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The Impact of FTAs on FDI in Korea

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Introduction

Korea has steadily expanded its FTA network since the Korea–Chile FTA in 2004. Currently, Korea has FTAs with 45 trading partners, including the world's top three economic blocs: the U.S., EU, and ASEAN plus India.

Table 1. Korea's FTAs as of 2012

Country (year of inception)	
Chile (Apr. 2004)	Singapore (Mar. 2006)
EFTA (Jun. 2006)	ASEAN (Jun. 2007)
India (Jan. 2010)	EU (Jul. 2011)
Peru (Aug. 2011)	U.S. (Mar. 2012)

It is unclear, theoretically and empirically, how FTAs should affect the flows of FDI. A major feature of FTAs is the elimination of bilateral tariffs over time. If FDI is a substitute for exports because tariffs account for a substantial portion of the costs for exporting, FTAs should lead to reductions in FDI. On the other hand, if FDI is complementary with exporting, given vertical specialization in production, FTAs should encourage additional FDI because it lowers the costs of intra-firm trade. After all, the impact of FTAs on FDI could appear in different guises depending on motives behind investment.

This study aims to empirically identify how FTAs affect outward and inward FDI at the bilateral level in Korea, focusing on the agreements with Chile, Singapore, ASEAN, and EFTA. In order to do so, we use bilateral FDI data from OECD over the period of 2000 through 2010.

Bilateral FDI in Korea

Outward FDI from Korea to its FTA partners, Chile, Singapore, EFTA, and ASEAN tended to grow at a faster rate than the total amount of its overseas investment. After the inception of Korea–Chile FTA, Korea increased investment in Chile mainly in the mining industry for resource development while it stayed still at the low levels of $45 million in 2004 and $81 million in 2009. Korea's investment in Singapore increased at an average of 60% per year from $594 million in 2004 to $5.295 billion in 2010, especially in the financial and professional services sectors. Outward FDI to EFTA was only $48 million in 2004 while it increased dramatically to $2.828 billion in 2010. Korea's investment in ASEAN, a major destination of Korea's overseas investment, reached $31.228 billion in 2010 from $4.478 billion in 2004, with increases in a variety of industries, ranging from mining, metal, and chemicals to real estate and financial services.

Table 2. Korea's Outward FDI (in millions of USD)

Year	World	Chile	Singapore	EFTA	ASEAN
2003	33,843	31	423	46	2,573
2004	39,936	42	594	48	4,478
2006	54,075	45	984	60	8,327
2007	74,776	72	1,668	816	9,228
2008	98,483	37	2,720	1,295	14,182
2009	115,450	81	2,785	1,426	16,157
2010	254,716	-	5,295	2,828	31,228

Source: OECD

Since the FTAs entered into force, inward FDI from the FTA partners has generally showed an upward trend. The speed of its growth was relatively small, however, compared to the magnitude of outward FDI. Chile became an investor in Korea for the first time in the year that followed the Korea–Chile FTA. It invested $7 million in 2005 and $20 million in 2009, mostly in the wholesale/retail and warehousing industries to distribute its agricultural products in Korea. During the post–FTA period Singapore has invested in the electrical/electronic manufacturing, real estate, and financial services sectors, and in the cultural and entertainment industries as well. Singapore's total investment in Korea increased to $3.469 billion in 2010 from $1.823 billion in 2005. At the start of the year of the Korea–EFTA, inward FDI from EFTA has increased, particularly in the machinery/equipment manufacturing and wholesale/retail and business services sectors. It was $855 million in 2005 and $3.352 billion in 2010. ASEAN has rather decreased its overseas investment in Korea from $6.332 billion in 2007 to $5.840 billion in 2010 due to the steep decline in investment inflows from the electrical and electronic industries, reducing the share of ASEAN in Korea's total inward FDI to 4% in 2010 from 10% before the Korea-ASEAN FTA.

Table 3. Korea's Inward FDI (in millions of USD)

Year	World	Chile	Singapore	EFTA	ASEAN
2004	55,955	-	1,264	784	5,392
2005	62,020	7	1,588	855	5,648
2006	70,951	7	1,823	966	5,860
2007	67,842	7	2,332	1,186	6,332
2008	75,446	7	2,147	1,186	5,945
2009	117,732	20	4,048	2,612	6,053
2010	134,234	-	3,469	3,352	5,840

Source: OECD

Specification and Data

In this section we seek to find empirical evidence on the effects of the FTAs on the changes in bilateral outward and inward FDI in Korea. We expand the knowledge capital model estimated by Carr *et al.* (2001), Markusen and

Maskus (2002), and Egger and Pfaffermayr (2004) using the FTA dummy as follows:

Equation 1

$$\ln(FDI_{kjt}) = \beta_0 + \beta_1 \ln(GDPSUM_{kjt}) + \beta_2 \ln(SM_{kjt}) + \beta_3 \ln(DIFF_{kjt}) + \beta_4 \ln(OPEN_{jt}) + \beta_5 BIT_{kjt} + \beta_6 FTA_{kjt} + \gamma_j + \tau_t + \varepsilon_{kjt}$$

Equation 2

$$\ln(FDI_{kjt}) = \beta_0 + \beta_1 \ln(GDPSUM_{kjt}) + \beta_2 \ln(SM_{kjt}) + \beta_3 \ln(DIFF_{kjt,>1}) - \beta_4 \ln(DIFF_{kjt,<1}) + \beta_5 \ln(OPEN_{jt}) + \beta_6 BIT_{kjt} + \beta_7 FTA_{kjt} + \gamma_j + \tau_t + \varepsilon_{kjt}$$

Table 4. Variables and Their Expected Sign

Variable	Definition	Horizontal FDI	Vertical FDI	Total FDI
$GDPSUM_{kjt}$	Sum of GDP in *k* and *j*	+		+
SM_{kjt}	$1-\left(\frac{GDP_{kt}}{GDPSUM_{kjt}}\right)^2-\left(\frac{GDP_{jt}}{GDPSUM_{kjt}}\right)^2$	+		+
$DIFF_{kjt}$	Ratio of per capita GDP of *k* and *j*	+/-	+	+/-
$OPEN_{jt}$	Trade volume divided by GDP in *j*	+	+	+
BIT_{kjt}	1 if BIT in force between *k* and *j* for *t*, 0 otherwise	+	+	+
FTA_{kjt}	1 if FTA in force between *k* and *j* for *t*, 0 otherwise	+/-	+	+/-
$ln(DIFF_{>1})FTA$	*DIFF*>1 and *ln(DIFF)*·*FTA*	+/-	+	+/-
$ln(DIFF_{<1})FTA$	*DIFF*<1 and *ln(DIFF)*·*FTA*	+/-	+	+/-

Note: see Carr et al. (2001), Markusen and Maskus (2002), and Egger and Pfaffermayr (2004) for the model predictions.

Equation 3

$$\ln(FDI_{kjt}) = \beta_0 + \beta_1 \ln(GDPSUM_{kjt}) + \beta_2 \ln(SM_{kjt}) + \beta_3 \ln(DIFF_{kjt,>1}) - \beta_4 \ln(DIFF_{kjt,<1}) + \beta_5 \ln(OPEN_{jt})_{kjt} + \beta_6 BIT + \beta_7 FTA_{kjt} + \beta_8 \ln(DIFF_{kjt,>1})FTA_{kjt} - \beta_9 \ln(DIFF_{kjt,<1})FTA_{kjt} + \gamma_j + \tau_t + \varepsilon_{kjt}$$

The dependent variables are the log of outward or inward FDI stocks between Korea (*k*) and its 184 trading partners (*j*) at the bilateral level for year *t*. The FDI stocks are explained by the four types of variables, country size, factor endowments, trade and FDI frictions, and interaction terms. It is expected that an increase both in size (*GDPSUM*) and similarity (*SM*) of Korea and its partner country positively affect horizontal FDI. The difference in their GDP per capita (*DIFF*) may be related to horizontal FDI. However, if it measures the difference in factor endowments between the two countries, it may increase vertical FDI. The degree of trade openness in the partner country (*OPEN*) and bilateral investment treaties (*BIT*) should obviously stimulate both horizontal and vertical FDI. The impact of FTAs on FDI may differ depending on reasons for investment, horizontal and vertical, as previously mentioned. Less tangibly, the signing of FTAs is likely to drive FDI flows intensifying economic and political cooperation between the two countries.

In Equation 2, *DIFF* is split into two parts, *DIFF*>1 and *DIFF*<1, because the characteristic of the partners changes by 1. For instance, if *DIFF*<1, partners should be developed countries with higher income than Korea. In Equation 3, the interaction terms of *DIFF* and *FTA* are inserted to capture the different effects of FTAs with partner countries with higher or lower per capita GDP than Korea. All equations include partner country-specific (γ_j) and time-specific fixed effects (τ_t). The usual error term is denoted by ε_{kjt}. Table 4 presents the def-

inition of the explanatory variables and their expected signs from the previous literature.

Table 5. Description of Variables

Variables	Mean	Std.Err	Min	Max
ln(Outward FDI)	3.53	2.97	-5.29	10.95
ln(Inward FDI)	2.27	3.38	-2.88	10.38
ln(GDPSUM)	27.51	.44	26.94	30.38
ln(SM)	-3.45	1.99	-9.92	-.69
ln(DIFF)	1.16	1.63	-1.82	5.14
ln(DIFF>1)	1.77	1.41	0	5.14
ln(DIFF<1)	-.15	.34	-1.82	0
ln(OPEN)	4.39	.49	3.01	6.13
BIT	.36	.48	0	1
FTA	.03	.17	0	1

The data on bilateral outward and inward FDI are collected from Source OECD International Direct Investment Statistics. *DIFF* and *OPEN* are calculated using GDP and trade data from World Bank (WDI) World Development Indicator. Information on BITs is obtained from UNCTAD (United Nations Conference on Trade and Development).

Empirical Results

The equations are estimated by sweeping partner country-specific fixed effects with the within transformation. Unobservable year characteristics are controlled for by a set of year dummies. The first three columns of Table 6 present the estimates of Equations 1 through 3 taking bilateral outward FDI as a dependent variable.

In all regressions the coefficients of *GDPSUM* and *SM* are estimated significantly positive, as expected, implying that outward FDI increases with the size and similarity of Korea and its partner country measured by GDP. In column (1) the coefficient of *DIFF* has a positive sign, which means that an increase in the endowments or income difference affects outward FDI asymmetrically according to whether partners are developed or developing countries. In columns (2) and (3) when partners are lower-income countries than Korea (*DIFF*>0), *DIFF* is significantly positive, suggesting that decreased factor prices in developing countries stimulate bilateral vertical FDI to the partners from Korea. On the other hand, when *DIFF*<0, it is estimated significantly negative, which may be interpreted as that a decrease in the income level of developed countries has a negative effect on Korea's horizontal FDI. The estimated coefficient of *OPEN* is negative, but not significant in all columns. *BIT* is marginally significantly positive only in columns (1) and (2).

In columns (1) and (2) the coefficient of *FTA*, which is of our main interest, is estimated significantly positive at the 5% significance level. Its magnitude shows that FTAs increase Korea's overseas investment by more than 50% on average. Furthermore, in column (3) the interaction terms of *DIFF* and *FTA* are significantly positive both when *DIFF*>0 and *DIFF*<0. It implies that FTAs encourage outward FDI to developed countries as well as developing countries by creating new investment opportunities.

In the last three columns of Table 6, the dependent variable is inward FDI from partner countries. Not surprisingly, *GDPSUM* and *SM* have a positive coefficient. As seen in columns (4) and (5), the coefficient of *DIFF* is estimated marginally significantly positive, but only when *DIFF*>0. Since foreign investments are mostly brought into Korea with horizontal motives, an increase in *DIFF*, possibly combined with a rise of Korea's per capita income, is likely to lead to an influx of horizontal FDI, especially from lower-income countries than Korea.

Table 6. Effects on Outward and Inward FDI

	Outward FDI			Inward FDI		
	(1)	(2)	(3)	(4)	(5)	(6)
ln(*GDPSUM*)	7.163***	6.935***	7.332***	3.719***	3.720***	3.886***
	(2.046)	(2.071)	(2.066)	(1.455)	(1.457)	(1.456)
ln(*SM*)	3.130***	3.100***	3.222***	2.249***	2.248***	2.307***
	(.979)	(.980)	(.976)	(.677)	(.679)	(.678)
ln(*DIFF*)	3.302***			1.204*		
	(.966)			(.686)		
ln($DIFF_{>1}$)		3.285***	3.404***		1.202*	1.222*
		(.967)	(.964)		(.691)	(.691)
- ln($DIFF_{<1}$)		-2.854**	-3.341***		-1.217	-1.476*
		(.976)	(1.154)		(.781)	(.787)
ln(*OPEN*)	-.068	-.041	-.079	1.088***	1.088***	1.043***
	(.396)	(.398)	(.397)	(.276)	(.277)	(.277)
BIT	.409*	.432*	.331	-.062	-.062	-.109
	(.225)	(.227)	(.230)	(.156)	(.157)	(.158)
FTA	.468**	.467**	-.842	-.168	-.168	-.815*
	(.233)	(.233)	(.540)	(.169)	(.169)	(.456)
ln($DIFF_{>1}$)·*FTA*			.552**			.155
			(.255)			(.204)
- ln($DIFF_{<1}$)·*FTA*			1.801***			1.072**
			(.594)			(.476)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Observations	884	884	884	926	926	926
R squared	.26	.26	.27	.39	.40	.41

1) Robust standard errors are parentheses.
2) ***, **, and * indicate significance at 1%, 5%, and 10%, respectively.

In all columns the estimate of *OPEN* shows that inward FDI is significantly positively affected by the trade openness of partner countries, calculated by the ratio of trade volume and GDP. It is quite natural because the major source of Korea's inward FDI is developed countries, which usually have high trade openness. It seems that *BIT* is not related to inward FDI. Unlike the result for outward FDI, there is no evidence that FTAs have a significant effect on inward FDI from partners. However, in column (6) the interaction term of *DIFF*<1 and *FTA* is estimated positive at the 1% significance level. Consequently, it is revealed that a FTA with a higher-income country may drive a larger inflow of FDI.

Conclusion

This study sheds light on the effects of FTAs on outward and inward FDI in Korea. It finds that there has been an upsurge in overseas investments made by Korea through the FTAs. The FTAs have encouraged vertical investments in developing countries as cheap manufacturing bases and horizontal investments in the services sectors of developed countries.

This study also shows that the FTAs have stimulated inward FDI to Korea, mainly from high-income partners.

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