



Determinants of Korean Outward Foreign Direct Investment: How Do Korean Firms Respond to the Labor Costs of Host Countries?

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Executive Summary

Low cost of labor has been one of the major incentives that foreign firms invest in many developing countries. Yet, many developing countries including China and ASEAN have recently experienced a rapid increase in labor costs. Using the wage information provided by JETRO, this study examines how Korean FDI outflow is affected by the increase in labor costs of the manufacturing industry in host countries. The results indicate that the worker's and engineer's wages in Asian developing countries, who accumulated at least 3 and 5 years of work experience, have generally a negative impact on Korean FDI outflow. However, there exist positive relationships between the wages and FDI when the wages stay at very low levels. We do not find evidence that labor costs make a significant impact on Korean FDI outflow to European or Developed countries.

Keywords: Foreign direct investment Labor costs, Korea

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1. Introduction

Foreign direct investment (FDI) is known to benefit host countries through multiple channels. Despite the lack of empirical consensus, several studies have shown the potential benefits of FDI on economic growth under certain conditions. For example, Borensztein, Gregorio, and Lee (1998) find that FDI is an important factor for economic growth through the transfer of technology from advanced market economies, only when the host countries possess a certain level of human capital. Similarly, Alfaro *et al.* (2010) show that FDI leads to higher economic growth under the well-developed financial markets. There also exist evidence that multinational firms create jobs that are both beneficial in worker's and the country's perspectives. Javorcik (2015) reviews the evidence that the jobs created by FDI tend to pay higher wages and offer more training opportunities in developing countries while increasing the countries' aggregate productivity.

Due to the potential that FDI benefits the recipient countries, there have been numerous attempts trying to identify the determinants of FDI inflow. Among several important factors to be considered, the macroeconomic indicators representing large domestic markets, lower input costs, or abundant natural resources have been discussed as major characteristics that attract FDI inflow. This study in particular focuses on low labor cost, which is one of the underlying motivations for

FDI. Low cost of labor contributes to reducing the production costs of foreign firms and therefore has incentivized many multinational firms to undertake FDI in developing countries over the last decade.

With the government efforts to expand the size of domestic markets and improve the basic lives of domestic workers, however, many developing countries have increased labor costs rapidly in recent period. For example, China, which had relatively lower wage levels compared to the other developing countries until the 1990s, has experienced rapid increase in wage since then. Its rising wage became one of the main factors moving labor intensive manufacturing industries out of China (Li *et al.* 2012; Donaubaauer and Dreger 2018). Similarly, Vietnam, one of the countries that has received large FDI inflows in labor-intensive industries, has also recently experienced faster wage growth compared to the growth rate of its labor productivity (ILO 2013). Given the nontrivial share of FDI taking place in developing countries to take advantage of low labor costs, recent increase in labor costs potentially disincentives foreign direct investment by increasing the production costs of foreign firms.

This study examines how FDI outflow is affected by the increase in labor costs of host countries. To this end, we analyze Korean FDI outbound to 39 different foreign countries from 2010 to 2018. Examining the trends of Korean FDI outflow serves several important purposes. First, Korea is ranked 10th in 2018 in terms of the amount of foreign direct investment outbound to foreign countries (UNCTAD 2019). It has consistently increased the amount of investments abroad since 2010. In addition, the large part of Korean FDI is concentrated in many Asian developing countries where recently experienced the increase in labor costs. Therefore, examining Korean FDI outflow can provide useful insight on how FDI outflow from a developed country is affected by the changes in the labor costs of host countries.¹ Considering that Korea's resource-seeking FDI driven by low labor costs are more likely to occur in Asian developing countries, we conduct a separate analysis for 16 Asian developing countries and 23 developed or European

¹ There have been a number of studies examining the determinants of Korean FDI outflow (Kim and Jun (2018); Kim and Lee (2015); Park *et al.* (2015)), but to our best knowledge this is the first study to analyze Korean FDI outflow using detailed wage information of host countries including ASEAN.

countries.

We use multiple data sources to conduct our analysis. We obtain information on wage categories including worker's, engineer's, and manager's wage from Japan External Trade Organization (JETRO). Comparable wage information over time across nations is often very challenging to obtain especially in the context of developing countries. Using unique dataset from JETRO, we were able to include the wages of workers with different educational backgrounds and work experience. Next, we collect the information on other factors affecting FDI flows such as the quality of human capital, domestic market size, trade openness of a country from World Bank Indicators and United Nations.

Our main results indicate that Korean FDI has potentially a non-linear relationship with the wages of Asian developing countries. Increase in the wage of workers and engineers who have at least 3 and 5 years of experience respectively tend to have positive relationships with the amount of Korean FDI, when the wages stay at very low levels. However, the relationships turn negative after worker's and engineer's wages surpass \$154 and \$290 per month. Wage increase after these thresholds seem to disincentivize the investment of Korean firms, and therefore there exist inverse U relationships between the amount of FDI and labor costs for Asian developing countries. By comparison, no statistically significant relationship is found between wages and the number of Korean firms entering Asian developing countries. These results suggest that the labor costs of Asian developing countries have a larger impact for the firms that are already operating in foreign markets than the new firms entering the markets. In the context of developed or European countries, we do not find a statistically significant relationship between any type of labor cost and FDI measures.

Our paper makes several contributions to the existing literature on FDI determinants. To our best knowledge this is one of the first papers that employ wage data provided by JETRO and link to FDI studies. It is challenging to explore the relationship between labor cost of host countries and FDI, especially in developing countries, because of the difficulty in obtaining detailed wage information. The data from JETRO provide wage information based on industry sector and worker's educational background and work experience, which is particularly beneficial to reflect the wage trends observed in many Asian developing countries. Also, considering that wages can be decoupled from labor productivity due to technological

innovation, the improvement of worker's health, nutrition, and education, or the policies implemented by governments, we suggest the potential existence of non-linear relationships between FDI and labor costs of host countries.

The remainder of the paper is organized as follows: Section 2 reviews the previous literature related to FDI determinants. Section 3 provides data description and summary statistics and Section 4 explains empirical strategy. The fifth section presents the main results for developing and developed countries and section 6 concludes.

2. Literature Review

The motivation of FDI can be summarized into three categories: 1) Market-seeking FDI 2) Resource-seeking FDI 3) Efficiency-seeking FDI (Dunning 1993). Firm's main purpose of market-seeking FDI (often called horizontal FDI) is to capture the domestic market of a host country. Therefore, firms typically replicate their production facilities in the host country to serve the local and regional domestic markets. Major factors that are considered to affect market-seeking FDI are domestic market size, market growth, tariffs, or transportation costs. Resource seeking FDI mainly targets abundant resources in a host country such as natural resources, raw material, or low-cost labor. Change in labor costs is more likely to affect the investment seeking resources. Lastly, efficiency-seeking FDI occurs as firms try to attain a competitive position in international markets by achieving economies of scale or scope.

Considering the different motivations of FDI, previous studies have identified a number of characteristics that attract FDI inflow. Market size, a relevant determinant to market-seeking FDI, is one of the widely accepted characteristics affecting FDI flow. It is usually captured by the variables such as GDP, GDP per capita, economic growth, and most studies show the positive relationship with FDI inflow (Arbatli 2011; Bevan and Estrin 2004). Market stability is another important determinant for FDI inflow. Several studies have shown the significant relationship between FDI inflow and the characteristics representing market stability such as inflation, exchange rate, political risk, or business climate (Goldberg and Kolstad 1995; Spiegel 1994). Trade openness, often expressed as the share of import and export out of total GDP, and institutional factors including regulations and corruption, or electricity have also been considered as significant determinants to influence FDI inflow (Benassy-Quere, Coupet, and Mayer 2007, Sekkat and Vezanzones-Varoudakis 2007).

Among many potential characteristics that influence FDI flows, our study particularly focuses on the relationship between labor costs and FDI inflow. Labor costs and FDI inflow can have a either positive or negative relationship depending on the extent to which labor productivity changes. If labor productivity increases faster than wage increase, FDI can still increase even with the increase in labor costs. Previous studies relying on unit labor costs, the ratio of wage or labor costs

to labor productivity (annual GDP per capita), have found the mixed results on the relationship between the two variables. Bellak, Leibrecht, and Riedl (2008) and Baltas, Tsionas, and Baltas (2018) show that unit labor costs and total labor costs are both related negatively with FDI in European Countries.² Similarly, Economou *et al.* (2017) also found that labor costs, which turn out to have negative relationship with FDI inflow in developing countries, are important determinants together with other institutional characteristics, such as lagged FDI, market size, gross capital formation and corporate tax. On the other hand, Boudier-Bensebaa (2005) and Walkenhorst (2004) found the positive relationship between labor cost and FDI inflow in Hungary and 11 OECD countries because unit labor costs partially reflected the quality of labor.

Our study mainly differs from the previous studies on labor costs and FDI in that we consider the non-linear relationships using multiple categories of wages in the manufacturing sectors of both developed and developing countries. Therefore, we were able to take account of different work experience and educational background of workers. Also, incorporating the recent trend of wage increase in many Asian developing countries, we contribute to the understanding of firm's decision responding to the labor costs of host countries.

² In Bellak, Leibrecht, and Riedl (2008), total labor costs are measured as the sum of net wages, personal income tax, social security contributions of employees, fringe benefits, bonuses, vouchers, employers' contributions to social security and contractual and private benefit plans. Unit labor costs are measured as total nominal labor costs per worker/nominal GDP per employment.

3. Data and Summary Statistics

We construct 39 country panels covering the period from 2010 to 2018. They consist of 19 countries from European region, 9 countries from Association of Southeast Asian Nations (ASEAN), 7 countries from South and Central Asia, and 4 other countries such as China, Australia, New Zealand, and Russia.³ Among them are 16 developing countries located in Asia and 23 European or developed countries.⁴ We collect the information regarding the economic conditions of host countries and Korean FDI outflow from several data sources. First, information on Korean outward FDI is obtained from the Export-Import Bank of Korea (Korea Eximbank). Korea Eximbank provides the datasets on South Korea's annual investment flow such as the number of new Korean firms operating in foreign markets and the amount of total FDI taking place in foreign countries, both at the industry level.

Next, we obtain the data on wage, corporate tax, and personal income tax from Japan External Trade Organization (JETRO), a government-related organization providing business support to Japanese companies operating in overseas markets. It conducts annual surveys to collect the information on the investment-related costs by cooperating with the Japanese Chamber of Commerce and Industry and local government agencies. This information is particularly beneficial for the current study because wage information, which is the main variable of our interest, is provided at a very detailed level. JETRO reports wage information into multiple categories such as engineer, worker, and manager, based on their educational levels, years of experience, and work positions.⁵ We use the nominal wages of each

³ European region includes Austria, Belgium, Czech Republic, France, Germany, Hungary, Italy, Netherlands, Poland, Slovakia, Spain, Sweden, Switzerland, Bulgaria, Morocco, Rumania, Turkey, Ukraine and UK. ASEAN includes, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore, Thailand, Laos and Vietnam. South and Central Asia include India, Pakistan, Sri Lanka, Kazakhstan, Mongolia, Bangladesh and Uzbekistan.

⁴ Developing countries include China, ASEAN, South and Central Asian countries, except for Singapore, and European or Developed countries include the rest of countries.

⁵ To the best of our knowledge, there is no data sources providing recent wage information, especially for Asian developing countries, by the types of workers. CEIC premium database

country, which is converted into the US dollar using the exchange rate of each year.

There is a slight variation how each type of employee is defined across countries, but it is generally defined as following: Workers have at least 3 years of work experience, and engineers and managers have a college degree or higher with approximately 5 and 10 years of experience, respectively. Each worker's wage includes his/her basic monthly salary as well as other benefits including social security payment, overtime pay, and bonus.⁶ JETRO provides wage information only in manufacturing and service sectors. We analyze the relationship between labor costs and FDI only in manufacturing sector because service sector FDI has many missing values.⁷ Lastly, we collect the information on GDP and trade openness from World Bank's World Development Indicators (WDI), and obtain Education index, which represents the skill level of the labor force in each country, from the Human Development Reports of United Nations Development Programme (UNDP).

Despite the benefits of using JETRO data, there exist limitations as well. First, JETRO is more likely to collect wage information from the regions or locations where Japanese companies operate. Therefore, its information does not represent the wage level of a whole country. Nonetheless, considering the paucity of wage information in developing countries, the data set is one of very few resources that are available for the current study. In addition, Korean companies expanding their business overseas markets often employ similar strategies to Japanese companies, which have relatively longer experiences of having foreign direct investment. In

provides wage information at detailed levels for some developing countries like China, India, or Indonesia, but do not have the same quality information for other developing countries.

⁶ Labor costs are usually referred to wage plus other related costs such as bonus, social security payment, and others. We use these two terms interchangeably in our study because these costs are not separately reported in our data. In addition, depending the economy size or the availability of information, some countries have wage information for multiple cities within a country, although most countries have the information only for a capital city. Ideally, we would like to use all this information at the regional level. However, due to the absence of other economic indicators at the same level, we averaged every information at the country level for our analysis. Also, we do not use the information on minimum wage because it is often reported with different units (i.e. hourly, weekly, or monthly) and missing for multiple countries.

⁷ Korean FDI data are available at smaller industry levels even in manufacturing and service sectors. However, we were not able to conduct analysis at the smaller industry levels because wage information from JETRO is available only at aggregate manufacturing or service sector.

this sense, JETRO information can be a reasonable indicator representing the wage level of the sectors where Korean companies operate in foreign markets. Second limitation of JETRO data is the possibility of measurement error. JETRO does not produce the data for academic research or profit-oriented purposes. Instead, its main purpose is to inform Japanese companies or government about the environment of foreign countries, with emphasis on investment-related costs. Therefore, the data do not always have consistent measurement units or methodology. We try to minimize this issue by using the information that have been consistently measured over time.

Table 1 illustrates summary statistics on economic conditions of host countries and Korean FDI outflow. Regions are divided into five groups such as Europe, ASEAN, South and Central Asia, the group of Australia, New Zealand, and Russia (ANR), and China. The table indicates that the countries belong to Europe and ANR tend to have higher wage levels compared to other groups because the former mostly consist of developed countries. Many developed countries often have higher wage levels or equal to that of Korea, so Korean firms are less likely to invest in these regions due to their labor costs. On the other hand, ASEAN, South and Central Asia, and China show relatively lower level in every wage category, which implies the potential benefit of resource-seeking FDI.

Unlike the wage levels, corporate and personal income tax do not show much variation across countries. Except the personal income tax that appeared to be higher in China and Europe, all of the other characteristics show the similarity across countries. Lastly, China seems to dominate other countries in terms of the Korean FDI outflow measures, the number of new firms and the total FDI amount. China had 726 new Korean firms on average from 2010 to 2018 and 3.8 billion dollars of total investment. ASEAN countries and ANR have second highest FDI investment from Korea whereas European countries and South/Central Asia seemed to have smaller FDI amount. These trends slightly change if we examine FDI trends only in manufacturing sector. China and ASEAN still receive the largest amount of FDI from Korea, but South and Central Asia receive more investment from Korean than ANR.

Table 1. Baseline summary statistics for the groups of countries

	Europe			ASEAN			South and Central Asia			ANR			China		
	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs	Mean	SD	Obs
Worker	2,275	1597	156	338	417	89	297	143	47	2,603	1287	27	422	85	9
Engineer	3,762	2244	158	655	714	89	606	221	47	3,918	1910	27	695	114	9
Manager	5,230	2597	158	1,295	1122	89	1,082	360	45	5,573	2160	27	1,270	198	9
Corporate income tax	0.23	0.06	158	0.25	0.05	89	0.25	0.08	47	0.26	0.05	27	0.25	0.00	9
Personal income tax	0.35	0.14	158	0.28	0.06	89	0.23	0.08	47	0.30	0.13	27	0.45	0.00	9
Number of new firms	9	10	158	90	147	89	23	27	47	19	11	27	726	141	9
FDI amount	201	428	158	486	589	89	115	195	47	520	760	27	3801	760	9
Number of new firms (Manufac. sector)	4	4	133	41	89	89	9	13	42	4	3	24	347	91	9
FDI amount (Manufac. sector)	53	125	133	222	391	89	93	180	42	41	61	24	3008	823	9

Notes: ANR represents Australia, New Zealand, and Russia. All wages are at monthly level, and wage units are converted to dollars using the exchange rate in each year. Wage levels in ASEAN appear to be similar to that of China because ASEAN includes Singapore. The unit of FDI amount is million dollars. The number of observation is not always equal to the product of the number of countries and year because some countries have missing values in certain years.

Source: JETRO data.

4. Empirical Analysis

To examine the impact of increasing labor cost in host countries on Korean FDI outflow, we use the fixed-effect model as following:

$$\begin{aligned} \text{Ln(FDI)}_{it} = & \alpha_0 + \beta_1 \text{lnwage}_{it-1} + \beta_2 \text{lnwage}_{it-1}^2 + \alpha_1 * \text{lnGDP}_{it-1} \\ & + \alpha_2 * \text{lnOpenness}_{it-1} + \alpha_3 * \text{Corp}_{it-1} + \alpha_4 * \text{Personal}_{it-1} + + \\ & \alpha_5 * \text{lnEdu}_{it-1} + \mu_i + \delta_t + \varepsilon_{it} \end{aligned}$$

Where Ln(FDI)_{it} is either the natural log of the number of new Korean firms or the amount of FDI invested in a recipient country i in year t . lnwage_{it} and lnwage_{it}^2 represent the first and second polynomial terms of log wage for each type of worker including worker's, engineer's, and manager's wage. We include the first and second quadratic terms of log wage to consider non-linear relationship of wage and Korean FDI outflow.

Although labor cost is an important determinant of FDI, wage increase alone does not necessarily decrease FDI inflow for several reasons. First, the countries attracting a large amount of FDI with low cost of labor are more likely to have the comparative advantage of labor costs for a while, even after the initial increase in wage. When they have relatively low labor costs compared to the other potential host countries, wage increase can have a very small impact on FDI inflow. Second, several factors may contribute to the decoupling of wages from productivity. Recent technological innovation can accelerate labor productivity growth so that wage increase lagged behind productivity growth. Also, increase in wage can lead to even higher increase in labor productivity through the improvement of workers' health, nutrition, or motivation. This can occur particularly in the early stage of economic development, especially in developing countries, where workers may receive lower wages than their productivity. By comparison, the attempts by governments to increase the wage of workers for the better life quality of workers or the expansion of domestic market size can increase wage faster than worker's productivity. We expect that non-linear relationship between the labor costs and FDI inflow can potentially exist depending on the stages of economic development, government policies, and relative costs of workers.

Besides on the wage variables, we additionally control GDP, trade openness

(measured with the share of export and import out of GDP), corporate and personal income tax to take into account of market size or economic environment in host countries. Previous studies also point out the importance of labor quality besides on the price of labor. Therefore, we also include educational index of each country, which is reported by United Nations.

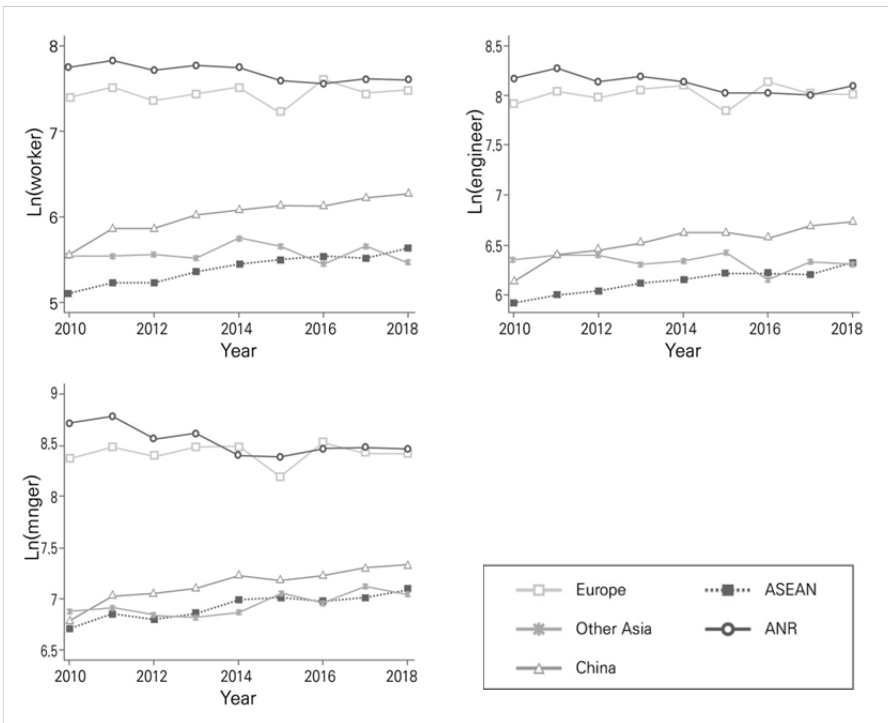
Studies exploring the determinants of FDI are typically prone to simultaneity issues. That is, change in labor costs can affect the inflow/outflow of FDI, but also at the same time change of FDI flow can affect the wage level of host countries. This issue is less likely to be a concern in our study, though. Given the small share of Korean investment in total FDI, labor costs of host countries are less likely to be affected by the investment of Korean firms. Also, we use the wage information that Japanese companies or organizations collect as a proxy for the investment costs of Korean firms. Lastly, we use the lagged labor costs of host countries to reduce concerns related to endogeneity concern.

5. Main Results

5-1. Wage Trends

Before we begin our main analysis, we examine how much labor costs changed over time in each country group. Figure 1 displays the natural log of wage trends for workers, engineers, and managers. The figure shows that Europe and the countries belong to ANR such as Australia, New Zealand, and Russia overall have higher levels of wages compared to other country groups. This is because the two groups mostly consist of developed countries. Their wage trends are also relatively stable during the sample period except for few years when exchange rates fluctuated.

Figure 1. Trends of log wage



Source: JETRO data.

Unlike the groups that consist of mainly developed countries, the other three groups (ASEAN, Other Asia, and China) show a rapid increase in labor costs, particularly in China and ASEAN. For example, worker's log wage in ASEAN countries increases from 5.10 to 5.64 between 2010 and 2018 while that of China increases from 5.57 to 6.28 during the same period. In raw wage values, there were approximately 50% and 102% increase in worker's wage of ASEAN and China, respectively. Other wage categories also show a rapid increase. These figures suggest that labor costs grow at a higher rate in Asian developing countries compared to those in other regions.

5-2. Asian Developing Countries

We confirmed that wages increase at different rates across countries and regions. This shows a potential possibility that increased labor costs in Asian region where Korean firms heavily invest in recent period affected Korean FDI outflow. We now turn to our main questions: how does the change in labor costs affects Korean FDI outflow? Given that Korea's resource-seeking FDI targeting low wage cost is most likely to occur in Asian developing countries, we analyze 16 Asian developing countries and 23 developed or European countries separately.⁸ We start our analysis with checking the linear relationship between FDI and labor costs in the developing countries. The results are reported in Table 2. First three columns show the impacts of different wage categories on total FDI amount, and next three columns display the impacts on the number of new Korean firms. Most of the coefficients indicate the negative relationships between FDI and the labor costs in Asian developing countries, and the impact of manager's wage on total FDI amount is marginally significant at 10% level. The coefficient for manager's wage indicates that 1% increase in manager's wage lowers the total amount of FDI by 0.67%. In addition, corporation tax rate in the previous year is one of the signifi-

⁸ We also conduct the same analysis with entire sample. When we examine the linear relationships between wages and FDI, all the wage variables have negative signs although only manager's wage shows statistical significance. In the analysis for non-linear relationships, none of the wage variables including linear and quadratic terms are statistically significant.

cant indicators predicting the firm's entry in current year. Trade openness is also significantly related to both FDI measures in every specification.

Table 2. Linear relationships between wage and FDI flow in developing countries

	Total FDI amount			Number of new firms		
	Worker Wage (1)	Engineer Wage (2)	Manager Wage (3)	Worker Wage (4)	Engineer Wage (5)	Manager Wage (6)
Ln_Wage[t-1]	0.008 (0.589)	-0.155 (0.352)	-0.669* (0.370)	-0.077 (0.342)	0.074 (0.258)	-0.105 (0.250)
Ln_Corp[t-1]	0.734 (2.242)	0.594 (2.302)	-0.030 (2.382)	-2.532** (1.068)	-2.407** (1.075)	-2.661** (1.126)
Ln_Pers[t-1]	0.208 (0.510)	0.241 (0.452)	0.257 (0.472)	0.080 (0.395)	0.030 (0.360)	0.065 (0.348)
Ln_GDP[t-1]	3.329 (3.199)	3.646 (3.001)	5.533* (2.963)	0.446 (1.694)	0.182 (1.663)	0.753 (1.776)
Ln_educ[t-1]	4.341 (4.406)	4.379 (4.292)	3.737 (4.336)	5.707* (2.874)	5.593* (3.006)	6.018** (2.955)
Ln_Open[t-1]	0.359*** (0.104)	0.373*** (0.087)	0.394*** (0.094)	0.139* (0.075)	0.125* (0.063)	0.133** (0.067)
N	97	97	97	105	105	104
Rsquared	0.911	0.911	0.913	0.946	0.946	0.945
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Year and country fixed effects fixed effects are included in every specification. Robust standard errors are reported in parentheses. *p<0.1, **p<0.05, ***p<0.01.

Source: Author's calculation.

Next, we examine whether the non-linear relationships between FDI and the labor costs exist for developing countries. As stated earlier, there can be the non-linear relationships depending on the stages of economic development, relative costs of workers, or government's wage policies. Table 3 shows that total FDI

amount have non-linear relationships with several wage categories in developing countries. Worker's and engineer's wage in host countries display a concave relationship with Korean FDI outflow as first polynomial term of wage is positive and second polynomial term of wage is negative. This result suggests that the wages in developing countries initially have a positive impact on total FDI amount, but as the wages continue increasing, firms are disincentivized to invest further in the host countries.

Table 3. Non-linear relationships between wage and FDI flow in developing countries

	Total FDI amount			Number of new firms		
	Worker Wage (1)	Engineer Wage (2)	Manager Wage (3)	Worker Wage (4)	Engineer Wage (5)	Manager Wage (6)
Ln_Wage[t-1]	5.250** (2.410)	7.146** (3.174)	7.386 (5.138)	-2.074 (2.037)	-0.952 (1.961)	-0.220 (3.368)
Ln_Wage squared[t-1]	-0.519** (0.239)	-0.631** (0.278)	-0.609 (0.400)	0.196 (0.196)	0.088 (0.169)	0.009 (0.257)
Ln_Corp[t-1]	0.548 (2.165)	-0.102 (2.291)	-0.485 (2.403)	-2.488** (1.070)	-2.326** (1.107)	-2.656** (1.149)
Ln_Pers[t-1]	-0.287 (0.528)	0.014 (0.404)	0.187 (0.447)	0.260 (0.404)	0.057 (0.369)	0.066 (0.350)
Ln_GDP[t-1]	3.263 (3.185)	4.488 (2.983)	6.467** (3.082)	0.527 (1.635)	0.104 (1.713)	0.741 (1.899)
Ln_educ[t-1]	2.250 (4.419)	3.349 (4.103)	2.973 (4.360)	6.309** (2.967)	5.699* (3.031)	6.032** (3.004)
Ln_Open[t-1]	0.206 (0.127)	0.244** (0.108)	0.304*** (0.093)	0.196* (0.106)	0.142* (0.078)	0.134* (0.078)
N	97	97	97	105	105	104
Rsquared	0.914	0.916	0.915	0.947	0.946	0.945
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Year and country fixed effects fixed effects are included in every specification. Robust standard errors are reported in parentheses. *p<0.1, **p<0.05, ***p<0.01.

Source: Author's calculation.

The thresholds that the impact of the labor costs change are 154 dollars/month for worker's wage and 290 dollars/month for engineer's wage. Considering that average worker's and engineer's wage in our sample of developing countries are 251 and 507 dollars/month, the dominant relationships between labor costs and FDI outflow are negative except when the wage levels are very low. At a very low wage level, FDI inflow and wages seem to be positively related because host countries have still relatively lower wages compared to those of other potential host countries or experience faster increase in labor productivity. These positive relationships have turning points as wages continue increasing, which can be partly driven by many government's current efforts to increase the wage level of domestic workers.

Manager's wage, which are potentially associated with more high skilled workers, appeared to have no significant impact on Korean FDI amount. This suggests that Korean FDI outflows are more sensitive to the wages of less experienced or low skilled workers in developing countries. Other than wage factors, trade openness shows significant relationships with total FDI amount in most specifications. Unlike the outcome of total FDI amount, labor costs of host countries do not affect the number of new Korean firms in foreign markets. None of the wage categories were statistically significant, and they do not show the similar patterns as observed with total FDI amount. These results indicate that the firms already operating in foreign markets are potentially more sensitive to the increasing wage costs of host countries than the newly entering firms. The other control variables such as corporate tax rate, educational index, and trade openness appeared to have significant impacts on firm's entry.

5-3. Developed Countries

Next we examine the relationship between FDI and labor costs of host countries in the context of developed or European countries. The results on linear relationships are reported in Table 4. Similar to developing countries, most coefficients represent the negative relationship between the labor costs of developed countries and Korean FDI outflow. We next examine whether there exist non-linear relationships between the two variables. Table 5 reports the results of main analysis for 23 developed or European countries. The results indicate that Korean FDI outflow is

not affected by the labor costs in developed or European countries. We do not find any significant relationships between any wage category and outcome variables. This can be partially explained by the very low share of manufacturing FDI in European and other advanced countries. Also, the main purpose of conducting FDI in developed countries is less likely to be the labor costs given that these countries on average have higher wage levels than Korea. Besides on labor costs, we find that corporation tax rate is a significant indicator affecting the firm's entry to developed or European countries.

Table 4. Linear relationships between wage and FDI flow in developed countries

	Total FDI amount			Number of new firms		
	Worker Wage (1)	Engineer Wage (2)	Manager Wage (3)	Worker Wage (4)	Engineer Wage (5)	Manager Wage (6)
Ln_Wage[t-1]	-0.553 (0.688)	-0.285 (0.691)	-0.793 (0.547)	0.346 (0.353)	-0.237 (0.371)	-0.075 (0.257)
Ln_Corp[t-1]	-0.803 (1.685)	-0.873 (1.638)	-0.671 (1.598)	-1.091* (0.555)	-1.110** (0.547)	-1.053* (0.569)
Ln_Pers[t-1]	0.806 (2.470)	0.611 (2.411)	1.202 (2.413)	-0.159 (1.296)	0.502 (1.337)	0.245 (1.205)
Ln_GDP[t-1]	0.126 (3.046)	0.420 (3.022)	0.410 (2.987)	1.268 (1.575)	1.276 (1.765)	1.185 (1.690)
Ln_educ[t-1]	-2.059 (9.462)	0.380 (8.447)	1.258 (8.246)	-2.877 (4.240)	-4.719 (4.251)	-4.242 (4.090)
Ln_Open[t-1]	2.615 (2.840)	2.956 (2.814)	3.047 (2.776)	2.507* (1.409)	2.271 (1.432)	2.281 (1.408)
N	128	129	129	124	125	125
Rsquared	0.398	0.412	0.420	0.712	0.709	0.708
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Year and country fixed effects fixed effects are included in every specification. Robust standard errors are reported in parentheses. *p<0.1, **p<0.05, ***p<0.01.

Source: Author's calculation.

Table 5. Non-linear relationships between wage and FDI flow in developed countries

	Total FDI amount			Number of new firms		
	Worker Wage (1)	Engineer Wage (2)	Manager Wage (3)	Worker Wage (4)	Engineer Wage (5)	Manager Wage (6)
Ln_Wage[t-1]	-8.315 (11.265)	-2.967 (9.652)	-4.045 (9.192)	-9.564 (6.330)	-2.561 (4.410)	-4.798 (6.893)
Ln_Wage squared[t-1]	0.544 (0.784)	0.172 (0.611)	0.198 (0.564)	0.689 (0.438)	0.149 (0.281)	0.284 (0.414)
Ln_Corp[t-1]	-0.875 (1.674)	-0.852 (1.662)	-0.608 (1.654)	-1.085** (0.533)	-1.086** (0.542)	-0.999* (0.565)
Ln_Pers[t-1]	0.961 (2.509)	0.745 (2.503)	1.349 (2.444)	-0.097 (1.321)	0.623 (1.359)	0.645 (1.363)
Ln_GDP[t-1]	0.408 (3.110)	0.495 (3.078)	0.448 (2.986)	1.767 (1.569)	1.375 (1.815)	0.448 (2.986)
Ln_educ[t-1]	-3.312 (9.889)	-0.122 (8.733)	1.503 (8.508)	-4.451 (4.086)	-5.253 (4.333)	1.503 (8.508)
Ln_Open[t-1]	2.676 (2.852)	3.018 (2.854)	3.129 (2.792)	2.860** (1.433)	2.342 (1.451)	3.129 (2.792)
N	128	129	129	103	103	103
Rsquared	0.401	0.413	0.421	0.724	0.710	0.710
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: Year and country fixed effects fixed effects are included in every specification. Robust standard errors are reported in parentheses. *p<0.1, **p<0.05, ***p<0.01.

Source: Author's calculation.

6. Conclusion

Developing countries including China and ASEAN have received a large amount of FDI, partially due to their plenty of labor resources at lower prices. However, many of them also have recently experienced the rapid increases in wages with government's efforts to increase wages for domestic markets and quality lives for domestic workers. The current study analyzes how Korean FDI outflow is affected by the increase in labor costs of host countries, which include many developing countries in Asia.

We find that the total FDI amount invested by Korean firms has a positive relationship with worker's and engineer's wages in Asian developing countries, when wages stay at a very low level. However, the relationship eventually turns negative as the wages continue increasing. Once labor costs increase beyond certain thresholds, the firms are incentivized to invest less in the host countries. The number of Korean firms entering the foreign markets show no statistically significant relationships with the labor costs of host countries. The results indicate that the wages of low skilled and less experienced workers are more likely to affect Korean FDI outflow, especially the firms that are already operating in foreign markets. We also find that there was no significant relationship between worker's labor costs in developed or European countries and Korean FDI outflow.

Our empirical findings suggest that increasing labor costs observed in many Asia developing countries can have an impact on Korean firms' foreign direct investment, especially for those operating in labor-intensive industry sectors such as manufacturing industry. To build more efficient FDI policies, governments or policy makers can consider the potential relationship between the labor costs and FDI outflow. Also, it will be important to follow the wage trends of the workers in the countries, which receive a large amount of Korean FDI in recent period. Constructing the data sets like JETRO can be one way to consistently monitor the detailed wage trends of the foreign workers. Future research may expand on this study if it can incorporate detailed wage information within an industry sector.

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국문요약

그동안 한국 제조업 기업의 개발도상국 직접투자에 있어 중요한 요인으로 작용했던 현지 근로자 임금이 최근 중국, 아세안 국가를 중심으로 빠르게 상승하고 있다. 본 연구는 제조업을 대상으로 현지 투자대상국의 임금이 한국의 해외직접투자에 미친 영향을 분석하였다. 현지 근로자 임금을 생산근로자, 엔지니어, 관리자로 세분화해 분석하였다. 분석 결과, 아시아 개도국의 경우 현지 근로자 임금이 매우 낮은 수준일 때는 생산근로자와 엔지니어의 임금 상승이 한국의 해외직접투자에 양(+)의 영향을 미치나, 일정 수준 이상에서는 음(-)의 영향을 미치는 등 비선형 관계가 있는 것으로 나타났다. 한편 선진국과 유럽 국가들의 근로자 임금을 이용한 분석에서는 현지 근로자의 임금과 한국기업의 해외직접투자 간에 유의적인 관계가 나타나지 않아 신흥국의 경우와는 다른 결과가 나타났다.

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Determinants of Korean Outward Foreign Direct Investment: How Do Korean Firms Respond to the Labor Costs of Host Countries?

Hanbyul Ryu and Young Sik Jeong

This study examines how Korean FDI outflow is affected by the increase in labor costs of the manufacturing industry in host countries. The results indicate that the worker's and engineer's wages in Asian developing countries, who accumulated at least 3 and 5 years of work experience, have generally a negative impact on Korean FDI outflow. However, there exist positive relationships between the wages and FDI when the wages stay at very low levels. We find that worker's labor costs in developed or European countries make a similar impact on Korean FDI outflow.

