A STUDY ON IMPACT OF OVERSEAS DIRECT INVESTMENT OF KOREA ON DOMESTIC INVESTMENT AND EMPLOYMENT

By

YU, Jehyun

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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Committee in charge:

Professor LEE, Siwook, Supervisor _____

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ABSTRACT

A STUDY ON IMPACT OF OVERSEAS DIRECT INVESTMENT OF KOREA ON DOMESTIC INVESTMENT AND EMPLOYMENT

By

YU, JEHYUN

The study analyzes the impact of domestic investment and employment of Overseas Direct Investment(ODI) in Korea using quarterly data from 1981 to 2017. The research utilizes lag distributed model and empirically analyzes the effect by industries and by form of investment. According to the result, ODI positively impacts on domestic investment and employment. In detail, M&A ODI was insignificant both in domestic investment and employment whereas greenfield ODI was significant. Also, the impact was larger in the service industry than manufacturing industry. In sum, the study shows the positive impact of outward investment in the service industry and greenfield ODI on the domestic economy.

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I. INTRODUCTION

The amount of Overseas Direct Investment (ODI) of Korea has gradually increased from the 1990s when relevant regulations were mitigated. The amount of ODI was approximately 4 billion USD in 1997. Korean ODI has increased tenfold in just twenty years, and was valued at 43.6 billion USD in 2017. Korea is ranked 13th in the world in terms of total ODI. ODI has differed not only in terms of quantity but also quality. For example, the ratio of greenfield to M&A ODI, or the purpose of ODI has largely changed compared to past years.

In contrast to the common understanding that Foreign Direct Investment (FDI) stimulated the Korean economy by increasing domestic investment and employment, some arguments exist that ODI substituted domestic investment and employment by outward investment. However, at the same time, others argue that the relationship between outward investment and domestic investment shows completeness through the increased demand of a subsidiary located overseas for a parent company.

Although the literature review is quite voluminous regarding the impact of ODI on domestic investment and employment, the impact is ambiguous because studies suggest different results. While some of the studies found some evidence of the positive effects of ODI on the domestic economy, others could not find any evidence of the positive effects of ODI on the domestic economy. This study is meaningful to figure out the real impact of ODI on the Korean economy by empirically analyzing it. Moreover, the study accounts for the time difference between ODI exiting Korea up to the time when ODI influences real domestic sectors. Many previous studies did not consider the time difference between capital flow and real investment.

The research aims to analyze how increased ODI influenced domestic investment

and employment. Firstly, the research analyzes the impact on domestic investment of ODI. Many researchers have studied whether outward investment crowds out or encourages domestic investment and the real effect has been quite controversial. The research analyzes time series data of ODI and domestic investment from 1981 to 2017 and determines which argument is valid in the case of Korea.

Secondly, the research analyzes the impact of ODI on employment. Like the impact of ODI on domestic investment, the impact of ODI on domestic employment can bring about two different results. Due to the expansion of domestic factories, employment can be increased. However, M&A FDI which can lead to structural adjustment, consolidation, and the shutdown of competing companies can lead to a decrease in employment. The study analyzes time series data of ODI and domestic employment from 1981 to 2017 and confirms which impact is greater.

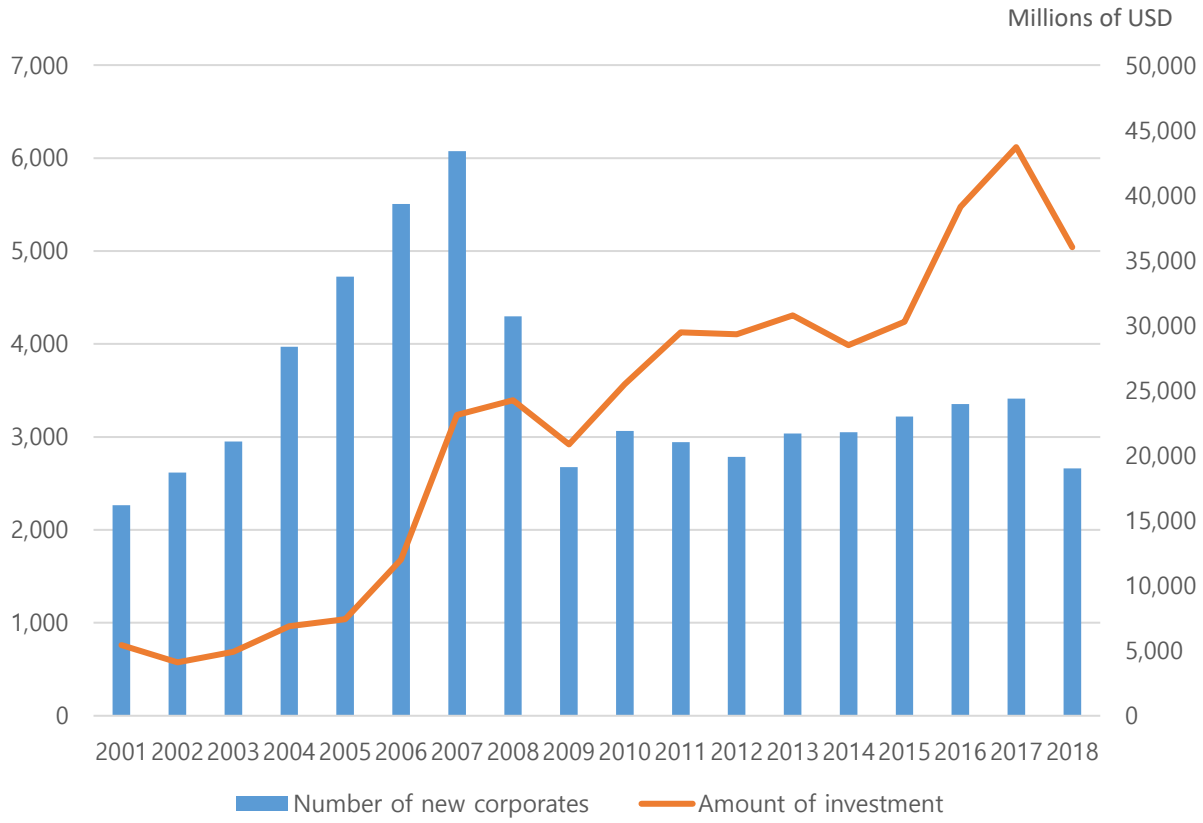
Thirdly, the study analyzes the impact of ODI on domestic investment and employment by several sectors in the industry. This detailed analysis will help inform which form of ODI or industry has influenced domestic investment and employment most effectively.

Chapter 2 reviews recent ODI trends in Korea. Chapter 3 provides previous research which cover the effect of ODI on domestic investment and employment. Chapter 4 introduces empirical data and the methodology used in the research, and Chapter 5 covers the empirical results and discussion. Chapter 6 provides a conclusion and implications.

II. ODI TRENDS

The ODI trend in recent years appeared in Figure 1. The amount of ODI and number of new corporates which invest in foreign countries were largely downsized after the 2008 global financial crisis and recovered. UNCTAD (2016) analyzed that the main factor of economic recovery was caused by cross-border M&As.

Figure 1 ODI trend in recent years (2001-2018)

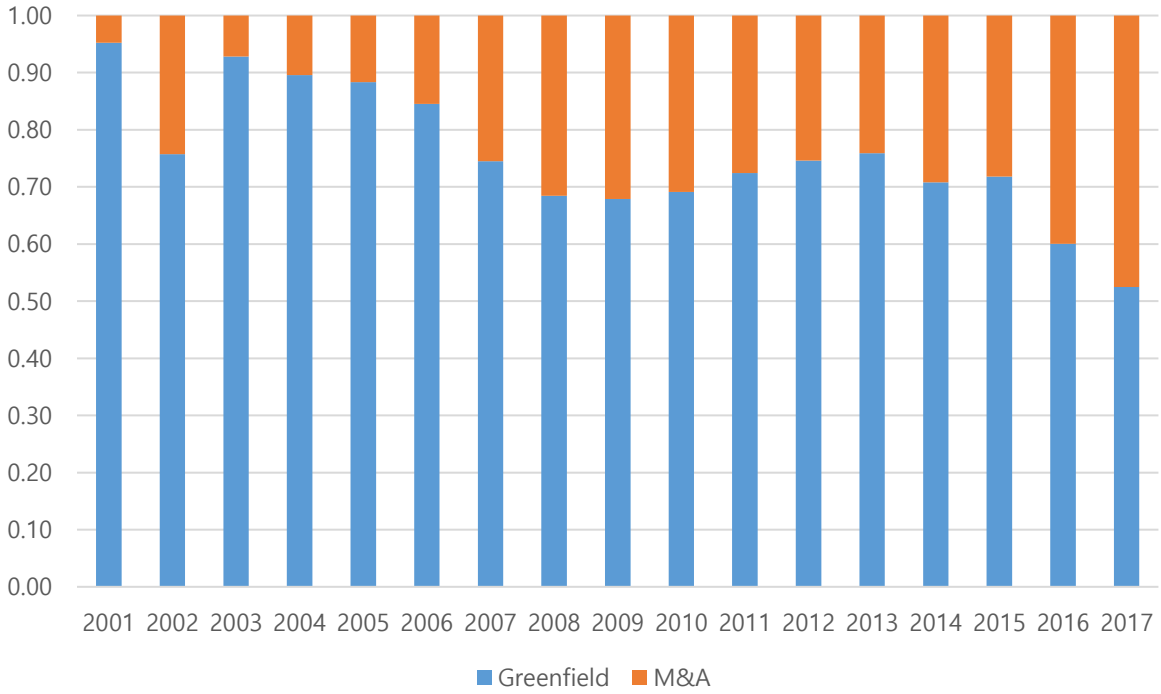


Source: ODI database (KEXIM)

Actually, we can observe that investment through M&A increased after the global financial crisis in 2008. Each Greenfield and M&A investment showed almost the same ratio, which is remarkable when it comes to comparing the ratio between greenfield and

M&A investment was roughly 9:1 in 2001.

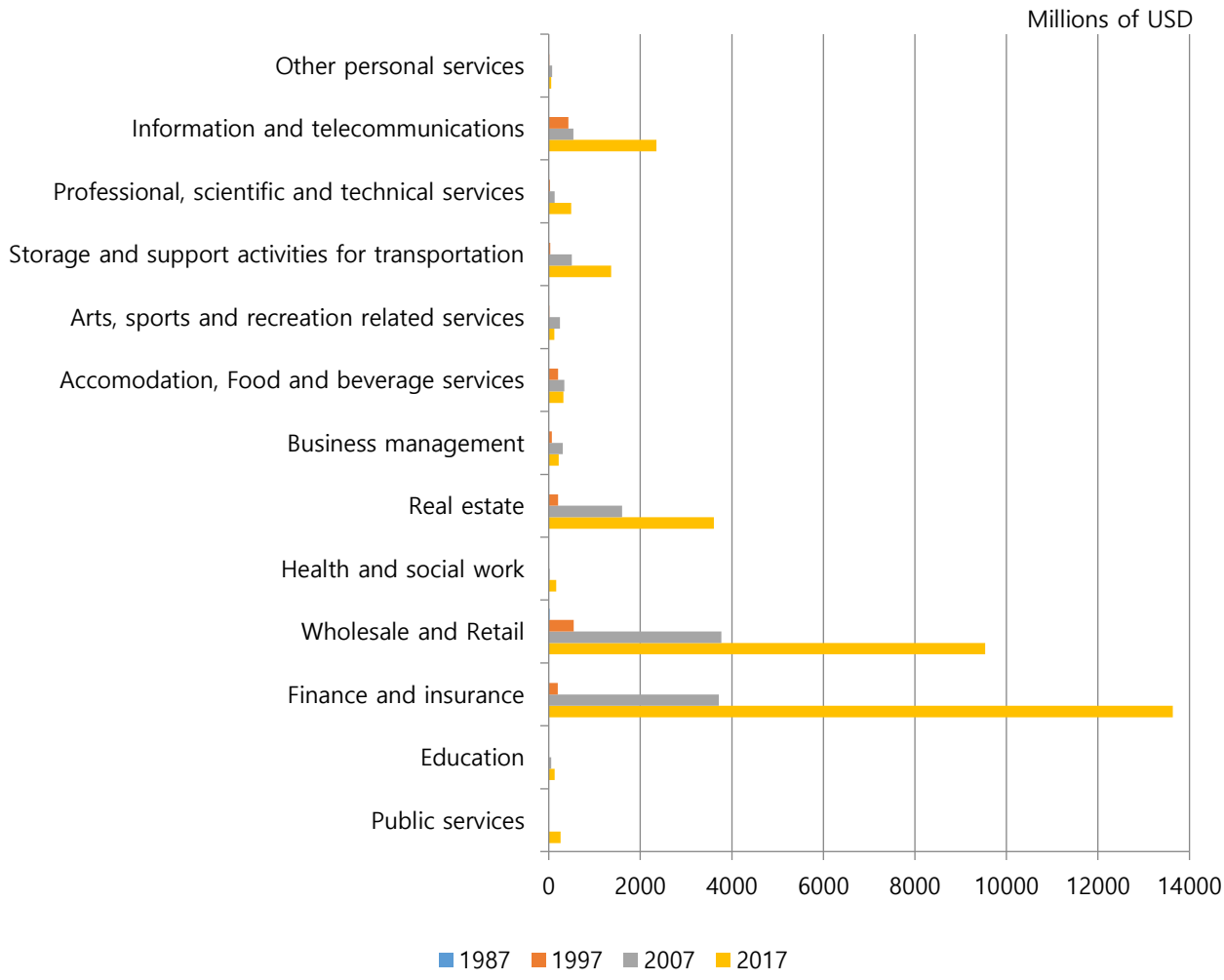
Figure 2 ODI trend by the form of investment



Source: ODI database (KEXIM)

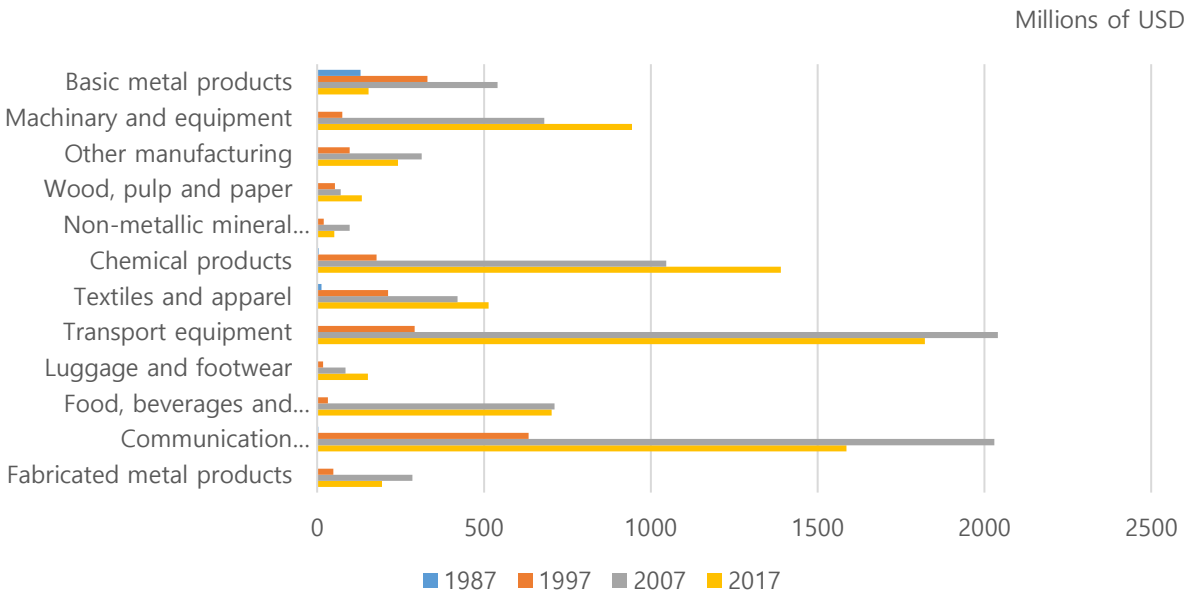
The industrial structure also changed a lot. Although both the number and scale of investment in the manufacturing industry were a lot more than those of the service industry in 1990s, the service industry surpassed the manufacturing industry in terms of the amount of ODI in 2000s. In detail, information and communications, professional science and technology service, logistics, real estate business, wholesale and retail, finance and insurance, etc., more than doubled in just ten years. Investment in the service sector in 2017 showed an increase over all the sectors except individual service, leisure, accommodation and business management service, when compared to 2007.

Figure 3 Comparison of service industries



Source: ODI database (KEXIM)

Figure 4 Comparison of manufacturing industries



Source: ODI database (KEXIM)

Table 1 ODI by the motive of investment

Purpose of Investment	**1987**	**1997**	**2007**	**2017**
Others	1%	24%	4%	0%
Overcoming protectionism	0%	4%	1%	0%
Adopting advanced technology	0%	7%	6%	17%
Promoting export	2%	36%	22%	6%
Securing raw materials	0%	2%	0%	0%
Resource-seeking	65%	11%	10%	4%
Obtaining low-waged workers	0%	7%	6%	2%
Entering third country	0%	0%	5%	28%
Entering local market	32%	9%	46%	43%

Source: ODI database (KEXIM)

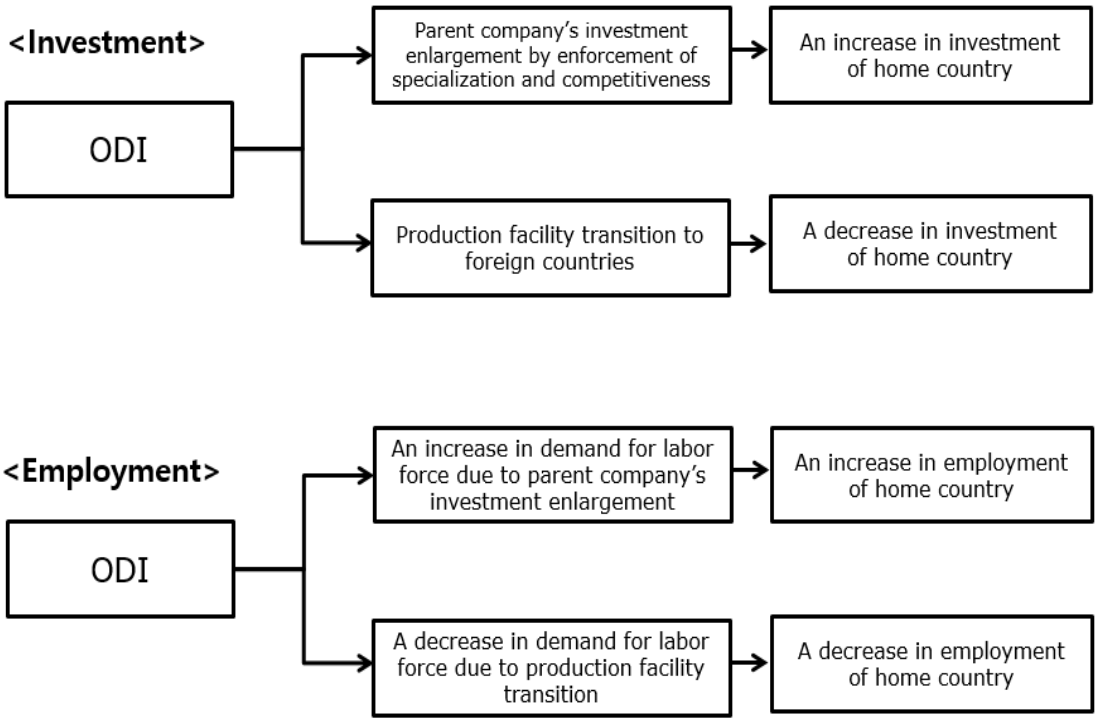
The purpose of Korean ODI is summarized in Table 1. Investment for adopting advanced technology and entering third country sharply increased in 2017 compared to past years. On the other hand, investment for overcoming protection, promoting export, resource-seeking, and obtaining low-waged workers reduced. In sum, Korea's ODI

tends to go for developed countries with aims to obtain advanced technology or enter the local market.

III. LITERATURE REVIEW

A flowchart for domestic investment and employment of ODI is shown in Figure 5.

Figure 5 A flowchart for home country's investment and employment of ODI



Source: Own flowchart based on Lee (2007)

There is a possibility of a decrease in domestic investment due to the transfer of production facilities to foreign countries. But if the parent company specializes in high

value-added activities and obtains competitiveness due to ODI, domestic investment can be magnified.

On the other hand, domestic employment can decrease because the transfer of production facilities leads to a decrease in demand for the home country's labor force. However, domestic employment can increase to satisfy a demand for domestic labor force by parent company's enlargement.

Previous works regarding the relationship between domestic and foreign investment point out that it differs according to the characteristic of industry, countries, the purpose of investment, etc. For example, research by Hejazi & Pauly (2003) analyzed panel data in Canada and pointed out that investment for developed countries or R&D related investment promotes intra-industry trade, which makes domestic and foreign investment complementary. On the other hand, Braunerhjelm & Oxelheim (2000) analyzed the Swedish industry and concluded that R&D related outward investment significantly substitutes home country investment.

Desai et al (2005) explored the U.S. time series data and found out that outward investment promoted domestic investment. When the outward investment by multinational corporates increases by 1 dollar, it stimulates domestic investment by 3.5 dollars. Multinational corporates split the production process both in the home and foreign country for the best profitability because the production costs of home and foreign countries can vary in each process. The researchers also pointed out that previous research which consider the foreign and domestic capital are substitutes in production made a mistake because of omitted variable bias.

Previous research dealing with ODI and home country employment also showed

different conclusions like in the case of investment. Lipsey et al (2000) who analyzed the cases of Japan, the United States, and Sweden concluded that when production in a foreign region increases due to ODI, employment in the home country also increases in order to supervise or support an affiliated company in the foreign region. Kwon et al (2016) researched the impact of ODI on employment using panel data from 1980-2014 among 13 service sectors in Korea. Their main result is that ODI in the service industry has consistently exerted a positive influence on domestic employment. According to Shin et al (2005), outward investment in heavy chemical industry stimulates home country employment by fostering R&D and management related work forces. On the contrary, light industry mainly outsources work force related production to foreign countries, home country employment tends to decline in light industry sector.

On the other hand, others argue that ODI crowds out home country employment. Hong (2013) used panel data from 1991-2009 in eighteen Korean manufacturing industries and concluded that the impact of ODI differs from partner countries. For example, ODI for developing countries negatively impacts domestic employment by substituting domestic production with aims to reduce production cost. In contrast, ODI for developed countries does not show any negative impact. Lee (2012) found out that ODI in the electronics industry negatively influenced Korea's domestic employment by substituting domestic investment. Especially, whereas conglomerates in the electronics industry were statistically insignificant, SMEs showed a negative impact on domestic employment.

IV. METHODOLOGY AND DATA

4.1. DATA

Table 2 shows variables including ODI by type and industry, GDP, operation rate, equipment investment and employment. Every variable is seasonally adjusted and took a natural log.

Table 2 Variables and Sources

Variables	Definitions	Sources
lnodi lnodim lnodis lnodig lnodimna	Overseas Direct Investment ODI in manufacturing industry ODI in service industry Greenfield ODI Brownfield ODI	KEXIM ODI Database
lngdp lnoper lnequip lnempl	GDP Operation Rate Equipment Investment Employment	BOK, OECD database KOSIS database BOK database KOSIS database

Quarterly data from 1981 to 2017 were used in the analysis. Real GDP and real equipment investment data were obtained from Bank of Korea (BOK), operation rate and employment by profession statistics were sourced from Korean Statistics Portal (KOSIS).

4.2. Methodology

In order to observe the impact of ODI on domestic investment and employment, the study set the dynamic model as follows.

$$y_t = \alpha + \beta_0 x_t + \beta_1 x_{t-1} + \cdots + \beta_k x_{t-k} + e_t \quad (1)$$

Whereas static model considers that the current value of independent variable determines the current value of the dependent variable, the dynamic model considers that both past and current values of independent variables can influence the dependent variable (Min and Choi, 2014). In our study, dependent variables are domestic investment and employment. And independent variables are the amounts of ODI considering time lags, GDP, etc.

The study will elaborate on the effect of ODI on home-country investment and employment in Korea using the below equations.

$$lnINV = f(lnODIt, lnODI_{t-1}, lnODI_{t-2}, lnODI_{t-3}, lnODI_{t-4}, lnGDP, lnOPER_{t-1}) \quad (2)$$

$$lnEMPL = f(lnODIt, lnODI_{t-1}, lnODI_{t-2}, lnODI_{t-3}, lnODI_{t-4}, lnGDP) \quad (3)$$

In equation (2), Dependent variable is log value of domestic investment (*lnINV*). Independent variables are log value of ODI of Korea to foreign countries including current value and past values of each four quarters ($lnODI_t$, $lnODI_{t-1}$, $lnODI_{t-2}$, $lnODI_{t-}$

$_{3}$, $lnODI_{t-4}$), GDP of Korea (*lnGDP*) and operation rate of past quarter ($lnOPER_{t-1}$). In other words, domestic investment is influenced by the current and past values of ODI, current GDP and past operation rate.

In equation (3), Dependent variable is log value of domestic employment (*lnEMPL*). Independent variables are log value of ODI of Korea to foreign countries including current value and past values of each four quarters ($lnODI_t$, $lnODI_{t-1}$, $lnODI_{t-2}$, $lnODI_{t-3}$, $lnODI_{t-4}$), GDP of Korea (*lnGDP*). In other words, domestic employment is influenced by the current and past values of ODI and current GDP.

In order to verify the stationarity of a time series, the study will conduct ADF and PP test. As mentioned before, the study will utilize finite distributed lag model which includes current and past values of independent variables. Although the model has a shortcoming that it is difficult to predict the adequate time lags of explanatory variables, the model can reduce the possibility of autocorrelation. (Min and Choi, 2014)

V. EMPIRICAL RESULTS

Lag for following analyses was determined according to the Akaike Information Criterion (AIC). Significant coefficients from <0> to <-4> quarters were added up altogether when considering the effect of ODI.

Table 3 Influence of ODI on domestic investment

	By form		By industry	
Variables	Greenfield	M&A	Manufacturing	Service
ODI	0.0562***	0.00550	0.0309*	0.0508***
<0>	(0.0197)	(0.0130)	(0.0172)	(0.0120)
	0.0202	0.0133	0.0142	0.0234*
<-1>	(0.0201)	(0.0124)	(0.0179)	(0.0126)
	0.0391**	0.0147	0.0227	0.0139
<-2>	(0.0184)	(0.0124)	(0.0181)	(0.0111)
	0.0143	0.00200	0.0301*	-0.00185
<-3>	(0.0196)	(0.0122)	(0.0173)	(0.0107)
	0.00770	0.00752	0.0101	-0.00316
<-4>	(0.0182)	(0.0123)	(0.0163)	(0.00857)
GDP	0.641***	0.667***	0.689***	0.667***
	(0.0831)	(0.113)	(0.0646)	(0.0662)
Operation rate	1.507***	1.345***	0.961***	1.621***
	(0.174)	(0.223)	(0.198)	(0.168)
Constant	-6.870***	-4.984***	-4.427***	-6.841***
	(0.969)	(1.520)	(1.229)	(0.854)
Observations	146	111	145	134
R-squared	0.975	0.911	0.975	0.973

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results show that domestic investment increases by 0.095% when greenfield ODI increases by 1%. Furthermore, while ODI in manufacturing increases domestic investment by 0.061%, ODI in service increases the domestic investment by 0.074%.

Table 4 Influence of ODI on employment

	By form		By industry	
Variables	Greenfield	M&A	Manufacturing	Service
ODI	0.00335	-0.00186	-0.00776	0.0128***
<0>	(0.00623)	(0.00308)	(0.00551)	(0.00356)
	-0.00437	-0.00450	0.00860	-0.00200
<-1>	(0.00633)	(0.00292)	(0.00579)	(0.00375)
	0.0174***	0.00337	0.00844	0.000942
<-2>	(0.00582)	(0.00293)	(0.00589)	(0.00326)
	0.00278	0.00430	-0.000202	0.00194
<-3>	(0.00619)	(0.00289)	(0.00564)	(0.00317)
	-0.00130	0.00146	-0.00599	0.00237
<-4>	(0.00574)	(0.00288)	(0.00531)	(0.00255)
GDP	0.243***	0.272***	0.285***	0.225***
	(0.0262)	(0.0267)	(0.0194)	(0.0190)
Constant	6.757***	6.630***	6.448***	7.023***
	(0.201)	(0.273)	(0.168)	(0.178)
Observations	146	111	145	134
R-squared	0.967	0.951	0.965	0.968

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Results show that the number of newly employed increases by 0.017% when greenfield ODI increases by 1%. Especially, the result confirms that the service sector influenced an increase in the number of employees more than the manufacturing sector, showing an increase in the number of employees by 0.013%. Due to the fact that the impact on investment and employment is more significant in the service industry than the manufacturing industry, we will narrow down the effect by the service industry.

Table 5 Influence of the manufacturing industry on domestic investment

	By manufacturing industry					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
ODI	-0.00411	-0.00418	0.0243	0.0364***	0.00586	0.0233
<0>	(0.0105)	(0.0185)	(0.0171)	(0.0128)	(0.0101)	(0.0182)
	-0.00919	0.0103	0.0235	0.0288**	0.00513	0.0233
<-1>	(0.0108)	(0.0192)	(0.0167)	(0.0129)	(0.0101)	(0.0183)
	-0.0139	0.00379	0.0197	0.0205	0.0127	0.0303
<-2>	(0.0102)	(0.0192)	(0.0169)	(0.0124)	(0.00985)	(0.0192)
	-0.0128	0.00407	0.0144	0.0122	0.0114	-0.00209
<-3>	(0.0104)	(0.0179)	(0.0162)	(0.0115)	(0.00952)	(0.0186)
	-0.00714	0.0107	0.0197	0.00148	0.00799	-0.00384
<-4>	(0.0100)	(0.0169)	(0.0159)	(0.0112)	(0.00915)	(0.0191)
GDP	1.022***	0.805***	0.720***	0.790***	0.824***	0.781***
	(0.0468)	(0.0920)	(0.0678)	(0.0328)	(0.0378)	(0.102)
L.lnoper	1.417***	1.284***	1.072***	0.706***	0.908***	1.335***
	(0.231)	(0.221)	(0.230)	(0.233)	(0.249)	(0.237)
Constant	-8.678***	-6.154***	-4.903***	-3.932***	-4.783***	-6.638***
	(1.277)	(1.448)	(1.355)	(1.202)	(1.359)	(1.553)
Observations	114	115	118	118	116	128
R-squared	0.925	0.921	0.935	0.943	0.932	0.953
	By manufacturing industry					
VARIABLES	(7)	(8)	(9)	(10)	(11)	(12)
ODI	0.0275	0.00102	0.0264*	0.00476	0.0247*	0.0146
<0>	(0.0182)	(0.0107)	(0.0140)	(0.0134)	(0.0142)	(0.0138)
	0.0262	-0.0107	0.0401***	0.00711	0.000814	0.00641
<-1>	(0.0183)	(0.0102)	(0.0148)	(0.0135)	(0.0141)	(0.0139)
	0.0257	0.000549	0.0490***	0.0187	0.0158	0.00293
<-2>	(0.0188)	(0.0110)	(0.0150)	(0.0135)	(0.0142)	(0.0140)
	0.0110	-0.00312	0.0331**	0.00916	0.00826	0.0103
<-3>	(0.0176)	(0.00923)	(0.0149)	(0.0132)	(0.0138)	(0.0125)
	0.00879	-0.00773	0.0330**	0.00491	-0.0157	-0.00340
<-4>	(0.0170)	(0.00900)	(0.0141)	(0.0127)	(0.0142)	(0.0126)
GDP	0.765***	0.976***	0.537***	0.780***	0.826***	0.853***
	(0.0358)	(0.0527)	(0.0472)	(0.0715)	(0.0557)	(0.0534)
L.lnoper	0.970***	1.314***	0.589***	1.251***	1.215***	1.237***
	(0.204)	(0.218)	(0.190)	(0.220)	(0.223)	(0.240)
Constant	-5.032***	-7.909***	-1.053	-5.883***	-6.242***	-6.577***
	(1.071)	(1.201)	(1.123)	(1.352)	(1.266)	(1.360)
Observations	129	115	118	118	121	113
R-squared	0.963	0.923	0.959	0.932	0.940	0.919

Notes: Each number indicates: (1) basic metal products (2) machinery and equipment (3) Other manufacturing (4) wood, pulp and paper (5) non-metallic mineral products (6) chemical products, pharmaceuticals and plastic products (7) textiles and apparel (8) motor vehicles and other transport equipment (9) luggage and footwear (10) food, beverages and tobacco products (11) electronic components, communication equipment and apparatuses (12) fabricated metal products

Table 6 Influence of the manufacturing industry on employment

	By manufacturing industry					
VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
ODI	-8.70e-05	0.00447	0.00687	0.00276	0.00235	0.000213
<0>	(0.00262)	(0.00446)	(0.00426)	(0.00326)	(0.00237)	(0.00450)
	0.00227	-0.00662	-0.00239	0.000303	-0.00431*	-0.00696
<-1>	(0.00274)	(0.00464)	(0.00423)	(0.00321)	(0.00233)	(0.00450)
	-0.000123	-0.00126	0.00445	0.00308	-0.000712	0.00420
<-2>	(0.00262)	(0.00463)	(0.00424)	(0.00325)	(0.00235)	(0.00475)
	-0.000996	-0.00284	0.00359	0.00826***	0.00218	0.000436
<-3>	(0.00267)	(0.00431)	(0.00412)	(0.00304)	(0.00226)	(0.00460)
	-0.000901	0.00569	0.00351	0.000960	0.00404*	0.00506
<-4>	(0.00252)	(0.00408)	(0.00406)	(0.00296)	(0.00218)	(0.00473)
GDP	0.285***	0.287***	0.255***	0.266***	0.277***	0.283***
	(0.0116)	(0.0220)	(0.0160)	(0.00775)	(0.00802)	(0.0250)
Constant	6.491***	6.485***	6.703***	6.587***	6.557***	6.492***
	(0.112)	(0.214)	(0.124)	(0.0733)	(0.0842)	(0.229)
Observations	114	115	118	118	116	128
R-squared	0.951	0.954	0.956	0.959	0.959	0.965
	By manufacturing industry					
VARIABLES	(7)	(8)	(9)	(10)	(11)	(12)
ODI	0.00268	0.00194	0.0134***	0.000826	0.00206	-0.00272
<0>	(0.00504)	(0.00264)	(0.00389)	(0.00337)	(0.00351)	(0.00335)
	-0.00384	-0.00230	-0.00217	-0.00401	-0.00385	-0.00193
<-1>	(0.00511)	(0.00251)	(0.00405)	(0.00341)	(0.00349)	(0.00333)
	0.0132**	-0.00290	-0.000767	0.000520	-0.00214	0.00356
<-2>	(0.00525)	(0.00271)	(0.00410)	(0.00342)	(0.00353)	(0.00334)
	-0.00306	0.000767	0.00290	0.00525	0.000853	0.00299
<-3>	(0.00492)	(0.00227)	(0.00408)	(0.00335)	(0.00342)	(0.00301)
	-0.00157	0.000866	0.0162***	0.00121	-0.00213	-0.00158
<-4>	(0.00471)	(0.00222)	(0.00385)	(0.00321)	(0.00353)	(0.00303)
GDP	0.272***	0.291***	0.226***	0.272***	0.301***	0.287***
	(0.00969)	(0.0129)	(0.0116)	(0.0176)	(0.0135)	(0.0119)
Constant	6.571***	6.447***	6.950***	6.613***	6.357***	6.470***
	(0.0874)	(0.130)	(0.101)	(0.164)	(0.128)	(0.104)
Observations	129	115	118	118	121	113
R-squared	0.966	0.953	0.967	0.955	0.959	0.951

Notes: Each number indicates: (1) basic metal products (2) machinery and equipment (3) Other manufacturing (4) wood, pulp and paper (5) non-metallic mineral products (6) chemical products, pharmaceuticals and plastic products (7) textiles and apparel (8) motor vehicles and other transport equipment (9) luggage and footwear (10) food, beverages and tobacco products (11) electronic components, communication equipment and apparatuses (12) fabricated metal products

Table 7 Influence of the service industry on domestic investment

	By service industry					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
ODI	0.0209*	0.0164**	0.00249	0.0145*	0.0136	0.00602
<0>	(0.0122)	(0.00651)	(0.00936)	(0.00783)	(0.00893)	(0.00951)
	0.0228*	0.0134*	0.00528	0.00317	0.0137	-0.0111
<-1>	(0.0125)	(0.00737)	(0.00959)	(0.00800)	(0.00862)	(0.0100)
	0.0327**	-0.00145	-0.00312	-0.00559	0.00883	-0.0249**
<-2>	(0.0127)	(0.00720)	(0.00949)	(0.00786)	(0.00819)	(0.00952)
	0.0202	0.00421	-0.0131	-0.0128	0.00259	-0.0161
<-3>	(0.0126)	(0.00689)	(0.00948)	(0.00816)	(0.00837)	(0.00975)
	0.0133	0.00981	-0.0344***	-0.0158*	0.00618	-0.00863
<-4>	(0.0125)	(0.00624)	(0.00974)	(0.00817)	(0.00801)	(0.00968)
GDP	0.689***	0.643***	1.235***	1.133***	0.594***	1.115***
	(0.0533)	(0.0502)	(0.0690)	(0.0679)	(0.0688)	(0.0780)
Operation rate	1.854***	0.474*	0.788***	0.237	0.639**	1.465***
<-1>	(0.173)	(0.247)	(0.228)	(0.185)	(0.258)	(0.226)
Constant	-8.468***	-0.613	-8.647***	-5.028***	-0.750	-10.01***
	(0.777)	(1.342)	(1.543)	(1.274)	(1.487)	(1.349)
Observations	144	87	79	73	96	114
R-squared	0.978	0.923	0.921	0.933	0.924	0.934
	By service industry					
Variables	(7)	(8)	(9)	(10)	(11)	(12)
<0>	0.0244**	0.00102	0.00407	-0.00682	0.0262**	0.000145
	(0.0117)	(0.0113)	(0.0115)	(0.00941)	(0.0113)	(0.0116)
<-1>	0.0181	-0.00875	0.0228*	0.00265	0.0194*	0.0226*
	(0.0120)	(0.0112)	(0.0115)	(0.00965)	(0.0109)	(0.0122)
<-2>	0.00805	-0.00742	0.0144	0.00262	0.0136	-0.0223*
	(0.0120)	(0.00982)	(0.0114)	(0.00919)	(0.0105)	(0.0125)
<-3>	0.00389	-0.00362	-0.000201	-0.00624	-0.0134	-0.0107
	(0.0117)	(0.00975)	(0.0114)	(0.00946)	(0.0107)	(0.0122)
<-4>	0.0129	-0.0157*	0.00232	-0.0115	-0.0194*	-0.0542***
	(0.0106)	(0.00920)	(0.0106)	(0.00968)	(0.0115)	(0.0123)
GDP	0.741***	1.004***	0.724***	1.029***	0.815***	1.016***
	(0.0494)	(0.0485)	(0.0659)	(0.0815)	(0.0611)	(0.0341)
Operation rate	1.132***	1.464***	1.214***	1.352***	1.177***	1.363***
<-1>	(0.233)	(0.242)	(0.233)	(0.240)	(0.237)	(0.225)
Constant	-5.075***	-8.886***	-4.983***	-8.806***	-5.809***	-8.350***
	(1.305)	(1.320)	(1.418)	(1.397)	(1.223)	(1.180)
Observations	108	94	105	103	98	87
R-squared	0.925	0.873	0.924	0.915	0.904	0.935

Notes: 1) Each number indicates: (1) wholesale and retail (2) finance (3) education (4) health (5) real estate (6) business management (7) accommodation (8) art (9) transportation (10) professional (11) information and communications (12) community service

2) Public service was excluded due to the lack of observations

According to the result, five service industries of ODI show a positive impact on investment. They are wholesale and retail trade, finance, accommodation, transportation and telecommunications service. Real estate and professional service appear insignificant.

Table 8 Influence of the service industry on employment

	By service industry					
Variables	(1)	(2)	(3)	(4)	(5)	(6)
ODI	-0.00254	0.00345**	-0.00295	0.00495**	0.00275	-0.000111
<0>	(0.00418)	(0.00166)	(0.00237)	(0.00227)	(0.00216)	(0.00251)
	0.00308	-0.000674	-0.00205	-0.000223	0.000330	-0.000637
<-1>	(0.00426)	(0.00188)	(0.00238)	(0.00232)	(0.00212)	(0.00265)
	0.00676	-7.26e-05	0.00159	0.000398	0.00456**	-0.00465*
<-2>	(0.00430)	(0.00184)	(0.00237)	(0.00226)	(0.00202)	(0.00254)
	0.00359	0.00236	-0.000505	-0.00267	0.000580	-0.00504*
<-3>	(0.00430)	(0.00176)	(0.00241)	(0.00236)	(0.00203)	(0.00259)
	-0.00843*	0.00270*	-0.00595**	0.00483**	0.00433**	-0.00395
<-4>	(0.00429)	(0.00157)	(0.00249)	(0.00234)	(0.00197)	(0.00257)
GDP	0.287***	0.248***	0.369***	0.315***	0.212***	0.346***
	(0.0173)	(0.0127)	(0.0162)	(0.0193)	(0.0169)	(0.0208)
Constant	6.437***	6.871***	5.514***	6.061***	7.261***	5.891***
	(0.151)	(0.138)	(0.184)	(0.221)	(0.182)	(0.205)
Observations	144	87	79	73	96	114
R-squared	0.965	0.955	0.947	0.949	0.959	0.953
	By service industry					
Variables	(7)	(8)	(9)	(10)	(11)	(12)
<0>	0.00610**	9.48e-05	0.00102	-0.00282	0.000238	-0.00395
	(0.00265)	(0.00244)	(0.00276)	(0.00204)	(0.00266)	(0.00271)
<-1>	-0.00118	-0.000292	-0.00192	-0.00221	0.00282	-0.00127
	(0.00272)	(0.00246)	(0.00275)	(0.00209)	(0.00257)	(0.00276)
<-2>	0.00389	-0.00119	0.00202	0.00276	0.00595**	-0.000181
	(0.00271)	(0.00219)	(0.00273)	(0.00200)	(0.00251)	(0.00293)
<-3>	0.00710***	-0.00258	-0.00204	0.00402*	-0.00166	-0.00349
	(0.00270)	(0.00217)	(0.00273)	(0.00206)	(0.00253)	(0.00285)
<-4>	0.00416*	-0.00189	0.00414	0.000231	-0.00521*	-0.00407
	(0.00242)	(0.00203)	(0.00254)	(0.00210)	(0.00263)	(0.00287)
GDP	0.243***	0.323***	0.282***	0.280***	0.291***	0.306***
	(0.0107)	(0.0106)	(0.0155)	(0.0177)	(0.0146)	(0.00781)
Constant	6.816***	6.074***	6.506***	6.544***	6.400***	6.336***
	(0.0994)	(0.121)	(0.168)	(0.189)	(0.151)	(0.0915)
Observations	108	94	105	103	98	87
R-squared	0.960	0.939	0.954	0.956	0.945	0.958

Notes: 1) Each number indicates: (1) wholesale and retail (2) finance (3) education (4) health (5) real estate (6) business management (7) accommodation (8) art (9) transportation (10) professional (11) information and communications (12) community service

2) Public service was excluded due to the lack of observations

According to the result of the impact of ODI on employment by the service industry, eight industries indicated a positive impact on employment. These are finance, health, real estate, business, accommodation, professional, telecommunications,

membership organizations and community services. All they are high value-added service industries except accommodation service.

VI. CONCLUSION

Previous studies regarding the impact of ODI on the home country economy with increasing ODI were actively researched. In the case of Korea, related works were developed especially during the 2000s with an abrupt increase of ODI. Most of the works were conducted on the basis of empirical studies because it is difficult to predict the relationship between ODI and domestic economic indices. Therefore, doing empirical research after the 2000s is meaningful in broadening the width of understanding of the relationship between domestic and outward investment, so that the research can reflect changed phases after the 2000s.

The study reaffirms the previous studies that outward investment does not substitute domestic investment and employment. Manufacturing industry indicates the significant increase in domestic investment right after the outward investment and after the third quarter, and service industry shows the significant rate of increase in domestic investment right after the outward investment and after the first quarter. Each manufacturing and service industry was estimated to increase by 0.061% and 0.074% respectively when ODI increases by 1%. Greenfield ODI also shows the significant increase in domestic investment right after the outward investment and after the second quarter. It was estimated to increase 0.095% when ODI increased by 1%. M&A ODI was not significant.

In the case of employment, the service industry indicates the significant increase

of employment right after the outward investment. Employment in service industry increases 0.0128% when ODI increases by 1%. Manufacturing industry was insignificant. Greenfield ODI shows the significant increase of employment after the second quarter of outward ODI.

In sum, the study sheds lights on the positive impact of outward investment in the service industry and greenfield ODI on the domestic economy. Korean companies can gain competitiveness through outward investment in the field of service industry considering that tertiarization is a global phenomenon. Especially, service industries which require a high quality of labor such as finance, professional technology, information and communications can boost domestic employment.

The paper considers the direct linkage of ODI on employment through home country investment. However, the paper does not consider the indirect linkage of ODI on employment through export. Also, the analysis could be further developed by including diverse control variables like world economic trend, exchange rate, etc.

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