

# A Study on the Analysis of Attracting Factors for Global Foreign Direct Investment Inflows

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## Abstract

**Purpose** - The objective of this study is to investigate what motivates global FDI inflows in the different economic development level and to clarify the FDI motivation type in the level of qualitative economic growth.

**Design/methodology/approach** - Major macroscopic social-economic factors induced FDI inflows were analyzed using fixed-effect panel regression with 30-year panel data of 28 countries from 1985 to 2014. For analysis in the stage of economic growth, two category of developed and developing countries was used. And to analyze FDI motivation type in the level of qualitative economic growth, 4 shares of GDP; consumption-government-investment expenditure and export, was used as explanatory variable.

**Findings** - In developed country, TFP(total factor productivity) and GDP have a great influence on FDI inflows, and consumption and labor compensation have a slight effect. This result indicates that the market seeking-driven, horizontal type investment is shown along with efficiency seeking investment. In developing country, human capital and TFP is shown to have greater impact on FDI inflows and labor compensation, exports, investment and government expenditures also have impacts. Thus it has confirmed that not only efficiency-seeking vertical investment for using low cost well educated laborer, but also government-driven economic growth and export policies could affect the FDI inflows.

**Research implications or Originality** - The FDI investment decision making of multinational companies is decided by their own purpose. But, in the concept of as follows; 1) FDI is a long-term capital flowing for maximization of economic utility with limited global resource, 2) Thus FDI could be affected by macro socio-economic factors of host country. 3) Also such macro factors is different by each economic growth qualitative level. Therefore macro socio-economic factors of each country could be affected by the qualitative level of their own economic growth. To attract FDI inflows, it is desirable to implement differentiated incentive policies in the qualitative level of economic growth. Furthermore in developing countries it is recommended to implement government driven economic growth policies as follows; fostering well educated human resources, improving technology productivity in the relative lower cost labor market compared to developed countries and boosting international export volume.

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**JEL Classifications:** F14, F18, F21, F23

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## I. Introduction

Multinational corporations play a very important role in the globalized world. Their foreign direct investment (hereinafter FDI) plays an important role in the global economy in terms of redistribution of resources. FDI is a good opportunity for developing countries with insufficient capital to create jobs, advance their own industries, and acquire advanced technologies. On the other hand, for advanced countries, they can increase overseas competitiveness by reducing production costs and advancing industrial structure. They can also expand new markets by entering the local markets. Countries around the world are making great efforts to attract FDI that can promote their own economic development.

Following these various motives, global FDI scale has grown over 30% on average annually since the 1990s. In this process, as developing countries grow at a rapid pace, the proportion of investments in developing countries is also increasing. In other words, although the share of developed countries in the global investment flow is still high, the share of investment in developing countries has also steadily increased, showing an increasing share in recent years. According to UNCTAD, FDI inflows to developed countries in 2015 amounted to 966 billion dollars, accounting for about 55% of global investment inflow, while FDI inflows to developing countries were 765 billion dollars, accounting for 45% of global investment inflow. In particular, among developing countries, investment inflow to Asian countries had the highest share at 55%.

FDI is made by independent decisions of multinational companies. It ultimately plays a role in inducing the globalization of the world economy. The decision of FDI of multinational corporations is influenced by the general investment environment such as macroeconomic factors of the target country and the inherent comparative advantage of the company (Dunning, 1993). Under the proposition of international capital that moves FDI to a place to maximize the efficiency of production through rational allocation of resources around the world, it can be said that FDI is highly related to national macro social and economic factors beyond the level of simple individual companies.

Studies on what factors determine FDI by multinational corporations have been actively conducted. Previous studies have shown different results about the relationship between FDI and macroscopic socioeconomic factors. Why research results on the relationship between FDI and macroscopic socio-economic factors are different? Methods of measuring capital movement include the amount of capital movement in the concept of flow that occurs over a certain period of time and the amount of capital movement in the concept of stock at a specific point in time. Results of research on the relationship between FDI and macroscopic socio-economic factors are different depending on which method is used. Second, there is a difference in the analysis period. In the case of advanced countries, capital liberalization has been actively promoted from the early 1980s. However, in the developing countries, capital liberalization has been promoted since the 1990s. Therefore, if the analysis period is different, the relationship between FDI and macroscopic socioeconomic factors may change. Third, there is a difference in analysis method. Different results can be obtained depending on whether the analysis is performed using cross-sectional data or a dynamic panel model.

Therefore, this study aims to analyze the determinants of each motive type of FDI inflows in 28 countries with large FDI scales from 1985 to 2014, taking into account economic and non-economic characteristics. This analysis is different from previous studies in the following three aspects. First, this study intends to empirically analyze the amount of capital movement of the flow to derive the differences and implications by comparing results with the existing

analysis using stock data. Second, considering that determinants of FDI inflows may differ depending on the stage of economic development, countries are divided into developed and developing countries and the influences are analyzed using variables reflecting the quality level of economic development. Third, by empirical analysis targeting 28 countries with large capital inflows over a long period of 30 years, this study intends to identify macroeconomic and social factors affecting global capital movement.

## II. Literature Review

### 1. FDI and Motivation Type

FDI is driven by the needs of multinational corporations aiming for sustainable growth. It is a form of investment that presupposes the objective of promoting sustainable growth by improving productivity and increasing profits through diversification of global production and efficient management control (Caves, 2007; Dunning, 1998).

Motives that companies pursue through FDI can be divided into four types: market-seeking, resource-seeking, efficiency-seeking, and strategic asset-seeking (Dunning, 1998/ 2002). Market seeking is closely related to the size of the target country's domestic market and its access to adjacent overseas markets. When a company tries to expand overseas market to overcome its limitations in its own market, the size of the investment destination country's market and the limited access through international trade are considered first. This type of motive is mainly used when the market access through export is limited by high tariff barriers, and so on. It is more advantageous to directly enter the market to produce and sell. In addition, investment can be made at a strategic level to develop and expand new markets by supplying products and services that meet conditions of the market of the target country.

The resource seeking is an attempt to acquire and utilize scarce resources at a relatively low wage. It is a type of investment by multinational companies in the early days along with a market seeking type. This is a society asset where physical resources such as agricultural products and underground resources, low-wage, unskilled labor force and skilled human resources, and all industrial infrastructure necessary for technological development are accumulated due to the development of labor-intensive and technology-intensive industries. If skilled human resources, industrial technology, and infrastructure that can be used by investment companies are lacking, then there is a lack of motivation for multinational corporations with technologies of high value-added industries to enter.

Efficiency seeking is an export-oriented investment with the main purpose of improving cost efficiency and reducing labor costs by transferring production to a low-wage country. It is used to increase cost efficiency by vertically integrating production where cost reduction is the priority. For example, rather than exporting our own products directly to the United States, we can enter Mexico which has a North Atlantic Free Trade Area (NAFTA) agreement with the United States and export products manufactured using cheap labor and tariff-free parts to the United States which has a low regional tariff. When it is advantageous to do so, we can set up a factory in Mexico. In addition, investments for rationalization of management of multinational corporations that have already entered are included in the investment in pursuit of efficiency. This type of motive is mainly considered when economic integration with neighboring regions has an economic comparative advantage over other regions. However, before

investing in the pursuit of efficiency, market entry or cost-saving investment must be made.

Strategic asset seeking can be used to acquire tangible and intangible strategic assets necessary for a company's long-term strategy. It is used as a tool to increase competitiveness by discovering the knowledge necessary for long-term growth of a company or overseas networks rather than finding elements of comparative advantage currently possessed by a company. Accumulated knowledge as patents, trademark rights, and management know-how, and the establishment of networks among foreign companies are important for long-term growth of a company. Strategic asset seeking may focus on weakening the competitiveness of competitors rather than strengthening the comparative advantage of a company.

## 2. Determinants of FDI Inflows

According to results of analyzing determinant of FDI, market size of the investing country such as gross domestic product is the most influential factor in market-driven direct investment (Dunning, 1998; Arbatli, 2011; Nunnenkamp, 2002; Pattayat, 2016; Rutihinda, 2005; Sankaran, 2015). As the factors of market-driven direct investment, economic growth and market size have been identified as major factors. As a result of analyzing FDI trend of US companies from 1981 to 2000, market size such as gross national product and population has a positive effect on FDI (Sethi et al., 2003). From 1988 to 1997, FDI for low-growth countries has a positive effect on the growth of gross domestic product (Lewis, 2000). In addition, gross domestic product and exports have positive effects as motives for market pursuit (Wadhwa and Reddy, 2011). Research on the inflow of FDI from Korea, such as the study of Ko Seok-Nam (2006), also shows that gross domestic product has a positive effect on FDI inflows.

The possibility of utilizing social overhead facilities and human resources is an important factor in resource-seeking direct investment. The developed social infrastructure has a positive effect on the inflow of investment to low-growth countries (Asiedu, 2006; Lewis, 2000; Rutihinda, 2005; Sankaran, 2015). However, in the case of skilled human capital, results were contradictory. In other words, although some studies have shown that skilled human capital has a positive effect on the inflow of investment (Djurovic, 2012; Lewis, 2000; Rutihinda, 2005; Sankaran, 2015), some studies have shown that such human capital does not affect the inflow of investment to developed countries (Murthy and Sinha, 2016). In addition, favorable economic policies such as market size, exports, trade opening, and tax cuts in developing countries have been identified as positive factors for investment inflow (Arbatli, 2011).

Mody and Srinivasan (1998), and Rutihinda (2005) et al. have shown that holding of adequate social overhead capital has a positive correlation with the inflow of FDI. Mottaleb (2007) revealed that the FDI inflows to developing countries with well-equipped infrastructure such as telephone and internet are high. Markusen (2004) has found that low social overhead capital in developing countries lowers investment by multinational corporations.

In early days of FDI of multinational corporations, for labor-intensive industries based on raw materials, low labor cost was a priority apart from skill proficiency. However, as the global division of labor in parts production progresses with the development of sophisticated technology-intensive industries, regions with relatively low labor costs and well-educated human resources are being considered as investment targets. Multinational corporations contribute to cultivating excellent human resources along with technology transfer through continuous education and training for workers in regions where they have entered. In this case, regions that have high-quality human resources and high educational standards are more likely to learn

skills of multinational companies and increase production efficiency of technology-intensive products than regions that do not have. Therefore, it can be seen that places with excellent human resources are better equipped to attract multinational companies and operate in high value-added industries.

Nunnenkamp (2002) and others have clarified that local workforce is an important factor supporting the activities of multinational corporations. However, Murthy and Shinha (2016) have said that in the case of developed countries, human resources have no effect on the inflow of FDI. In addition, Blomström and Kokko (2001) have suggested that research proposals on FDI, human capital, and education in developing countries can be seen as factors for attracting FDI appropriate to the level of investment target countries.

In the case of efficiency-seeking direct investment, it can be seen from FDI data of U.S. companies that efficiency investments that seek to reduce production costs are expanding to developing countries in Asia (Sethi et al., 2003). The trend of export-oriented efficiency-seeking investments to developing countries in Asia has been confirmed (Athukorala, 2009). The scale of exports from developing countries has a positive effect on the inflow of foreign investment (Arbatli, 2011; Tran and Dinh, 2014).

The most important purpose of efficiency-seeking investment is to increase cost efficiency through reduction of labor costs by transferring production to low-wage areas, it also means export-oriented investment (Dunning, 1998; Athukorala, 2009). Arbatli (2011) has confirmed that exports from developing countries have a positive effect on FDI inflows. Tran and Dinh (2014) have also revealed that the larger the export size, the higher the inflow of FDI. In the case of South Korea, wages were found to have a negative effect on the inflow of FDI (Cho Taek-Hee, 2008; Ko Suk-Nam, 2006). It has been confirmed that low wages can affect FDI inflows in Mexico (Botello and Davila, 2016; Jordaan, 2008).

In general, productivity refers to labor productivity which measures efficiency in terms of output per worker or hourly worker. It can be measured in various ways such as capital, energy, and facility productivity, as other measures. However, these productivity factors are measured only as single factor. It is difficult to properly understand the effect of increasing overall productivity. To properly investigate the overall efficiency of production, it is necessary to take into account all factors to determine total factor productivity. In order to increase production efficiency, input factors need to reflect technological development, economies of scale and scope, improved resource allocation, and institutions in addition to factors such as capital and labor so total factor productivity can be an indicator of the technological level of an economy.

Brenner (2014) has analyzed the effect of FDI on economic growth and total factor productivity according to the stage of economic development, showing that FDI contributes to economic growth in developing countries. However, it was revealed that total factor productivity of middle-income and developed countries was increased and the innovation capacity of developed countries was improved through the effect of technology transfer.

In a recent study by Hong Seung-Gee and Kim Moo-Soo (2018), the impact of macro-social and economic factors on the inflow of FDI in 28 countries around the world was analyzed by dividing into developed and developing countries according to the economic development stage of investment target country from the viewpoint of stocked inflows. As a result, it was found that gross domestic product, government consumption, and household consumption in developed countries had a great influence, showing characteristics of market-seeking horizontal type investment. However, in developing countries, labor compensation, human capital,

investment expenditure, and exports had a great influence on efficiency, showing characteristics of pursuing efficiency-seeking vertical type investment.

As a follow-up study, Kim Moo-Soo and Lee Chan-Hee (2019) analyzed the impact of FDI inflows by continent in 15 developing countries from the viewpoint of stocked inflows, showing that labor compensation was the most influential factor in Asia with a strong efficiency-seeking investment with a cost saving. In addition, in Latin America, exports were the most influential factor. Export-oriented investments to third countries were shown. And, in Africa, investment expenditure was the biggest influencing factor, showing economic growth-pursuing investments.

### 3. FDI Measurement Scale

Economic variables for capital inflow can be divided into the concepts of flow and stock. Stock is a cumulative variable measured at a specific time. Flow means an influent measured over a certain period of time. In empirical analysis of the relationship between FDI and macro-social and economic factors, the variable measuring the size of FDI can be identified as the concept of flow occurring over a certain period of time or as the concept of stock which is the amount of capital inflow that exists at a specific time.

Kim Hong-Ki (2015) has empirically analyzed the effect of capital movement on economic growth using five-year average data from 1980 to 2012 using FDI inflows measured as flow and stocks. Results of that study have revealed that flow inflows can better explain the effect on the economic growth in developing countries than stock inflows. This might be due to characteristics of unstable time-series data. Since there were only seven time series data used in panel analysis, there might be limitations in properly investigating and comparing long-term trends.

Hong Seung-Gee and Kim Moo-Soo (2018) have analyzed macroeconomic and social factors affected to FDI stock inflows according to the stage of economic development and qualitative level using data from 28 countries of the United Nations Conference on Trade and Development (UNCTAD) measured as stock inflows for 30 years to explain long-term trends based on time series data with stable cointegration relations. Their results have confirmed that characteristics of market-seeking horizontal type investment are stronger in developed countries while characteristics of efficiency-seeking vertical type investment to reduce labor costs are more significant in developing countries.

Therefore, in this study, based on the research of Hong Seung-Gee and Kim Moo-Soo (2018) used stock FDI inflows, FDI inflows were analyzed in terms of the net inflow to derive the differences and implications.

## III. Model Specification

### 1. Research Model

This study analyzed determinants of FDI by using panel data built for 28 countries from 1985 to 2014. To understand differences according to the qualitative level of economic growth and the stage of economic development, target countries were divided into developed and developing countries. Among motives of FDI suggested by Dunning (1993), determinants of

FDI were analyzed focusing on market-seeking, resource-seeking, and efficiency-seeking types

For an empirical analysis in this study, a basic panel regression analysis was used. A fixed effect model is the optimal model shown through the Hausman test. It was finally used in this study. In addition, the model of (1) was derived by referring to the model of Masron and Abdullah (2010).

$$\begin{aligned}
 \text{FDI net inflow} &= f(\text{MSV}, \text{RSV}, \text{ESV}) & (1) \\
 \text{MSV(Market Seeking Variables):} & \text{GDP,} \\
 & \text{(C) Share of Household Consumption in GDP,} \\
 & \text{(G) Share of Government Expenditure in GDP} \\
 & \text{(I) Share of Investment Expenditure in GDP} \\
 \text{RSV(Resource Seeking Variables):} & \text{CK (Accumulated Capital), HC (Human capital)} \\
 \text{ESV(Efficiency Seeking Variables):} & \text{(E) Export,} \\
 & \text{(L) Share of Labor Compensation in GDP,} \\
 & \text{(TFP) Total Factor Productivity}
 \end{aligned}$$

In model (1), the dependent variable, FDI, was measured as the net inflow of FDI from the investing country to the investment target country. Market-seeking explanatory variables included gross domestic product (GDP), household consumption (C), government expenditure (G), and investment expenditure (I) as components of gross domestic product. Resource-seeking explanatory variables included accumulated capital (CK) and human capital (HC) variables. Efficiency-seeking explanatory variables included total exports (X), labor compensation (L), and total factor productivity (TFP).

$$\begin{aligned}
 \log \text{FDI}_{it} &= \alpha + \mu_i + \beta_1 \log \text{GDP}_{it} + \beta_2 \log \text{C}_{it} + \beta_3 \log \text{G}_{it} + \beta_4 \log \text{I}_{it} + \beta_5 \log \text{CK}_{it} \\
 &+ \beta_6 \log \text{HC}_{it} + \beta_7 \log \text{X}_{it} + \beta_8 \log \text{L}_{it} + \beta_9 \log \text{TFP}_{it} + \varepsilon_{it} & (2)
 \end{aligned}$$

- FDI (FDI net inflows, in million, USD)
- GDP (Gross Domestic Product, in million, USD)
- C (Share of Household Consumption in GDP, %)
- G (Share of Government Expenditure in GDP, %)
- I (Share of Investment Expenditure in GDP, %)
- CK (Accumulated Capital, in million, 2011 US\$)
- HC (Human capital index)
- X (Share of total exports in GDP, %)
- L (Share of labor compensation in GDP, %)
- TFP (Total factor of productivity level)
- $\varepsilon_{it}$ : error term,  $\mu_i$ : regional fixed effect  $\alpha$ : constant term

## 2. Variable Description

To analyze the influenced factors of FDI net inflow on host country, gross domestic product, household consumption, government expenditure, investment expenditure, accumulated capital, human capital, exports, labor compensation, and total factor productivity were used as independent variables. In this study, dependent variable was set based on the FDI inward net flow announced by the United Nations Conference on Trade and Development (UNCTAD).

In addition, data published in Penn World Table 9.0 were used as explanatory variables as they might affect investment inflow.

We intend to use gross domestic product as an explanatory variable as explained in the previous research. In addition there might be qualitative changes in gross domestic product according to changes in the government's economic growth policy (Krugman et al., 2015). Suppose FDI has a significant effect on gross domestic product, it can also affect qualitative changes. Therefore, qualitative changes in gross domestic product may have an effect on the inflow of FDI. Thus, household consumption, government expenditure and investment expenditure among elements constituting gross domestic product were used explanatory variables in order to understand the impact of the qualitative level of economic growth along with gross domestic product that could determine the market size of host country.

Socially accumulated capital and human capital held by each country were used to identify the resource-seeking purpose. In this study, the social capital data of Caselli and Wilson (2004) with a long-term measurement of buildings, transportation facilities, communication information facilities, software and so on owned by each country were used as explanatory variables of accumulated social capital. This study attempts to understand the impact on the inflow of FDI using human resource index measured based on studies of Barro and Lee (2013) and Psacharopoulos (1994) as explanatory variables for human capital.

Each country's total export, labor compensation level, and total factor productivity were used to identify the purpose of pursuing efficiency. In previous study net export was used as variables to explain the level of foreign trade openness or the amount of foreign trade. However net export has limitations in determining the actual export size of each country by subtracting total import from total export. Therefore this study attempts to examine the effect of total exports on FDI inflows.

In order to understand characteristics of efficiency-seeking investments that seek to increase production efficiency by utilizing relatively low-wage labor force data measured by country wage levels are used as explanatory variables. Therefore based on the study of Gollin (2002) labor compensation share in GDP was used as a variable in this study.

FDI has a positive effect on economic growth through the improvement of total factor productivity although the opposite was also observed. This study attempts to understand the effect of each country's technology level indicator expressed as total factor productivity on the FDI inflows. For this total factor productivity measured in studies of Feenstra et al. (2013), Diewert and Morrison (1986) and Caves et al. (1982a/1982b) was used as an explanatory variable. Along with the above explanation, data used in the analysis are summarized in Table 1.

### 3. Analysis Method

FDI inflows as a dependent variable were used by converting net inflow to logarithm. In the case of net inflow, negative (-) values might exist because disinvestment might occur. If there is a negative (-) value in the variable, natural logarithm could not be taken. Then derived coefficient could not be interpreted for elasticity, which might lead to a problem in which the convenience of analysis is would be poor. Therefore, FDI net inflow were log converted for an unbalanced panel analysis.



**Table 1.** Summary of Analysis Data

Variables		Measurement Level	Name of variable	Source	
E x p l i a n a t o r y	Dependent	FDI	Net inflow of FDI, (US(\$), log conversion)	log FDI	UNCTAD
		GDP	Real GDP at chained PPPs (US(\$), log conversion)	log GDP	PWT
	Market-seeking	Household consumption	Share of household consumption in real GDP (% , log conversion)	log C	PWT
		Government Expenditure	Share of government expenditure in real GDP (% , log conversion)	log G	PWT
		Investment Expenditure	Share of Investment expenditure in real GDP (% , log conversion)	log I	PWT
	Resource-seeking	Accumulated Capital	Capital stock at current PPPs (US(\$), log conversion)	log CK	PWT
		Human capital index	Human capital index based on years of schooling and returns to education	log HC	PWT
		Export	Share of exports in real GDP (% , log conversion)	log X	PWT
		Efficiency-seeking	Labor compensation	Share of labor compensation in GDP at current national prices (% , log conversion)	log L
	Total factor productivity		TFP at constant national prices (2011=1)	log TFP	PWT

## IV. Analysis and Results

### 1. Panel Unit Root Test

Panel data were a combination of time series data and cross-sectional data. If a regression analysis between two variables was performed using unstable time series data, spurious regression might occur, which might lead to significant results although there was no relationship between two variables. In this case, unstable time series data must be first differentiated and converted into stable time series data to apply the traditional regression analysis theory. To eliminate the hypothetical regression problem that might appear in regression analysis of time series data, a unit root test was performed to determine whether the data is stable (see <Table 2>).

Unit root test methods include Dickey-Fuller (DF) test, Augmented Dickey-Fuller (ADF) test, and Phillips-Perron (PP) test. Of these, the singular DF test is valid only when the error term is white noise. Thus, PP test which adjusted the t statistic of the DF test was used to adjust heterovariance and correlation between series. However, based on the study of Monto-Carlo, there was a tendency to reject the null hypothesis when PP test was unstable. Thus, ADF test with a parallax variable added to DF test was used to cross-check PP test (Schwert, 1987).

The unit root test should be performed prior to the cointegration test to confirm the existence of a cointegration relationship in long-term analysis. Therefore, in this study, ADF unit root test was performed and the null hypothesis that all variables except  $I_{sh}$  had unit roots at a significance level of 1% could not be rejected, indicating that unit roots existed in all variables (see <Table 2>).

**Table 2.** Panel Unit Root Test

Variables	ADF-Fisher		PP-Fisher	
	Statistic	p-value	Statistic	p-value
log FDI	60.65	0.31	101.29	0.00
log GDP	17.37	1.00	34.74	0.99
log C_sh	67.53	0.14	81.38	0.02
log G_sh	65.17	0.19	89.40	0.00
log I_sh	88.44	0.00	61.35	0.29
log CK	2.52	1.00	1.52	1.00
log HC	34.14	0.99	154.14	0.00
log X_sh	37.97	0.97	35.72	0.98
log L_sh	73.10	0.04	77.09	0.02
log TFP	55.84	0.48	70.85	0.09

## 2. Panel Cointegration Test

In panel data, when individual time series data are unstable series with unit roots, the theory used for traditional time series analysis has problems such as false regression. Generally, when results of a regression analysis between two time series show a high coefficient of determination (R<sup>2</sup>) and a low Durbin-Watson test value, the problem of unstable time series data should be considered. However, if there is a linear combination that creates a stable time series between unstable time series with unit roots, these time series can be considered to have a co-integral relationship. This co-integral relationship can be viewed as supporting the hypothesis that a series of variables that differ from each other in the short term will have a constant relationship in the long term. Therefore, if unstable time series have stable co-integral relationships, estimates of regression coefficients with congruence can be obtained because co-integral relationships occur when linear coupling between variables is stable even though individual variables are unstable.

For the cointegration test, the cointegration test method developed by Engle and Granger (1987) was used. Engle-Granger co-integral test determines whether there is a co-integral relationship between two integration series X and Y by whether the residual term  $Z_t$  forms a stable series at  $Y_t = \beta_1 + \beta_2 X_t + Z_t$  when the variable Y is regressed against X. Here, if  $Z_t$  is I(0), there is a co-integral relationship between X and Y. If  $Z_t$  is I(1), it can be concluded that X and Y do not have a co-integral relationship. Engle-Granger(1987)'s test of cointegration goes through a two-step process. First, the residual term  $Z_t$  is obtained by regression analysis of Y for X. Then the unit root test for  $Z_t$  is performed using the Dickey-Fuller test. That is,  $\Delta Z_t = Z_t - Z_{t-1}$  is regressed against  $Z_{t-1}$  to obtain t-ratio. It is then compared with the threshold. If t-ratio > a critical value, it means that there is no co-integral relationship between X and Y. Conversely, if t-ratio < a critical value, it means that a co-integral relationship exists between X and Y.

(Table 3) shows that cointegration exists in the regression equation by rejecting the null hypothesis that there is no cointegration at the significance level of 1% as a result of cointegration test.

**Table 3. Eagle-Granger Cointegration Test**

Series: log FDI, log GDP, log C_sh, log G_sh, log I_sh, log CK, log HC, log X_sh, log L_sh, log TFP				
Null Hypothesis: No cointegration				
Augmented Dickey-Fuller Test			t	p-value
			-3.74	0.00
Dependent Variable: D(RESID)				
Variable	Coefficient	SE	t	p-value
RESID(-1)	-0.69	0.09	-8.00	0.00
D(RESID(-1))	-0.06	0.07	-0.86	0.39

### 3. Error Correction Model

The error correction model is based on the notion that if there is an equilibrium relationship between variables, the deviation from the long-term equilibrium at any one point in time will be adjusted over time. The error correction model has the advantage of being able to represent not only short-term fluctuations of cointegrated variables, but also characteristics of long-term equilibrium relationships.

As a result of conducting a first-order regression analysis with level variables before using the error correction model, as shown in Table 4, coefficient of determination (R2) was high and the Durbin-Watson test value was low, indicating characteristics of an unstable time series with autocorrelation. To obtain information on the long-term relationship between variables, the following error correction model(3) was derived. In this model, estimated the balance error ( $Z_t - 1$ ) of the past period was used as an additional explanatory variable.

$$\log FDI_{it} = \alpha_0 + \alpha_1 Z_{t-1} + \mu_i + \beta_1 \log GDP_{it} + \beta_2 C_{it} + \beta_3 G_{it} + \beta_4 I_{it} + \beta_5 \Delta CK_{it} + \beta_6 HC_{it} + \beta_7 X_{it} + \beta_8 L_{sh_{it}} + \beta_9 TFP_{it} + \varepsilon_{it} \tag{3}$$

As a result of performing a quadratic regression analysis with the error correction model in (3), as shown in (Table 4), the coefficient of determination (R2) did not change significantly, while the Durbin-Watson test value increased from 0.8 to 2 or more, indicating no autocorrelation. Thus, it is possible to make as table estimation.

### 4. Fixed-effect Panel Regression Analysis

Fixed-effect panel regression analysis was performed to analyze factors influencing the inward FDI. First, to understand the differences of determinants of FDI inflows according to the stages of economic development, results were analyzed by dividing countries into developed and developing countries. The sections are as follows (refer to (Table 4)).

In developed countries, GDP indicating the size of domestic market had a positive effect on the inward FDI. However, it did not affect the inflow of FDI to developing countries. This is consistent with previous studies (Pattayat, 2016; Wadhwa and Reddy, 2011) showing that the size of the market in the investment target country is a factor influencing the influx of market pursuit type, but different from a study showing that it is significant in both developing and developed countries (Hong Seung-Gee and Kim Moo-Soo, 2018).

Looking at qualitative level of economic growth, in developed countries, consumption and

investment expenditure were found to have a slightly positive effect, whereas government consumption and investment expenditure were main factors in developing countries. These analysis results of developing countries are consistent with a previous study (Hong Seung-Gee and Kim Moo-Soo, 2018). They were also consistent with research results of Djurovic (2012), who argued that government expenditure could affect the inflow of FDI in developing countries.

As a resource-seeking motive, accumulated capital and human capital were found to have no effect on FDI inflows in developed countries, consistent with study results of Murthy and Sinha (2016) showing that human capital did not have a significant effect on FDI inflows, but this result is inconsistent with previous studies showing that developed social infrastructure had a positive effect on the inflow of FDI (Hong Seung-Gee and Kim Moo-Soo, 2018; Rutihinda 2005; Sankaran 2015). However, human capital appeared to have a greater influence on the inflow of FDI in developing countries, confirming that characteristics of resource-seeking investment were appeared. This was consistent with previous studies (Hong Seung-Gee and Kim Moo-Soo, 2018; Lewis 2000; Rutihinda, 2005) showing that a well-educated and skilled workforce had a positive effect on inward FDI.

It was shown that total factor productivity had a positive effect on the inflow of FDI in both developed and developing countries. In particular, in developed countries, total factor productivity appeared to have a greater impact on FDI inflows. It can be inferred that both market-oriented investments and efficiency-oriented investments that can increase the productivity by improving technology are made. In addition, it can be inferred that labor compensation also has a positive effect on FDI inflows in both developed and developing countries. Thus, the pursuit of efficiency through cost reduction is also a major factor in capital movement. This is consistent with previous studies (Athukorala, 2009; Dunning 1993; Hong Seung-Gee and Kim Moo-Soo, 2018; Sethi et al., 2003) claiming that production cost reduction due to low wages is an important factor on the decision-making of FDI.

Exports were found to have a positive effect on inward FDI to developing countries. This can be inferred that developing countries known to be utilized as global production bases based on the productivity of a low-wage system. This explains that a export-oriented investment type has been occurred in developing countries and is in agreement with previous studies (Hong Seung-Gee and Kim Moo-Soo, 2018; Masron and Nor, 2013; Tran and Dinh, 2014) showing that larger size of exports can promote the inflow of export-oriented investment.

**Table 4.** Results of Panel Regression Analysis of Fixed Effects by Stage of Economic Development

Dependent Variable (FDI net inflows)	Developed countries				Developing countries			
	Level variables (N=369)		Error correction (N=340)		Level variables (N=441)		Error correction (N=422)	
Constant	-17.93 (-3.36)	***	-17.36 (-3.13)	***	6.62 (3.24)	***	6.39 (3.32)	***
log GDP	2.12 (3.29)	***	2.10 (3.23)	***	-0.15 (-0.45)		-0.15 (-0.50)	
log C_sh	2.09 (1.85)	***	2.23 (1.94)	*	-0.23 (-0.55)		-0.26 (-0.64)	
log G_sh	-0.67 (-0.96)		-0.68 (-0.96)		0.44 (2.98)	***	0.42 (2.97)	***
log I_sh	0.57 (1.08)		0.90 (1.66)	*	0.91 (4.71)	***	0.81 (4.57)	***

log CK	-0.27 (-0.55)	-0.32 (-0.65)	0.02 (0.09)	0.04 (0.19)		
log HC	2.41 (0.81)	2.737 (0.90)	6.83 (7.97)	6.645 (8.23)	***	***
log X_sh	0.73 (1.93)	0.552 (1.45)	0.726 (5.01)	0.702 (5.35)	***	***
log L_sh	-2.28 (-1.491)	-3.004 (-1.89)	-1.114 (-2.18)	-0.938 (-2.02)	**	**
log TFP	3.16 (3.22)	3.213 (3.24)	1.788 (2.84)	1.65 (2.75)	***	***
Error		0.291 (5.23)		0.463 (10.55)		***
R <sup>2</sup>	0.70	0.71	0.77	0.81		
D-W	1.39	2.10	1.07	1.94		

Note: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.001$ .

## 5. Results

This study used macroscopic socio-economic data from 28 countries (13 developed countries and 15 developing countries) with large FDI inflows for 30 years from 1985 to 2014 to determine the factors that promote FDI net inflows.

Results of the analysis can be summarized as follows; The influx of FDI includes a mixture of the motives of the market-seeking type, the resource-seeking type, and the efficiency-seeking type. The type of motive for FDI varied depending on the stage of economic development. In developed countries, total factor productivity (TFP) had a great influence on FDI inflows along with GDP. This can be inferred that efficiency and market seeking investment has happened in the developed countries. The horizontal market seeking investment was identified in the study of Hong Seung-Gee and Kim Moo-Soo (2018). Thus improvement of productivity with a high technology and expansion of market might be more important to attract FDI inflows.

In developing countries, human capital and total factor productivity were found to have a greater influence on FDI inflows. And investment expenditure, government expenditure, exports, and labor compensation had also significant effects. This was confirmed in the study of Hong Seung-Gee and Kim Moo-Soo (2018) which is explained that a vertical type efficiency seeking investment was occurred in developing country. Such investment mainly targets for using skilled low cost laborer. Also it could be inferred that improving total factor productivity under a government's economic growth, export promotion and education system improvement policy has an good attraction for inward FDI in developing countries.

Through these results, expansion of the market of the host country (Hong Seung-Gee and Kim Moo-Soo, 2018; Lewis, 2000; Pattayat, 2016; Wadhwa and Reddy, 2011) and export volume (Arbatli, 2011; Tran and Dihn, 2014) are important to attract inward FDI. Also improving total factor productivity (Alfaro, et al., 2009; Brenner, 2014) and maintaining well educated human resources (Rutihinda, 2005; Sankaran, 2015) are necessary for inward FDI. In addition FDI moves to where efficiency can be increased by reducing costs (Dunning, 1998; Sethi et al., 2003) with a high technology and is making good performance.

## V. Conclusion

It can be inferred that the FDI of multinational corporations is aiming for a place where has a high technology productivity and can expand target market above all else. At the same time, it can be inferred that cultivating well educated human resource, maintaining relatively a low cost labor market compare to the developed countries and increasing export volume is important for attracting FDI inflows.

This result explains that in order to attract inward FDI to developing countries, some policies are needed as follows; 1) a labor policy that can stably maintain a relatively inexpensive wage system compared to advanced countries, 2) an education policy that can cultivate excellent human resource and improve technology, 3) a government driven economic growth policy that can increase the size of the domestic market, 4) an open door policy to expand export volume.

Even though a FDI decision making of multinational corporation is driven by the needs of individual corporation, FDI may contribute the optimization of global welfare and promote the globalization of world economy based on the proposition of long-term capital movement for re-allocation of global resources. Therefore FDI could be closely related to macroscopic socio · economic factors of host country. The influx of FDI depends on the qualitative level of economic growth of host country. Thus carefully designed economic growth strategies and investment policies are needed for them. The policies should be suitable for their economic conditions and matched the needs of FDI as a driving force for their economic growth.

In addition to macro socio · economic variables, the investment environment of host country can be influenced by various invisible factors such as country-specific history, culture, politics, policies, and institutions. Therefore research on intangible factors such as economic freedom and institutions of host country would be needed in the future. Besides studies about the comprehensive effects of bilateral or regional FTA agreements would be also needed.

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