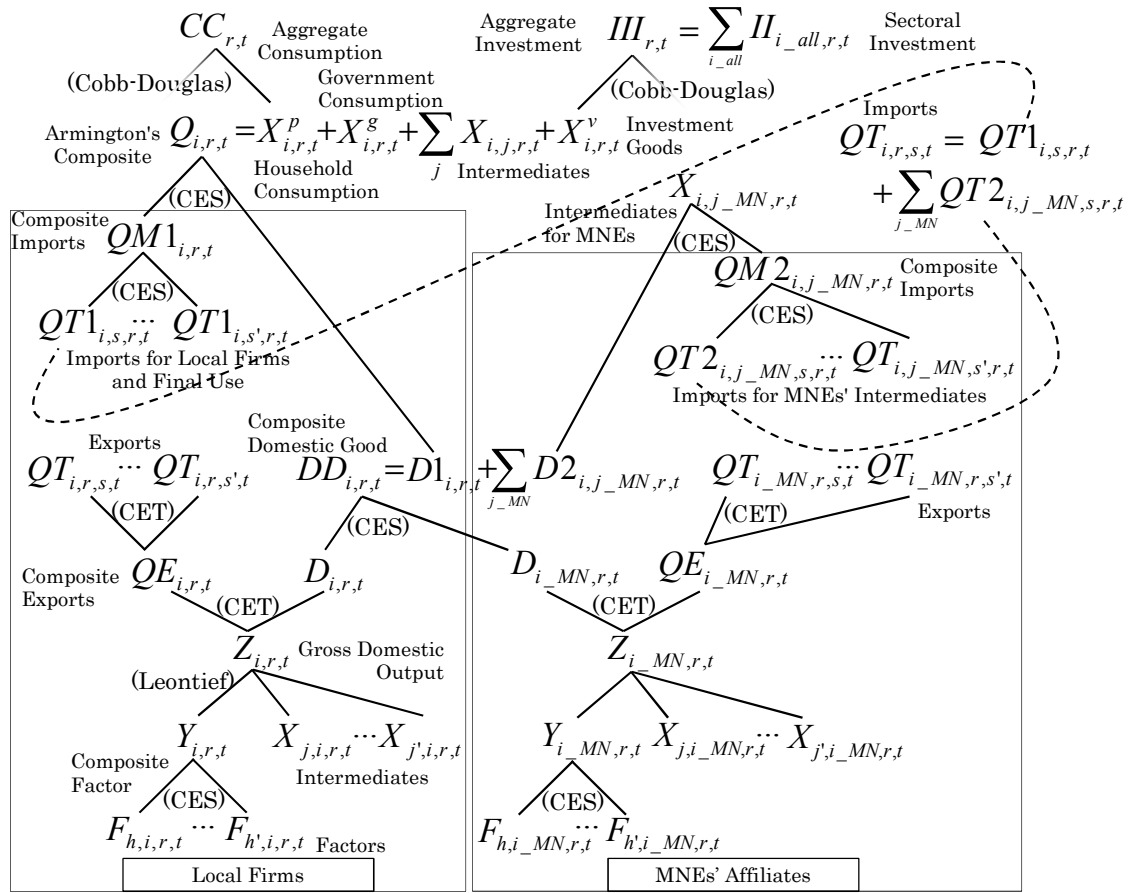
2.   Model

We develop a 20-sector and 3-region (Japan, China, and the rest of the world (ROW)) world trade CGE model with recursive dynamics (Table 1). This sectoral aggregation pattern is chosen to use the METI data, which show the above-documented concentration of Japanese FDI in Chinese manufacturing, with maximum details conformable to the GTAP sectors. This model follows the line of the CGE model by Hosoe (2014) with nested constant elasticity of substitution (CES)/transformation (CET) structure, and distinction of MNE affiliates from local firms in 12 Chinese manufacturing sectors (Figure 4). No MNE affiliates are, however, assumed to operate in either Japan or the ROW, but only China hosts MNE affiliates established by Japanese FDI.

Table 1: Sectoral Aggregation

Abbreviation	Sector
AGR	Agriculture
COA	Coal (mining)
OIL	Oil (mining)
GAS	Gas (mining)
FOD, FOD2*	Food
TXA, TXA2*	Textiles and apparel
WPP, WPP2*	Wood and paper
CHM, CHM2*	Chemical
PTC, PTC2*	Petroleum and coal product
POT, POT2*	Pottery
STL, STL2*	Steel
NFM, NFM2*	Nonferrous metal
MET, MET2*	Metal product
TEQ, TEQ2*	Transport equipment
EEQ, EEQ2*	Electric equipment
MAN, MAN2*	Other manufacturing
ELY	Electricity (energy)
TWG	Town gas (energy)
TRS	Transportation
SRV	Service

*: Sectors hosting Japanese MNE affiliates in China.

Figure 4: Structure of the CGE Model for FDI Analysis (within a period)

$CC_{r,t}$ Aggregate Consumption

(Cobb-Douglas)

Government Consumption

Aggregate Investment $III_{r,t} = \sum_{i\_all} II_{i\_all,r,t}$ Sectoral Investment

(Cobb-Douglas)

Armington's Composite $Q_{i,r,t} = X^p_{i,r,t} + X^g_{i,r,t} + \sum_j X_{i,j,r,t} + X^v_{i,r,t}$ Investment Goods

Household Consumption   Intermediates

Imports $QT_{i,r,s,t} = QT1_{i,s,r,t} + \sum_{j\_MN} QT2_{i,j\_MN,s,r,t}$

Composite Imports $QM1_{i,r,t}$

(CES)

$QT1_{i,s,r,t} \cdots QT1_{i,s',r,t}$

Imports for Local Firms and Final Use

Intermediates for MNEs $X_{i,j\_MN,r,t}$

(CES)

$QM2_{i,j\_MN,r,t}$ Composite Imports

(CES)

$QT2_{i,j\_MN,s,r,t} \cdots QT_{i,j\_MN,s',r,t}$

Imports for MNEs' Intermediates

Exports $QT_{i,r,s,t} \cdots QT_{i,r,s',t}$

(CET)

Composite Domestic Good $DD_{i,r,t} = D1_{i,r,t} + \sum_{j\_MN} D2_{i,j\_MN,r,t}$

(CES)

Composite Exports $QE_{i,r,t}$ $D_{i,r,t}$

(CET)

$D_{i\_MN,r,t}$ $QE_{i\_MN,r,t}$

(CET)

$QT_{i\_MN,r,s,t} \cdots QT_{i\_MN,r,s',t}$ Exports

$Z_{i,r,t}$ Gross Domestic Output

(Leontief)

$Z_{i\_MN,r,t}$

Composite Factor $Y_{i,r,t}$ $X_{j,i,r,t} \cdots X_{j',i,r,t}$ Intermediates

(CES)

$Y_{i\_MN,r,t}$ $X_{j,i\_MN,r,t} \cdots X_{j',i\_MN,r,t}$

(CES)

$F_{h,i,r,t} \cdots F_{h',i,r,t}$ Factors

$F_{h,i\_MN,r,t} \cdots F_{h',i\_MN,r,t}$

Local Firms

MNEs' Affiliates

Source: Adopted and modified from Hosoe (2014)

For this study, we made two modifications in the original model. While Hosoe (2014) assumed that both of the FDI and local investment were endogenously determined according to the sectoral mass and the rate of returns, we exogenize the FDI so that we can manipulate it to examine their hypothetical changes in our counter-factual simulation. Second, we simplify the model by omitting energy composite that was installed to describe substitution among various energy inputs.

The input pattern (domestic vs. imported) and thus the cost structure of MNE affiliates and local firms are separately estimated using the METI data (Table 2). That is, Chinese local firms will exhibit different costs compared to the Japanese MNE affiliates operating in the same sector. This feature was absent in many earlier CGE models with MNEs, as Latorre (2009) reviewed. Furthermore, by assuming two separate Armington's (1969) CES/CET structure for local firms and MNE affiliates as shown in the left and right panels in Figure 4 respectively, we can assume different import-domestic demand ratios and export-domestic supply ratios between these two subsectors to reflect their import sourcing/export sales patterns. The output of these two

subsectors (i.e., the domestic good produced by the local firms $D_{i,CHN,t}$ and that of the MNE affiliates $D_{i\_MN,CHN,t}$) are combined into a composite domestic good $DD_{i,CHN,t}$ using a CES aggregation function. This structure depicts competition between MNE affiliates and local firms. For this CES function, we use the elasticity of substitution often assumed for that between imports and domestic goods provided by the GTAP database, following Latorre et al. (2009).

Table 2: Sales, Exports, and Imports of Japanese MNE Affiliates and their Share in Total Sectoral Sales, Exports, and Imports in China

| Sector	Sales [mil. USD]	Share [%]	Exports [mil. USD]	Share [%]	Imports [mil. USD]	Share [%]
Food	4,809	1	600	2.5	95	0.08
Textiles and apparel	3,132	0.7	1,821	1.1	1,114	0.64
Wood and paper	598	0.2	138	0.3	182	0.12
Chemical	6,470	0.9	1,598	7.4	1,541	0.81
Petroleum and coal product	270	0.1	17	0.00	71	0.00
Pottery	1,063	0.3	410	1.6	311	0.05
Steel	5,145	1.1	704	1.9	1,847	0.89
Nonferrous metal	1,630	0.7	619	3.8	441	0.12
Metal product	1,460	0.7	790	1.8	343	0.44
Transport equipment	45,333	12.7	5,839	14.3	10,042	4.39
Electric equipment	30,306	6.2	20,710	7.5	16,081	1.15
Other manufacturing	37,474	3.2	21,064	6.2	11,422	0.99

Source: compiled by the authors with METI data for sales, exports and imports and with the GTAP Database for sectoral total sales, exports and imports.

Dynamics is intrinsically driven by savings with a constant propensity to save (Figure 5). The savings are allocated among sectoral investment for domestic firms $II_{j,r,t}$ and the MNE affiliates (only in China) $II_{j\_MN,CHN,t}$. The domestic sectoral investment $II_{j,r,t}$ is determined by the share of their sectoral operating surplus $p^{f}_{CAP,j,r,t}{}^{\zeta} F_{CAP,j,r,t}$ in their total.[3] In contrast, the FDI $II_{j\_MN,CHN,t}$ is set to be exogenous for our counter-factual simulation as discussed above. This investment (or new capital) is added to the original putty-clay type capital stocks for the next period. Feeding a population growth rate pop, which drives the labor endowment $FF_{h\_mob,r,t}$, a depreciation rate dep, and a rate of returns of capital ror, the model generates a

---

[3] By manipulating the parameter ζ, we can change adjustment speed of capital stock through installation of new capital in reaction to yield gaps among sectors. In this study, we assume ζ =1.

constantly-growing path.

Figure 5: Dynamic Model Structure for the j-th Sector in Japan
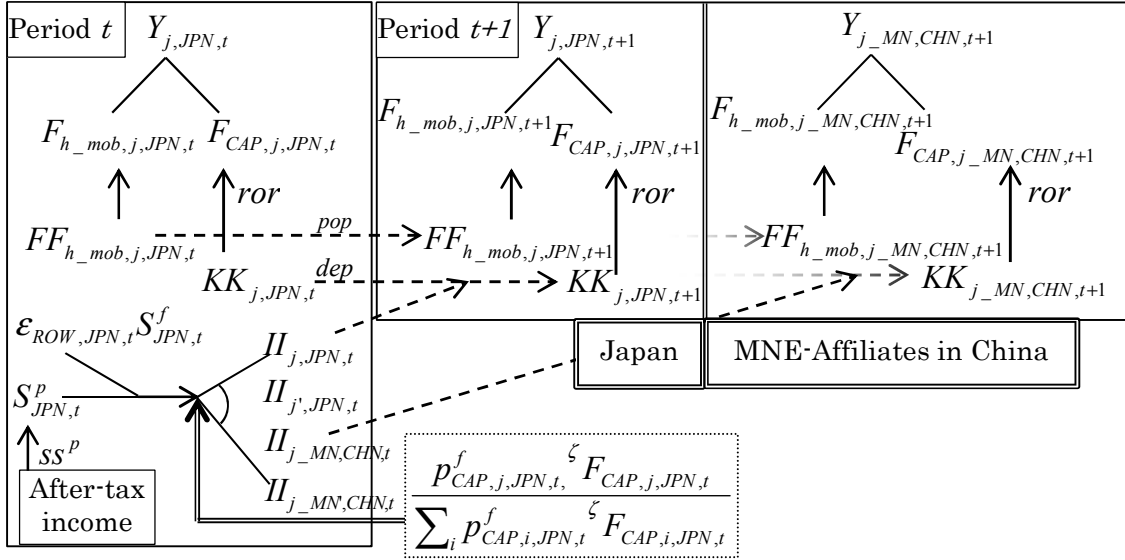
Source: Adopted and modified from Hosoe (2014)

3. Data and Simulation Scenario

We use the GTAP database version 8 for the year 2007 (Hertel, 1997). As mentioned above, one of the strengths of our simulations lies in the use of a detailed dataset describing Japanese subsidiaries in China and their FDI evolution. We compute the share of Japanese affiliates in all the Chinese manufacturing industries by using *Survey of Overseas Business Activities* by METI for 2007 and the annual average foreign exchange rate (117.754 JPY/USD) reported in *International Financial Statistics* by IMF for 2007. Table 2 shows that the share of Japanese MNE affiliates in their sectoral sales in China is sizable in such sectors as transport equipment (12.7%), electronic equipment (6.2%) and other manufacturing (3.2%).[4] These sectors have been major FDI recipients in the recent evolution of these inward flows to China (Figure 1). Table 2 shows that the presence of Japanese MNE affiliates is often larger in exports than that in output, but smaller in imports. This relatively low dependence on imported intermediates would imply a relatively weak backward linkage with their Japanese headquarters.

---

[4] Sectoral sales are used to separate input and output of Japanese MNE affiliates from those of Chinese local firms, following a common practice used in CGE models with MNEs (e.g., Lakatos and Fukui, 2013).

We assume a business-as-usual (BAU) path that is constantly growing at the rate of 2% p.a. as the base of our comparative dynamics and run this recursive dynamic model for five periods to measure a short-run impact of the FDI fall.[5] In our counter-factual scenario, FDI flows are assumed to fall by the magnitude as large as its average decline during 2007-2011 (Table 3). Across all manufacturing sectors, FDI flows were reduced by 34% in these five years on average. Behind this general reduction, there are a few sectors that experienced a positive FDI change.

Table 3: Average Growth Rate of FDI Inflows [2007-2010] [%]

Host Sector in China	FDI Growth Rate
Food	-85
Textiles and apparel	-44
Wood and paper	-16
Chemical	-40
Petroleum and coal product	-59
Pottery	15
Steel	32
Nonferrous metal	57
Metal product	12
Transport equipment	-45
Electric equipment	-51
Other manufacturing	-33
Total	-34

Source: Computed by the authors based on the METI data.

4.   Simulation Results

4.1   Sectoral Impact

The output of Japanese MNE affiliates in China would fall in general. Among 12 manufacturing sectors, the food sector would experience the largest decrease of output by 18% while the nonferrous metals sector would show the largest increase by 12% (Figure 6). This is because we assumed that the former experienced the largest reduction of FDI by 85% and that the latter did the largest increase of FDI by 57%. Comparing the assumed magnitude of FDI changes with that of the resulting output changes of MNE affiliates, the ratio is 4-5:1 in all sectors but the petroleum and coal product sector. That is, about 20-25% of the original magnitude of FDI changes would be transmitted to the output changes.

---

[5] The direction of the impacts would not change even when we extend the time horizon of our experiment.

Figure 6: Impact on Manufacturing Output (Deviations from the BAU in Period 5, %)
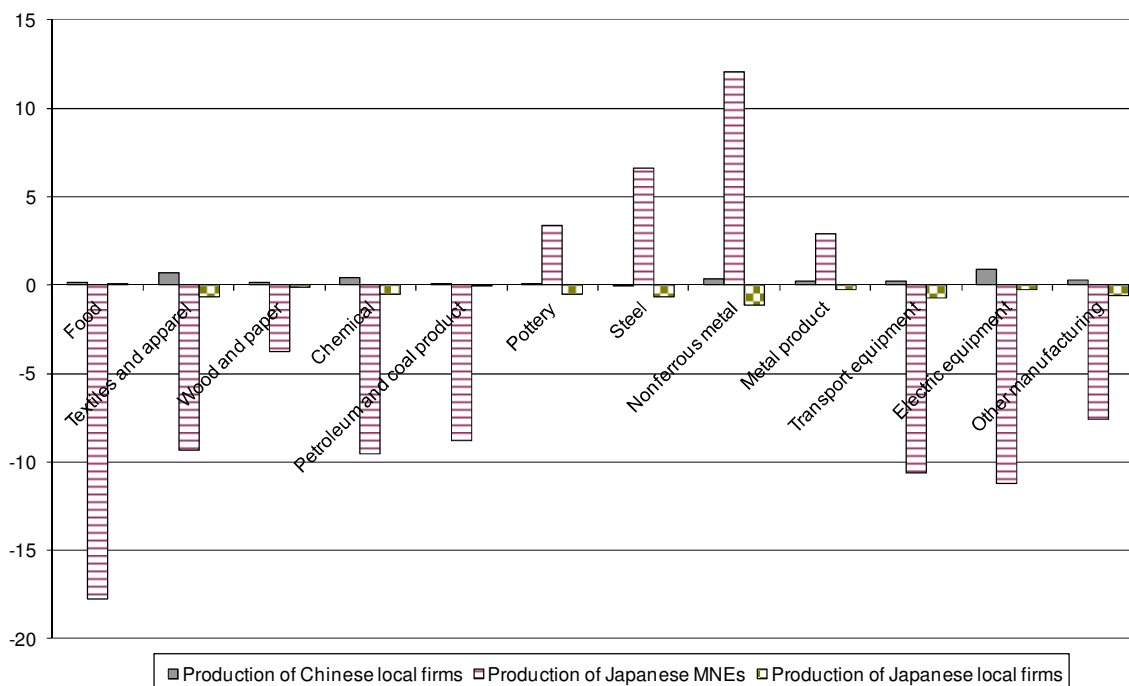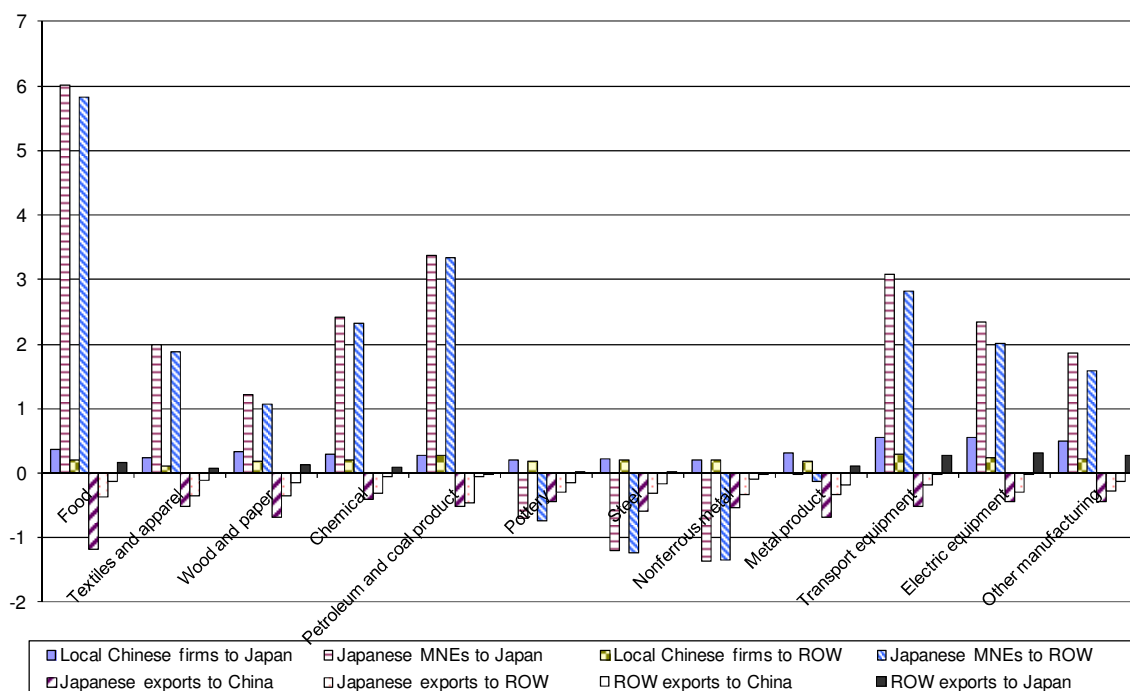

Source: Simulation results

The impact of FDI changes on output of local firms in China and Japan would be relatively small. This is because their market sizes are very large compared with the MNE affiliates' output (Table 2). However, a deeper analysis of their changes can tell us richer implications. In China, the electric equipment sector would gain most, followed by the textiles and apparel sector. Japanese MNE affiliates in these sectors are located in the north-east part among these 12 sectors in the Baldwin-Okubo (2013) diagram (Figure 3). That is, these MNE affiliates are most (but not fully) dependent on Japan both in sourcing and sales among these 12 sectors. In their absence due to their FDI fall, Chinese local firms would take over the role that Japanese MNE affiliate played and increase their output. Many other Chinese local manufacturing sectors would gain. Their gains would be larger when their rival MNE affiliates show a more conspicuous contraction.

In Japan, all sectors but food would reduce their output although we often expect that the FDI fall could lead to a return of investment to the domestic sectors and thus increase of their output in Japan. This puzzling result is caused partly because the contraction of MNE affiliates in China would reduce demand for intermediates supplied by Japanese local firms. However, as many of the Japanese MNE affiliates are not so much dependent on intermediates imported from Japan

(Figure 3), this would not be the decisive reason. The key driver of this phenomenon is rather a foreign exchange rate.

The patterns of FDI flows would not only affect production of Japanese MNE affiliates but also their prices. A lower level of capital accumulation by FDI would result in higher capital remunerations and thus higher product prices and their export prices of MNE affiliates (Figure 7)[6]. This export price rise would make the MNE affiliates' exports less competitive and reduce them (Figure 8). The bilateral trade between China and Japan would contract (1.0% for the Chinese exports and 2.5 % for the Japanese exports) (Table 4). At the same time, the FDI fall would directly reduce demand of the RMB for investing in China. They would jointly make the RMB depreciate by -0.8% vis-à-vis the Japanese yen (JPY) and less (around -0.3%) against the US dollar (USD). This RMB depreciation would cause the decrease of the Japanese exports and output.
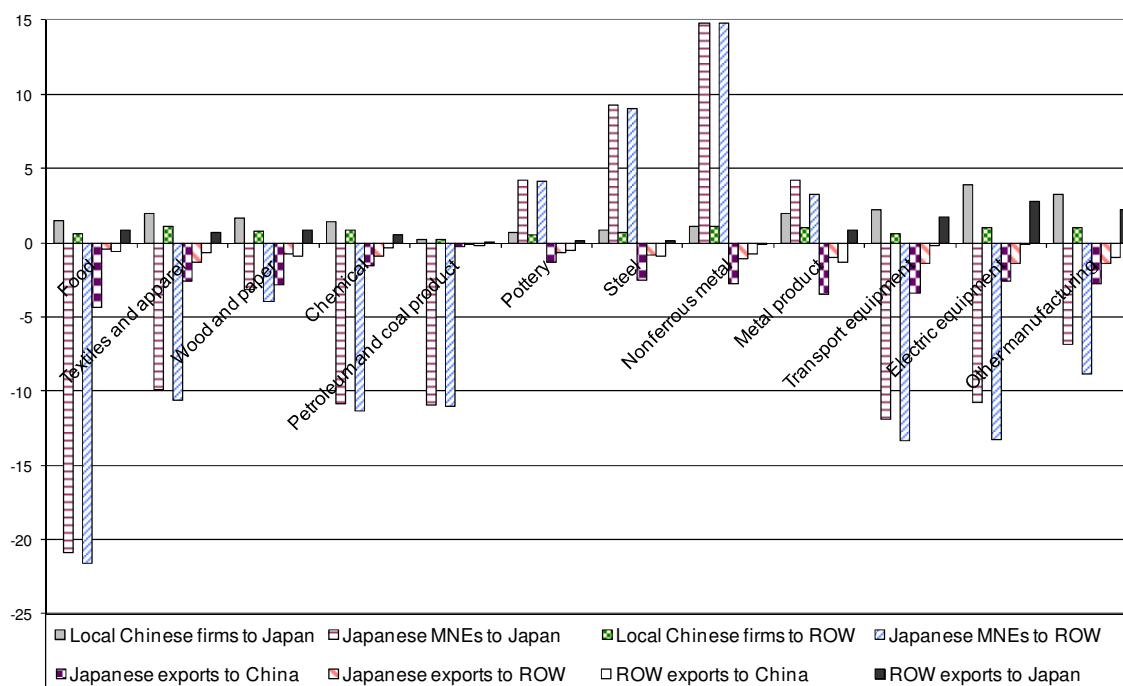
Figure 7: Impact on Manufacturing Export Prices (Deviations from the BAU in Period 5, %)

Source: Simulation results

---

[6] The export prices are measured relative to a numeraire price (index of Armington's composite good prices).

Figure 8: Impact on Manufacturing Exports (Deviations from the BAU in Period 5, %)

Source: Simulation results

Table 4: Total Output and Exports of the 12 Manufacturing Sectors (Deviations from the BAU in Period 5, %)

	Output	Exports	Exports to China	Exports to Japan	Exports to ROW
China	0.09	0.50	-	-0.97	0.66
Chinese local firms	0.32	1.03	-	2.27	0.93
Japanese MNEs	-8.90	-9.42	-	-8.79	-10.23
Japan	-0.42	-1.49	-2.49	-	-1.25
ROW	0.00	0.01	-0.51	1.18	0.01

Note: Laspeyres quantity indexes are computed on the basis of simulation results.

4.2   Aggregate Impact

Just because the total manufacturing output would increase in China and decrease in Japan, can we conclude that China would be a gainer and that Japan would be a loser? To answer this question, we need to examine the impacts on the non-manufacturing sectors. This RMB depreciation would discourage exports and production of tradable sectors (i.e., manufacturing) in Japan and then make investment in these sectors less profitable. Finally, resources would move into the service sector to increase its output by 0.2% (Figure 9). In contrast, Chinese manufacturing sectors would expand while its service sector would contract by 0.3%.

Figure 9: Impact on Non-manufacturing Output (Deviations from the BAU in Period 5, %)
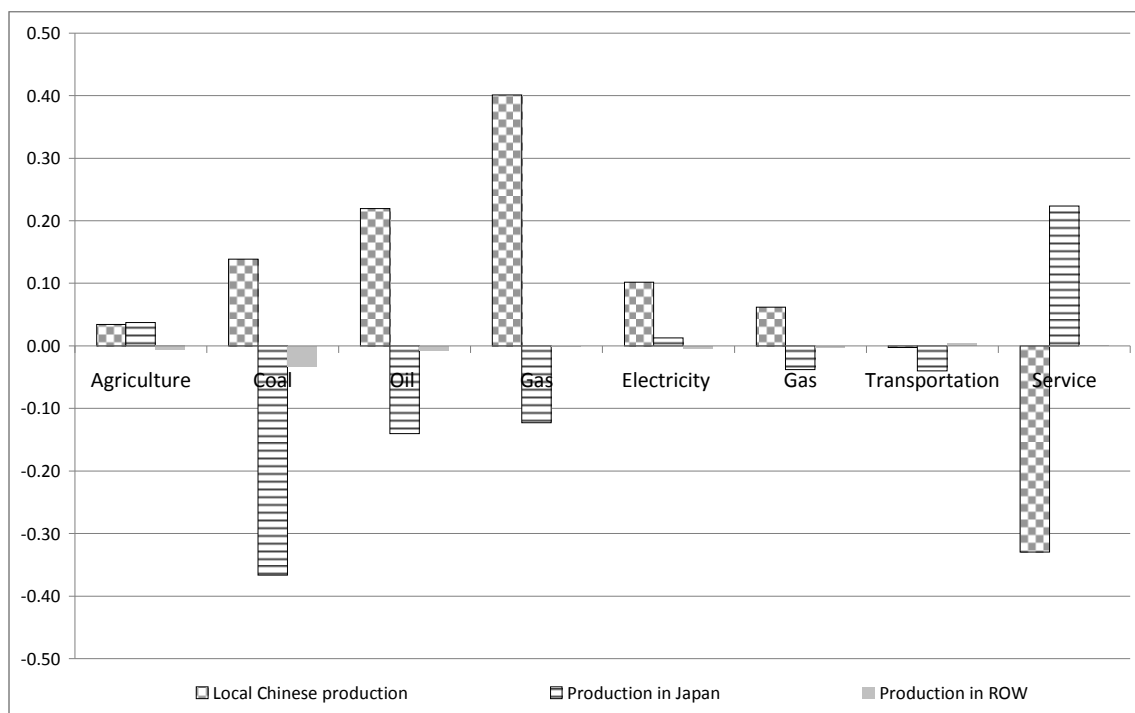
Source: Simulation results

As no direct shock is assumed in the non-manufacturing sectors, their output changes would be found small across sectors and regions. On the other hand, the services sector is very large, among these non-manufacturing sectors, accounting for 28% and 58% of overall production in China and Japan, respectively. Even a small output change in this sector could have a large significance. Combining the gains in manufacturing with the losses in service, China would be found a loser in terms of its GDP/GNP (Figure 10). With the same logic, Japan would be found a gainer in total. The nationality of capital stocks is not changed in our simulation but only their location where capital stocks are installed is changed (i.e., FDI vs. domestic investment). Therefore, GNP would not be affected so significantly; the change of GDP would be found larger. Among two types of labor forces, the wage rate of skilled labor would fall larger than that of unskilled labor. As the service sector in China employs skilled labor more intensively in China, its contraction would affect skilled labor more severely.

Figure 10: Impact on Welfare, GDP, GNP, and Wages (Deviations from the BAU in Period 5, %)
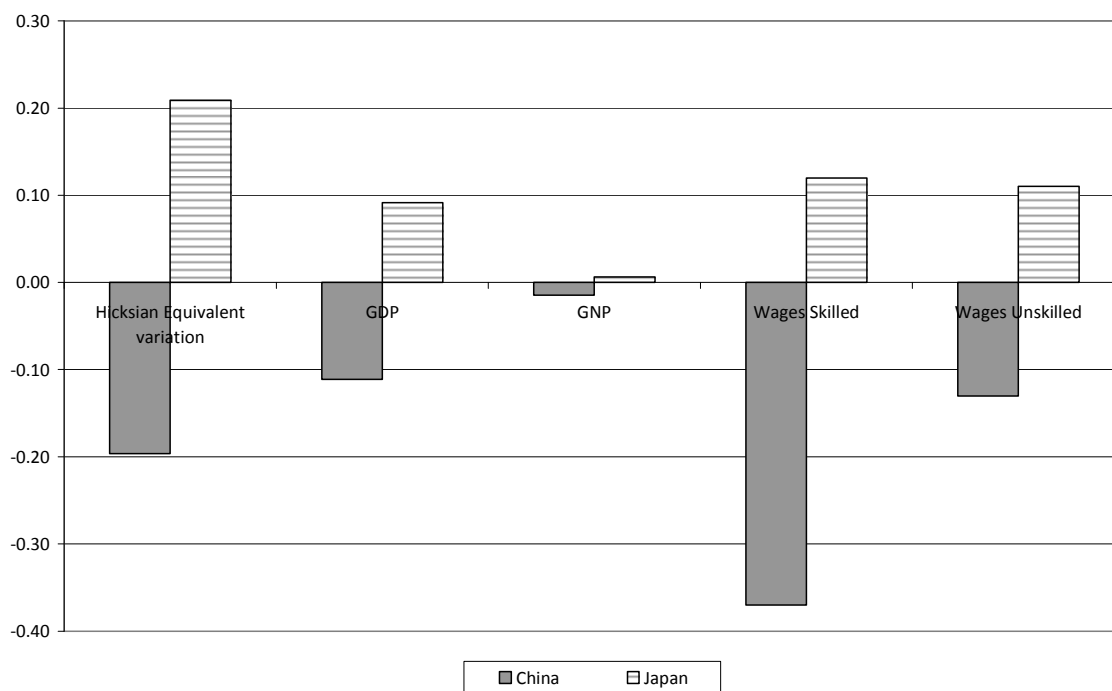
Source: Simulation results

5.　　Conclusions

Japan is the largest single country heavily investing in China in the form of FDI. FDI is often changeable and volatile in response to various news and shocks. While Japan had long committed to the Chinese economy with FDI, we learned after the financial crisis that this trend would be no longer sure or could be reversed suddenly. We simulated a sharp FDI fall that we observed after the financial crisis with a dynamic CGE model and quantified its impact not only on the Chinese economy but also on the Japanese economy.

Whilst the contraction of Japanese FDI would benefit many Chinese manufacturing sectors, especially textiles and apparel, and electric equipment, it would cause depreciation of the RMB to accelerate manufacturing exports. The aggregate results show that the FDI fall would not be good news for China since they would imply lower welfare, GDP and wages, which would originate mostly from a contraction of its service sector. In contrast, Japan would be found a gainer in this FDI fall despite declines of manufacturing output and exports. This implication is derived by using a comprehensive macroeconomic framework with microeconomic details describing production, trade, and investment by sector.

Economies are being globalized and integrated. With negative news, FDI flow can move back home as quickly as it moved out for a small profit margin. Eventually, a nation-wide riot hitting many Japanese MNE affiliates in China in 2012 made Japanese companies hesitate to invest in China further. While we simulated the FDI fall after the financial crisis in 2009, our quantitative result provides a good implication in understanding the impact of another possible negative shock to Japanese FDI. These days, Japanese MNE affiliates are accelerating FDI to other countries than China. We can elaborate our CGE model framework by incorporating FDI to the third party and the impact of switching of FDI destinations from China to others in the context of globalizing Asian economies.

Acknowledgements

References

Armington, P. (1969) "A Theory of Demand for Products Distinguished by Place of Production," *IMF Staff Papers*, vol. 16, pp. 159–178.

Armstrong, S. (2009) "Japanese FDI in China: Determinants and Performance", Asia Pacific Economic Papers No. 378, The Australian National University.

Baldwin, R. and Okubo, T. (2013) "Networked FDI: Sales and Sourcing Patterns of Japanese Foreign Affiliates," *The World Economy*, in press.

Barba Navaretti, G. and Venables, A. J. (2004) *Multinational Firms in the World Economy*, Princeton University Press, Princeton, NJ.

Blaise, S. (2005) "On the Link between Japanese ODA and FDI in China: A Microeconomic Evaluation using Conditional Logit Analysis", *Applied Economics*, vol. 37, pp. 51–55.

Cassidy, J. F. Andreosso-O'Callaghan, B. (2006) "Spatial Determinants of Japanese FDI in China", *Japan and the World Economy*, vol. 18, pp. 512–527.

Cheng, S. (2007) "Structure of Firm Location Choices: An Examination of Japanese Greenfield Investment in China", *Asian Economic Journal*, vol. 21, pp. 47–73.

Dean, J. M., Lovely, M. E. and Mora, J. (2009) "Decomposing China–Japan–U.S. trade: Vertical specialization, ownership, and organizational form", *Journal of Asian Economics*, vol. 20, pp. 596–610.

Greaney, T. M. and Li., Y. (2009) "Assessing Foreign Direct Investment Relationships between China, Japan, and the United States", *Journal of Asian Economics*, vol.20, pp. 611–625

Gómez Plana, A. G. and Latorre, M. C. (2014) "When Multinationals Leave: A CGE Analysis of the Impact of Divestments", *Economics*, vol. 8. http://dx.doi.org/10.5018/economics-ejournal.ja.2014-6

Hertel, T. W. (ed.) (1997) *Global Trade Analysis: Modeling and Applications*, Cambridge University Press, Cambridge, MA.

Hosoe, N. (2014) "Japanese Manufacturing Facing Post-Fukushima Power Crisis: a Dynamic Computable General Equilibrium Analysis with Foreign Direct Investment", *Applied Economics*, vol. 46, pp. 2010–2020.

Kawai, N. (2009) "Location Strategies of Foreign Investors in China: Evidence from Japanese Manufacturing Multinationals", *Global Economic Review*, vol. 38, pp. 117–141.

Kim, W. S., Lyn, E. and Zychowicz, E. (2003) "Is the Source of FDI Important to Emerging Market Economies? Evidence from Japanese and U.S. FDI", *Multinational Finance Journal*, vol. 7, pp. 107-130.

Lakatos, C. and Fukui, T. (2013) "Liberalization of Retail Services in India: A CGE model", Working Paper No. 2013-03A, U.S. International Trade Commission, Office of Economics, URL: http://www.usitc.gov/research_and_analysis/staff_products.htm

Latorre, M. C. (2009) "The Economic Analysis of Multinational: A Review", *Hacienda Publica Española,* vol. 191, pp. 97–126.

Latorre, M. C. (2013) "On the Differential Behaviour of National and Multinational Firms: A Within and Across Sectors Approach", *The World Economy*, vol. 36, pp. 1245-1372.

Latorre, M. C., Bajo-Rubio, O., and Gómez-Plana, A. G. (2009) "The Effects of Multinationals on Host Economies: A CGE Approach," *Economic Modelling,* vol. 26, pp. 851–864.

Lipsey, R. E. (2002) "Home and Host Country Effects of FDI", Working Paper No. 9293, National Bureau of Economic Research.

Markusen, J. R. (2002) *Multinational Firms and the Theory of International Trade*, MIT Press, Cambridge, MA.

Ministry of Economy, Trade and Industry (METI) (2012), *Survey of Overseas Business Activities*, the Government of Japan, Tokyo. Available at: http://www.meti.go.jp/english/statistics/tyo/kaigaizi/ index.html

Petri, P. A. (2012) "The Determinants of Bilateral FDI: Is Asia Different?", *Journal of Asian Economics*, vol. 23, pp. 201–209.

Ramstetter, E. D. (2011) "Recent Downturns and Inward Direct Investment in Asia's Large Economies", Graduate School of Economics, Kyushu University, Working Paper Series

Vol. 2011-10, March.

Tanaka, K. and Hashiguchi, Y. (2012) "Spatial Spillovers from FDI Agglomeration: Evidence from the Yangtze River Delta in China", IDE Discussion Paper No. 354.

UNCTAD (2012) *World Investment Report*, United Nations, New York and Geneva.

Whalley, J. and Xin, X. (2010) "China's FDI and Non-FDI Economies and the Sustainability of Future High Chinese Growth", *China Economic Review*, vol.21, pp. 123-135.

Xing, Y. (2006) "Why is China so Attractive for FDI?: The Role of Exchange Rates", *China Economic Review*, vol. 17, pp. 198–209.

Xing, Y. (2010) "Facts About and Impacts of FDI on China and the World Economy", *China: An International Journal*, vol. 8, pp. 309–327.

Zhang, K. H. (2013) "How Does Foreign Direct Investment Affect Industrial Competitiveness? Evidence from China", *China Economic Review*, in press.