Korea and the World Economy, Vol. 20, No. 1 (April 2019) 43-63

The Impact of ASEAN-Korea Free Trade Agreement on Foreign Direct Investment*

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This paper aims to analyze and examine the impact of ASEAN-Korea FTA on FDI flows into Korea and ASEAN countries to verify the economic validity of AKFTA. In order to analyze the impact of AKFTA on FDI, this study employs the knowledge-capital model by considering industrial development stages of countries. This study conducts panel data (2001-2012) analysis to alleviate unobserved heterogeneity and multicollinearity. The results show that the AKFTA 2006 Goods Agreement has a statistically negative effect on FDI in the member countries, while the AKFTA 2009 Investment Agreement has a positive impact on FDI in the member countries.

JEL Classification: C33, F21, F15
Keywords: AKFTA, FDI, knowledge-capital model

* Received February 26, 2019. Revised April 27, 2019. Accepted April 30, 2019. The authors thank two anonymous referees for their careful reading of the manuscript and their insightful comments and suggestions. All responsibility for any errors in the manuscript remains our own. This paper is based upon the thesis submitted by Ryoma Kanazawa in fulfillment of the requirement for the master of art in international commerce at Korea University. The thesis was written under the supervision and with the help of Moonsung Kang. This work was supported by a grant from Korea University.

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1. INTRODUCTION

In East Asia, many countries shifted from an import-substituting industrialization policy to an export-oriented industrialization policy during the 1980s and promoted the liberalization of trade and investment. As a result, the amount of trade and investment within East Asia increased rapidly and the production and logistics networks have intensified. Free Trade Agreements (FTAs), aiming to eliminate tariff and non-tariff barriers between more than two countries, have been playing an important role in this process, and economic integration has progressed along with the expansion of FTAs. In Southeast Asia, the ASEAN Free Trade Area (AFTA) came into effect in 1993, and the network of bilateral FTAs of ASEAN in East Asia has expanded, following the Japan-Singapore Economic Partnership Agreement. In addition, illustrated by the regional financial cooperation framework known as Chiang Mai Initiative which was formed between ASEAN and Japan, China, and South Korea after the Asian currency crisis in 1997, regional integration is also an exercise in risk management. The focus of regional integration since 2000s has been shifting to the expansion of intra-regional trade (Park *et al.,* 2012). With this trend, FTAs with ASEAN (ASEAN + 1) have been actively negotiated to achieve a position as representative production networks in Asia as well as to promote intra-reginal trade.

The ASEAN-Korea free trade agreement (AKFTA) is an interesting example of regional integration because it has expanded the scope and depth of economic integration. ASEAN and Korea signed the Framework Agreement on Comprehensive Economic Cooperation in 2005 and the AKFTA in Goods agreement was signed in 2006, the Service agreement in 2007 and the Investment agreement in 2009 (ASEAN, 2013). Free movement of goods and services and tariff and non-tariff reduction by the AKFTA are expected to have a significant impact on economies of member countries as well as various economic activities. A research question is whether the AKFTA has increased the levels of FDI into the member countries.

The objective of this paper is to examine the impact of AKFTA on ASEAN

and Korea, focusing on foreign direct investment (FDI) to verify the economic validity of AKFTA. There is an academic controversy whether FTAs have the positive impact on overall FDI activities since FTAs would have the negative impact on horizontal FDI, whereas have the positive impact on vertical FDI[1] (Markusen, 2002; Markusen and Maskus, 2002; Brainard 1997; Helpman, 1984). The pure impact of FTAs on FDI (horizontal FDI + vertical FDI) is an empirical research question.[2] This study presents an important implication for this question by showing a new evidence of the AKFTA case. To examine the impact of AKFTA on FDI in Korea and ASEAN countries, this study employs the knowledge-capital model which is developed by Markusen (2002). The regression analysis is conducted by using panel data from 2001 to 2012 to alleviate unobserved heterogeneity and multicollinearity. This study also considers industrial development stages of AKFTA countries because the economic structure and industrial development stages of AKFTA countries are diverse and the effect of AKFTA on FDI would vary considerably by the development stages. In order to check the robustness of this analysis, Arellano-bond dynamic panel Generalized Method of Moments (GMM) estimation is employed at the end.

This paper is structured as follows. Section 2 explains methodology and data of the regression analysis. Section 3 outlines hypotheses for the impact of AKFTA on FDI flows into AKFTA member countries. In section 4, the results of this study are presented and discussed. Section 5 concludes this paper.

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1) According to Markusen and Maskus (2002), horizontal FDI refers to firms' activities in host countries roughly similar to those in home countries whereas vertical FDI refers to firms geographically separate activities by stages of production.

2) A lot of empirical research has been accumulated on the relationship between FTAs and FDI, and the results of previous research on whether FTAs have the positive impact on FDI are mixed (Bae and Jang, 2013; Li and Maani, 2016; Reed *et al*., 2016). However, it is found that FTAs are more likely to be negatively associated with FDI between developed countries, whereas FTAs are more likely to have positive effect on FDI in developing countries where labor costs are relatively low (Jang, 2011; Yoo, 2016).

2. DATA AND METHODOLOGY

2.1. The Regression Model and Data Sources

In this study, the knowledge-capital model is employed based on Yoo (2016) and Li *et al*. (2016). Yoo (2016) utilized specific economic variables such as economic size, bilateral similarity, relative factor endowments differences, market potential, trade openness, and interaction terms to examine the impact of ASEAN FTA on FDI by applying the knowledge capital model. Li *et al*. (2016) also employed the knowledge capital model including third country effect and divided ASEAN-China FTA by two stages which are 2005 Goods agreement and 2007 Service agreement to investigate effects of ACFTA on the member countries from the FDI perspectives. Therefore, in accordance with the previous empirical researches, the regression model of this study is constructed based on the knowledge capital model as follows:

$$\begin{aligned}\ln\left(FDI_{dit}\right) = {} & \beta_0 + \beta_1 \ln\left(dis_{di}\right) + \beta_2 G_{dit} + \beta_3 S_{dit} + \beta_4 SK_{dit} \\ & + \beta_5 OPEN_{dt} + \beta_6 \Gamma_{dit} + \beta_7 \Theta_{dit} + \beta_8 AKFTA06_{dit} \\ & + \beta_9 AKFTA07_{dit} + \beta_{10} AKFTA09_{dit} + \beta_{11} FTA_{dit} + u_{di} + \vartheta_t + \epsilon_{dit}.\end{aligned}$$

Here, the dependent variable FDI_{dit} is inward FDI stock from home country d to host country i in year t. Thus, $\ln\left(FDI_{dit}\right)$ is the natural logarithm of inward FDI stock of ASEAN countries and Korea from home countries. β_0 is a constant term and $\ln\left(dis_{di}\right)$ is the natural logarithm of distance between home and host countries. G_{dit} is bilateral market size calculated by the sum of GDP in host and home countries. S_{dit} is similarity in country size. SK_{dit} represents relative factor endowments differences. Li *et al*. (2016) employed home-to-host capital endowment ratios and home-to-host skilled and unskilled labor ratios as relative factor endowments differences. However, since there are a lot of missing data of these variables in ASEAN countries, this study utilizes bilateral production cost differences as relative factor endowments differences based on Yoo (2016). $OPEN_{dt}$

represents trade openness of host country *i* in year *t*. Γ_{dit} is an interaction term of G_{dit} and SK_{dit} and Θ_{dit} is an interaction term of $\ln(dis_{di})$ and SK_{dit}. $AKFTA06_{dit}$ is a dummy variable to indicate the AKFTA 2006 Goods agreement; prior to 2006 the value equals to 0 and following this year the value equals to 1. $AKFTA07_{dit}$ and $AKFTA09_{dit}$ are also dummy variables to indicate the AKFTA 2007 Service agreement and the AKFTA 2009 Investment agreement.[3] FTA_{dit} is a dummy variable which represents whether FTAs come into effect between home country *d* and host country *i* in year *t*. u_{di} is country-pair effect and ϑ_t is time effect.

The variables in the model were calculated as follows: $G_{dit} = \ln(GDP_{dt} + GDP_{it})$ shows the bilateral economic size of AKFTA countries and host countries. $S_{dit} = \ln(1 - S_{dt}^2 - S_{it}^2)$ where $S_{dt} = GDP_{dt} / (GDP_{dt} + GDP_{it})$ and $S_{it} = GDP_{it} / (GDP_{dt} + GDP_{it})$ measures the bilateral similarities in economic size between AKFTA countries and host countries. $SK_{dit} = \left|\ln(percapitaGDP_{dt}) - \ln(percapitaGDP_{it})\right|$ captures the production cost differences between countries which explains factor endowments differences. $OPEN_{dt} = \ln\{(Export_{dt} + Import_{dt}) / GDP_{dt}\}$ reflects trade openness of AKFTA countries *d* in year *t*.

Bilateral inward FDI stock data for Korea and ASEAN countries[4] was collected with FDI from thirty OECD member countries, China, Hong Kong, Mongolia, and AKFTA member countries. Bilateral inward FDI stock data is from 2001 to 2012 and the data source is UNCTAD, Bilateral FDI Statistics. Other data sources which used for the analysis and the variables definition are summarized in table 1 and the selection of countries is shown in table 2.

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3) According to Li *et al*. (2016), FTA agreements are expected to have different impacts on FDI flows into member countries by types of agreements. This study also considers effects of all types of AKFTA, Goods, Services, and Investment agreements to capture these effects more precisely.

4) Laos, Myanmar, and Brunei were excluded as home countries in this analysis since there are a lot of missing data for bilateral FDI data.

Table 1 Definition and Data Sources of Variables

Variables	Definition	Data Sources
Dependent variable		
$\ln(FDI_{dit})$	Natural logarithm of FDI stock	UNCTAD, Bilateral FDI Statistics
Independent variables		
$\ln(dis_{di})$	Natural logarithm of distance between home and host countries	CEPII
$G_{dit} = \ln(GDP_{dt} + GDP_{it})$	Bilateral market size	World Bank's World Development Indicators
$S_{dit} = \ln(1 - S_{dt}^2 - S_{it}^2)$	Similarity in country size, where $S_{dt} = GDP_{dt} / (GDP_{dt} + GDP_{it})$ $S_{it} = GDP_{it} / (GDP_{dt} + GDP_{it})$	
$SK_{dit} = \left\lvert \begin{matrix} \ln(percapitaGDP_{dt}) \\ -\ln(percapitaGDP_{it}) \end{matrix} \right\rvert$	Bilateral production cost differences	
$OPEN_{dt} = \ln\left\{ \begin{matrix} (Export_{dt} + Import_{dt}) / \\ GDP_{dt} \end{matrix} \right\}$	Trade openness of AKFTA countries	
$\Gamma_{dit} = G_{dit} \times SK_{dit}$	Interaction term	
$\Theta_{dit} = \ln(dis_{di}) \times SK_{dit}$	Interaction term	
$AKFTA06_{dit}$	Dummy variable of AKFTA 2006 Goods agreement	
$AKFTA07_{dit}$	Dummy variable of AKFTA 2007 Service agreement	
$AKFTA09_{dit}$	Dummy variable of AKFTA 2006 Investment agreement	
FTA_{dit}	Dummy variable of FTA between home and host countries	

Sources: Created by the author based on Li *et al*. (2016) and Yoo (2016).

Table 2 Selection of Countries

FDI home countries			FDI host countries
Australia	Italy	Hong Kong	Korea
Austria	Luxembourg	China	Cambodia
Belgium	Netherland	Mongolia	Indonesia
Bulgaria	New Zealand	Korea	Malaysia
Canada	Poland	Brunei	Philippines
Cyprus	Portugal	Cambodia	Singapore
Czech Republic	Spain	Indonesia	Thailand
Denmark	Slovakia	Malaysia	Vietnam
Finland	Slovenia	Myanmar	
France	Sweden	Philippines	
Germany	Switzerland	Singapore	
Greece	UK	Thailand	
Hungary	Norway	Vietnam	
Iceland	USA	Lao PDR	
Ireland	Japan		

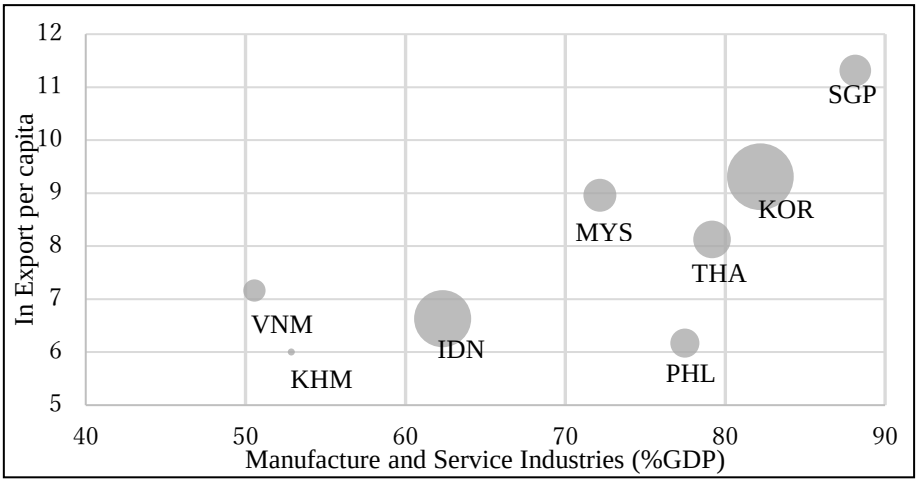
Source: Created by the author.

2.2. Classification of Industrialization Development Stages

This study classifies the industrial development stages of ASEAN[5)] countries and Korea into three groups based on Joo *et al*. (2011) and Yoo (2016). Figure 1 shows the economic diversity among AKFTA member countries according to the share of manufacture and service industries to GDP and log export per capita. The share of manufacture and service industries to GDP as well as export per capita in Korea and Singapore are very high which suggests that their economic structure has high proportion of manufacture and

5) Laos, Myanmar, and Brunei were excluded since the regression analysis does not include these countries as home countries due to the lack of data availability.

Figure 1 The Economic Diversity among AKFTA Member Countries, 2012



Note: The circles in the figure indicate the size of GDP. Laos, Myanmar, and Brunei were excluded since the regression analysis does not include these countries.
Source: Created by the author based on World Bank Indicators and Nation Master (http://www.nationmaster.com/country-info/stats/Economy/Exports-per-capita#country).

service industries and are industrialized at the advanced level. Thailand, Malaysia, and Philippines also have the high share of manufacture and service industries to GDP, but they could be regarded as the ongoing industrialization economies since their economic structure is not yet competitive in the world market compared to Korea and Singapore. The economic structure in Indonesia, Vietnam, and Cambodia is less industrialized compared to other AKFTA member countries. Relatively low manufacture and service industries share indicates that the primary sector accounts for a large portion of the economic structure in these countries.

Accordingly, the economic structure and industrial development stages considerably vary among ASEAN countries. It is important to capture the effect of AKFTA on FDI into the member countries according to industrial development stages because a broad range of economic diversity of ASEAN countries would provide different results by each of industrial development stages. Table 3 shows the classification of industrial development stages

Table 3 Classification of Industrial Development Stages among ASEAN Countries and Korea

Category	Feature of Economic Structure	Countries
Diversified Economy	High proportion of manufacture and service industries	Korea, Singapore
Ongoing Industrialization Economy	Vitalized manufacture and service industries, but not yet competitive in the world market	Thailand, Malaysia, Philippines
Incipient Industrialization Economy	Onset of manufacture and service industrialization	Indonesia, Vietnam, Cambodia

Source: Created by the author based on Yoo (2016).

among ASEAN countries and Korea. In this study, the industrial development stages are classified into three categories: Diversified Economy relevant to Korea and Singapore, Ongoing Industrialization Economy relevant to Thailand, Malaysia, and Philippines, and Incipient Industrialization Economy relevant to Indonesia, Vietnam, and Cambodia.

2.3. Descriptive Statistics of the Variables

Descriptive statistics of the variables are shown in table 4. The samples were divided into three categories based on industrial development stages. The total sample size is 1,873 and 684 for the diversified economy, 651 for the ongoing industrialization economy, and 538 for the incipient industrialization economy.

According to the mean analysis, FDI flows ($\ln(FDI_{dit})$) into the diversified economy are larger than those into the ongoing industrialization economy and the incipient industrialization economy. Additionally, the mean of similarity in market size (S_{dit}) in the diversified economy is also larger compared to other two groups of industrial development stages. These descriptive statistics suggest that home countries, which are mostly categorized by capital-abundant countries, are more likely to invest in their assets in host countries

Table 4 Descriptive Statistics of the Variables

Variable	Mean	Std.Dev.	Min	Max
Full Sample (1,873 obs.)				
$\ln(FDI_{dit})$	19.439	2.708	13	25
$\ln(dis_{di})$	8.584	0.873	5.754	9.692
G_{dit}	27.719	1.108	24.302	30.447
S_{dit}	−1.76691	1.201	−7.039	−0.693
SK_{dit}	2.087	1.328	0.001	5.013
$OPEN_{dt}$	4.828	0.590	3.818	6.090
Γ_{dit}	57.630	36.497	0.028	138.761
Θ_{dit}	18.043	11.988	0.010	45.985
$AKFTA06_{dit}$	0.170	0.376	0	1
$AKFTA07_{dit}$	0.129	0.336	0	1
$AKFTA09_{dit}$	0.107	0.310	0	1
FTA_{dit}	0.327	0.469	0	1
Diversified Economy (684 obs.)				
$\ln(FDI_{dit})$	20.134	2.921	13	25
$\ln(dis_{di})$	8.600	0.841	5.754	9.639
G_{dit}	27.854	0.988	25.704	30.447
S_{dit}	−1.411	0.821	−4.578	−0.693
SK_{dit}	1.068	1.014	0.001	4.435
$OPEN_{dt}$	5.082	0.801	4.097	6.090
Γ_{dit}	29.394	27.105	0.028	114.155
Θ_{dit}	8.692	7.601	0.010	33.527
$AKFTA06_{dit}$	0.148	0.355	0	1
$AKFTA07_{dit}$	0.108	0.311	0	1
$AKFTA09_{dit}$	0.091	0.287	0	1
FTA_{dit}	0.368	0.483	0	1
Ongoing Industrialization Economies (651 obs.)				
$\ln(FDI_{dit})$	19.553	2.401	13	25
$\ln(dis_{di})$	8.587	0.880	5.754	9.624
G_{dit}	27.696	1.050	25.760	30.398
S_{dit}	−1.423	0.784	−3.927	−0.693
SK_{dit}	2.279	0.914	0.019	4.081
$OPEN_{dt}$	4.699	0.276	4.172	5.174
Γ_{dit}	63.046	25.194	0.557	106.08
Θ_{dit}	19.998	8.881	0.152	37.7752
$AKFTA06_{dit}$	0.184	0.388	0	1
$AKFTA07_{dit}$	0.138	0.345	0	1
$AKFTA09_{dit}$	0.111	0.314	0	1
FTA_{dit}	0.307	0.462	0	1
Incipient Industrialization Economies (538 obs.)				
$\ln(FDI_{dit})$	18.416	2.461	13	25
$\ln(dis_{di})$	8.562	0.906	6.284	9.692
G_{dit}	27.577	1.290	24.302	30.428
S_{dit}	−2.636	1.538	−7.039	−0.693
SK_{dit}	3.151	1.152	0.337	5.013
$OPEN_{dt}$	4.661	0.418	3.818	5.093
Γ_{dit}	86.973	32.047	9.799	138.761
Θ_{dit}	27.567	11.187	2.847	45.985
$AKFTA06_{dit}$	0.182	0.386	0	1
$AKFTA07_{dit}$	0.145	0.352	0	1
$AKFTA09_{dit}$	0.125	0.330	0	1
FTA_{dit}	0.299	0.458	0	1

Source: Created by the author.

where are also capital-abundant countries. In terms of relative factor endowments differences (SK_{dit}), the incipient industrialization economy has the largest relative factor endowments differences compared to the others. It is expected that vertical firms will be more motivated to invest their assets into the incipient industrialization economy to take advantage of a comparative advantage of factor endowments differences. The mean of trade openness is similar between the ongoing industrialization and the incipient industrialization economies, but the mean of trade openness in the diversified economy is relatively higher compared to the others. More open market environment is expected to motivate MNCs to invest their assets into the diversified economy.

Through the descriptive statistics analysis, it is found that the economic structure among ASEAN countries and Korea is considerably diverse and economic effect of AKFTA on FDI into the member countries might be different by their industrialization levels. The diversity of economic structure would necessitate an analysis considering industrial development levels in order to examine the impact of AKFTA on FDI flows into the member countries.

3. HYPOTHESIS

Hypotheses are based on Li *et al*. (2016) and Yoo (2016), and they are shown as follows.

- Hypothesis 1: Bilateral market size is positively related to all types of FDI (horizontal, vertical, and export platform FDI[6]).
- Hypothesis 2: Similarity in country size is positively related to horizontal and export platform FDI whereas is negatively related to vertical FDI.

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6) In this study, export platform FDI are defined as plants in a home country and a host country with export from a host country to third countries, based on Li *et al*. (2016).

- Hypothesis 3: Relative factor endowments differences are positively related to vertical FDI whereas are negatively related to horizontal FDI.
- Hypothesis 4: Trade openness is positively related to all types of FDI.
- Hypothesis 5: FTAs and AKFTA have a positive impact on vertical and export platform FDI whereas the impact on horizontal FDI can be either positive or negative.

According to Li *et al*. (2016) and Yoo (2016), bilateral market size (G_{dit}) between AKFTA countries and host countries is expected to have a positive impact on all types of FDI between home and host countries. Increased size of economy is more likely to provide positive incentives to invest in host countries for MNCs to access to host countries markets. Similarity in market size between home and host countries (S_{dit}) is expected to be positively associated with horizontal and export platform FDI whereas is expected to be negatively associated with vertical FDI. Since the main motive of horizontal FDI is to access to markets in host countries, the bilateral market size similarity is more likely to motivate MNCs to construct production bases by conducting horizontal FDI. However, since MNCs are more likely to conduct vertical FDI when production costs in host countries are lower than those in the home countries in order to minimize costs in the production processes, vertical FDI is expected to have a negative relationship with the bilateral market size similarity.

Relative factor endowments differences (SK_{dit}) capturing the production cost differences between home and host countries are expected to have a positive impact on vertical FDI whereas have a negative impact on horizonal FDI. Vertical firms seek relatively lower labor costs than those in their home countries to take advantage of a comparative advantage in host country. Thus, the effect of an increase of relative factor endowments differences on vertical FDI is expected to be positive. In contrast, the effect of an increase of relative factor endowments on horizontal FDI is expected to be negative because the major factor of an increase of relative factor endowments can be explained by

not only an increase of GDP per capita of home countries but also a decrease of GDP per capita of host countries (Yoo, 2016). Considering horizontal FDI is motivated by high marketability in a host country, a decrease in GDP per capita in host countries will have a negative impact on horizontal FDI. However, the effect of an increase of relative factor endowments on export platform FDI can be mixed because the incentive of conducting export platform FDI is complicated and indeterminable. Trade openness ($OPEN_{dt}$) is expected to have a positive impact on all types of FDI. MNCs are more likely to invest their assets in host countries where provide more open market environment.

The interaction term (Γ_{dit}) reflects the effect of bilateral market size (G_{dit}) on FDI into host countries with an increase of relative factor endowments differences. Increased bilateral market size can be explained by not only an increase in economic size in home countries but also an increase in economic size in host countries. When economic size in host countries shrinks but economic size in home countries increases more than the shrink of economic size in host countries, both of bilateral market size and relative factor endowments will increase. Thus, the effect of the interaction term (Γ_{dit}) can be mixed. The interaction term (Θ_{dit}) allows for the potential difference of the impact of distance on horizontal and vertical FDI. An increase in transport costs caused by longer distance between home and host countries is expected to foster horizontal FDI since there is a substitutional relationship between horizontal FDI and trade transaction. However, long distance would increase production costs which may outweigh the effect of an increase of relative factor endowments (Li *et al*., 2016). Thus, the interaction term (Θ_{dit}) is expected to have a negative impact on vertical FDI.

The impact of AKFTA and FTAs on FDI can be either positive or negative. The reduction or elimination of tariff and non-tariff barriers caused by FTAs will lead to low transportation and trade costs which motivate MNCs to conduct vertical FDI since firms in the home country can import intermediate goods from firms in host countries at the relatively low cost (Li *et al*., 2016). Therefore, FTAs are expected to have the positive impact on vertical FDI flows

into host countries (vertical fragmentation effect). Meanwhile, FTAs are expected to have the negative impact on horizontal FDI flows into host countries because horizontal FDI has a substitutional relationship with transaction in trade. MNCs are more likely to conduct trade rather than horizontal FDI to access to host countries markets when trade costs substantially decreased due to FTAs (plant rationalization effect). Additionally, according to Li and Maani (2016), FTAs are expected to have the positive impact on horizontal FDI from external countries because the formation of FTAs reducing internal tariffs and the presence of high external tariffs promote horizontal FDI from external countries to invest in member countries (market expansion effect). Thus, when the vertical fragmentation effect and market expansion effect exceed the plant rationalization effect, FTAs could promote any types of FDI flows into the host countries.

4. RESULTS

Table 5 shows the regression analysis results for the impact of AKFTA on FDI flows into AKFTA member countries. This study employed the knowledge-capital model as considering industrial development stages. In order to estimate the impact of AKFTA on FDI, the regression analysis was conducted with fixed effect regression[7] by using panel data from 2001 to 2012 to alleviate unobserved heterogeneity and multicollinearity. Robust standard errors were employed to consider panel-level heteroskedasticity.

First of all, bilateral market size (G_{dit}) between AKFTA countries and host countries has a positive impact on FDI flows into AKFTA member countries and is statistically significant at the 1% level regardless of industrial development stages. The positive sign for the coefficient of bilateral market size (G_{dit}) reflects that an increase in size of economy in AKFTA member countries motivates MNCs to invest their assets in AKFTA member countries

7) Since Breush and Pagan test and Sargan-Hansen statistic rejected random effect regression and pooled regression, this section focuses on interpreting the fixed effect regression results.

Table 5 Estimation Results for FDI Flows to AKFTA Member Countries

	All AKFTA countries	Diversified Economy	Ongoing Industrialization Economy	Incipient Industrialization Economy	System GMM
$\ln(FDI_{dit-1})$					0.530***
					(0.061)
$\ln(dis_{di})$					0.046
					(0.179)
G_{dit}	3.412***	4.295***	2.730***	3.858***	0.660***
	(0.574)	(0.843)	(0.432)	(0.988)	(0.145)
S_{dit}	0.557	0.894*	1.060*	−1.206	0.413***
	(0.408)	(0.501)	(0.612)	(0.918)	(0.097)
SK_{dit}	6.530	−0.340	5.157	18.931***	0.162
	(4.713)	(7.118)	(8.376)	(6.951)	(1.272)
$OPEN_{dt}$	0.633**	0.064	1.476***	0.191	0.744***
	(0.245)	(0.469)	(0.311)	(0.431)	(0.150)
Γ_{dit}	−0.309*	0.203	−0.269	−0.581**	0.033
	(0.159)	(0.300)	(0.213)	(0.272)	(0.043)
Θ_{dit}	0.114	−0.627	0.019	−0.594	−0129
	(0.527)	(0.847)	(0.692)	(0.553)	(0.085)
$AKFTA06_{dit}$	−0.249*	−0.527**	−0.078	0.072	−0.425**
	(0.140)	(0.231)	(0.261)	(0.197)	(0.163)
$AKFTA07_{dit}$	0.056	−0.061	0.200	0.074	−0.066
	(0.117)	(0.191)	(0.212)	(0.142)	(0.169)
$AKFTA09_{dit}$	0.193*	−0.153	0.344**	0.109	0.321**
	(0.106)	(0.243)	(0.156)	(0.112)	(0.131)
FTA_{dit}	0.196*	0.310*	0.223**	0.477**	0.162
	(0.101)	(0.168)	(0.104)	(0.194)	(0.137)
Constant	−75.260***	−98.724***	−56.805***	−85.015***	−12.227***
	(16.052)	(24.631)	(12.078)	(25.913)	(3.850)
R-sq	0.425	0.513	0.384	0.422	
Regression model	Fixed effect	Fixed effect	Fixed effect	Fixed effect	
AR(1) test Prob>z					0.000
AR(2) test Prob>z					0.914
Hansen J test Prob>chi2					0.628
N	1,873	684	651	538	1,640

Note: Dependent variable is the log of bilateral FDI stock. Time period is 2001-2012. Panel is unbalanced. $\ln(dis_{di})$ is omitted because of collinearity in fixed effect regression. Robust standard errors are used in parentheses. *$p < 0.1$. **$p < 0.05$. ***$p < 0.01$.

in order to access to the markets. Similarity in market size between home and host countries (S_{dit}) has a positive influence on FDI flows into the

diversified economy and the ongoing industrialization economy in AKFTA member countries. This result can be interpreted that MNCs are more likely to conduct horizontal FDI in more developed and industrialized countries to access to their markets. Relative factor endowments differences (SK_{dit}) have a statistically significant positive impact on FDI flows into only the incipient industrialization economy. This result suggests that vertical MNCs invested their assets into the incipient industrialization economy with a motive for the cost minimization in production processes by utilizing a comparative advantage of factor endowments differences. In addition, trade openness $(OPEN_{dt})$ has a positive impact on FDI flows into overall AKFTA member countries and into the ongoing industrialization economy. The positive sign for trade openness $(OPEN_{dt})$ is consistent with the hypothesis and suggests that open market environment positively contributed to FDI flows into the member countries.

In terms of interaction terms, $\Gamma_{dit}(G_{dit} \times SK_{dit})$ has a statistically significant negative impact on FDI into overall AKFTA member countries and the incipient industrialization economy whereas $\Theta_{dit}\left(\ln\left(dis_{di}\right) \times SK_{dit}\right)$ is statistically insignificant. The negative sign for interaction term (Γ_{dit}) can be interpreted that an increase in bilateral market size led to shrinking the relative factor endowments differences. This is because that ASEAN countries, especially the incipient industrialization economy in ASEAN, have achieved high economic growth and the economic growth rate in these countries is much higher than developed countries. Thus, it is likely that high economic growth in ASEAN countries led to an increase bilateral market size and shrinking the relative factor endowments differences between home and host countries.

For the AKFTA and FTA variables which are the main independent variables in this study, the AKFTA 2006 Goods agreement has a statistically negative impact on FDI flows into overall AKFTA member countries whereas the AKFTA 2009 Investment agreement has a statistically positive impact on FDI flows into the member countries. Considering the industrial development stages, AKFTA 2006 Goods agreement has a negative impact on FDI flows

into the diversified economy and AKFTA 2009 Investment agreement has a positive impact on FDI flows into the ongoing industrialization economy. However, AKFTA does not have a statistically significant impact on FDI flows into the incipient industrialization economy. The negative sign for the AKFTA 2006 Goods agreement in the diversified economy reflects that horizontal FDI was dominant in the diversified economy snice MNCs are more likely to conduct horizontal FDI in countries where have high marketability. As a result, the plant rationalization effect outweighed the vertical fragmentation effect and the market expansion effect in the diversified economy. In contrast, the positive sign for the AKFTA 2009 Investment agreement in the ongoing industrialization economy indicates that the AKFTA 2009 Investment agreement promoted FDI inflows into the member countries by encouraging investment flows and promoting a liberal, facilitative, transparent, and competitive investment (ASEAN, 2013). However, the negative impact of AKFTA06 outweighs the positive impact of AKFTA09. Thus, as a whole, AKFTA has a negative influence on FDI flows into the member countries. In terms of the dummy variable of (FTA_{dit}) representing whether FTAs come into effect between home and host country in a given year, FTAs have a positive impact on FDI flows into all AKFTA member countries. Therefore, the overall effect of FTAs on FDI flows into AKFTA member countries is positive regardless of their industrial development stages.

This study also tested the dynamic panel data model because the previous researches mentioned that FDI might affect the investment in the future and FTAs are likely to be endogenous, so using FTA as an explanatory variable for FDI without controlling for endogeneity would likely bring biased estimation (Reed *et al.*, 2016; Li *et al.*, 2016; Baier and Bergstrand, 2007; Egger *et al.*, 2011). Thus, further econometric consideration would be necessary to alleviate these biases and to secure the robustness of this analysis. An instrument variable method is often employed to solve the endogeneity problem, but it is difficult to find an appropriate instrument in the FTA case (Bae and Jang, 2013). Accordingly, this paper employed Arellano-bond

dynamic panel Generalized Method of Moments (GMM) estimation in order to check the robustness of the analysis. Considering the dataset which has a short time series (2001-2012), system GMM would be preferable to difference GMM. The lagged dependent variable is added in the equation and the lagged dependent variable, AKFTA, and FTA variables are treated as endogenous and use all available lags as the instruments.

Hansen J statistic test has a null hypothesis of the instruments as a group are exogenous and it cannot reject this null hypothesis in this analysis. The Arellano-Bond test AR(1) and AR(2) for autocorrelation has a null hypothesis of no autocorrelation and it rejects this null hypothesis, which means that there is no autocorrelation in this analysis. Even though in the system GMM estimation results, FTA variable is statistically insignificant and the value of coefficients are different from the fixed effect regression results, the results for AKFTA variables are consistent: AKFTA 2006 Goods agreement has a negative relationship with FDI, AKFTA 2009 Investment agreement has a positive relationship with FDI, and AKFTA 2007 Service agreement is insignificant. The coefficient signs of other variables are also reasonably similar to the results in the fixed regression results. Thus, the robustness results also suggest that, as a whole, AKFTA has a negative influence on FDI flows into AKFTA member countries since the negative impact of AKFTA06 outweighs the positive impact of AKFTA09.

5. CONCLUSIONS

This study explored the impact of AKFTA on FDI in AKFTA member countries to verify the economic validity of AKFTA by employing the panel data (2001-2012) analysis. Fixed effect regression analysis shows that AKFTA 2006 Goods agreement has a negative impact on FDI flows into AKFTA member countries whereas AKFTA 2009 Investment agreement has a positive impact on FDI. However, there is not statistically significant effect of AKFTA 2007 Service agreement on FDI. The overall economic effect of

AKFTA on FDI is negative, which suggests that the plant rationalization effect outweighs the vertical fragmentation effect and the market expansion effect.

This study conducted the further economic analysis to investigate the impact of AKFTA on FDI according to the industrial development stages of AKFTA member countries. AKFTA 2006 Goods agreement has a negative impact on FDI flows into the diversified economy relevant to Korea and Singapore and AKFTA 2009 Investment agreement has a positive impact on FDI flows into the ongoing industrialization economy relevant to Thailand, Malaysia, and Philippines. However, all types of AKFTA are not statistically associated with FDI flows into the incipient industrialization economy relevant to Indonesia, Vietnam and Cambodia. The finding of negative effect of AKFTA 2006 Goods agreement on the diversified economy reflects that horizontal FDI is dominant in the economy since MNCs are more likely to be motivated to invest horizontal FDI into the markets where have high marketability. As a result, the plant rationalization effect exceeds the FDI-promoting effects in the diversified economy. The positive impact of AKFTA 2009 Investment agreement in the ongoing industrialization economy indicates that MNCs are more likely to conduct vertical FDI in the economy by utilizing the advantage of a comparative advantage of factor endowments differences for cost minimization, which contributed to increasing in levels of FDI in the economy. In addition, the AKFTA 2009 Investment agreement promoted FDI in the ongoing industrialization economy by making the investment environment more liberal, facilitative, transparent, and competitive.

This result presents very important implications for policy makers. Even though AKFTA has the negative impact on the well-developed and industrialized economy where horizontal FDI is dominant, overall FTAs are positively associated with FDI flows into all types of economy by the industrial level analysis. It suggests that FTAs would increase the levels of FDI in member countries in the long term regardless of the development stages and types of FDI. In addition, AKFTA promotes the levels of FDI into the ongoing industrialization economy. The incipient industrialization countries would enjoy FDI benefits from AKFTA only when the economy achieves the

further stage of industrialization. Thus, this study clarifies that fostering the levels of industrialization as well as promoting the open and friendly investment environment in developing countries through FTAs would contribute to attracting FDI from MNCs. Considering FDI is playing an important role in economic development directly through enhancing human capital development and increasing productivity, the attraction of FDI from developed countries through FTAs would be significant for sustainable economic development.

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