

**ANALYSIS OF MACROECONOMIC DETERMINANTS INFLUENCING  
FOERIGN DIRECT INVESTMENT (FDI) IN INDONESIA  
IN THE PERIOD OF 1982-2012**

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This study aims to investigate and to explain the relationship between macroeconomics determinants and foreign direct investments (FDI) in Indonesia. Data used in this study are secondary data in the form of time series of yearly data during the period of 1982-2012 which obtained from official website of World Bank. It comprises FDI as dependent variables and Gross Domestic Product (GDP), Inflation, Exchange Rate and Openness in Indonesia as independent variables. This study also included Infrastructure in determining FDI inflows to Indonesia. Research methods employed in this study are: Ordinary Least Square (OLS) used to analyze the long term relationship between dependent variable and independent variables and Error Correction Model (ECM) used to analyze the dynamic short term relationship between the dependent variable and independent variables and speed of adjustment of model toward equilibrium. In addition, this study also employed classical assumption test to determine the validity of the model.

The findings shows that GDP, infrastructure, inflation rate, exchange rate, and trade openness have significant influence in the long term to FDI inflows in Indonesia. GDP, infrastructure and trade openness have positive significant influence to FDI while inflation and exchange rate have negative significant influence to FDI. Meanwhile, the short term analysis shows that inflation has negative significant influence while trade GDP, openness and exchange rate have positive significant influence toward FDI inflows in Indonesia. The ECT value also shows negative significant 0.66, it means that the speed of adjustment of the model from disequilibrium is amounted for 66%. Based on the result of the study, it is recommends policymakers such as government, Bank Indonesia and *Otoritas Jasa Keuangan* (OJK) to ensure the stability of macroeconomic determinants such as GDP, Exchange Rate, Inflation, and Trade Openness. Government should also improve its expenditure on the key consideration of infrastructure such as telephone lines, as a ways to accelerate the improvement of FDI inflows. And to attract foreign investors, the government's incentive policy should also focus on the improvement of export performance. The policies that can be taken are in the form of reduced tax rate in the industrial sector, simplifying export procedures and production empowerment by increasing production of export and product promotion through exhibitions or websites, business partnership programs and export marketing management training.

**Keywords: FDI, GDP, Inflation, Exchange Rate, Openness, Infrastructure, ECM.**

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## A. INTRODUCTION

During the last three decades, the world economy has increasingly integrated with FDI. FDI itself has been becoming a particularly significant driving force behind the interdependence of national economy. Even though most of FDI concentrates on developed countries, its importance is undeniable for developing countries as well.

Indonesia is one of developing countries which require substantial funding to carry out its economic development. Depending only on domestic funds is considered as not sufficient to fulfill the development needs. This is due to the amount of domestic savings which is still lack for fulfilling the required investments. As pointed out by Goeltom (2008) that domestic savings as the main source of financing development are usually inadequate for the scale of investment development required. Therefore, due to the limitations of domestic funds, the government to increases the amount of financing from foreign sources.

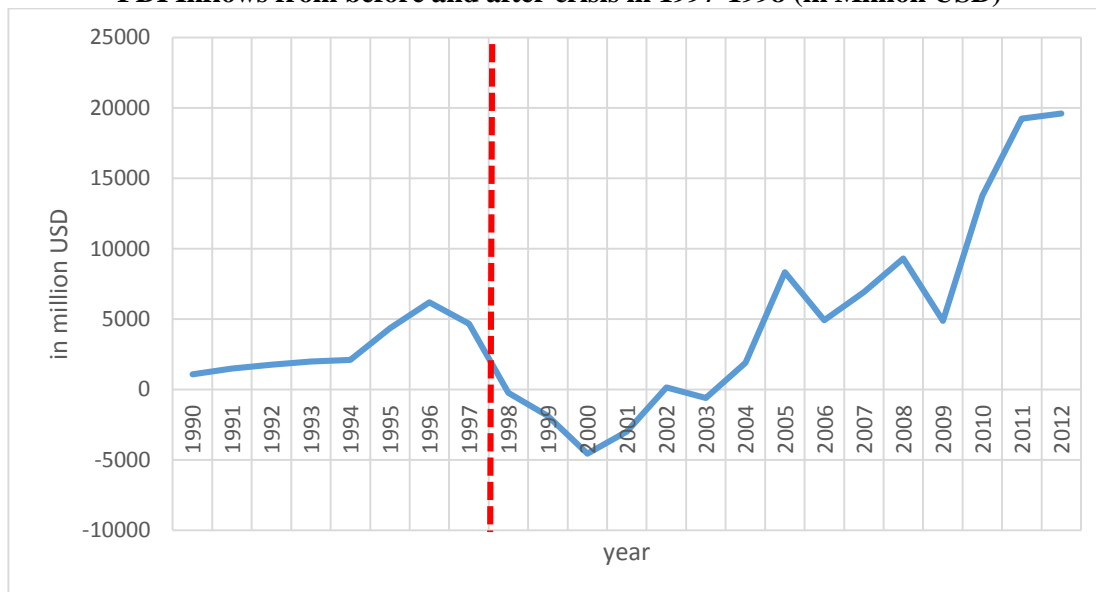
Foreign financing source can be divided into foreign debt and foreign investment. Foreign debt and foreign investment, they cannot be used individually but rather they have to be used as complementary, that is complementing each other's weaknesses.

But, if the accumulation of foreign debt has already been so large, then it may become a burden for state budget in the future. Imagine, if the government is in a state of continuously using foreign financing in the form of debt, then this may lead to the accumulation of debt in long term which will eventually become a burden to the state budget, because the obligation to repay the debt principal and interest. Thus government policy should be directed to gradually be able to maintain the health level in using foreign debt and reduce the dependency of using foreign debt excessively.

Hence, one alternative that allows the Government to obtain a source of development funds is to increase the foreign investments, which can be obtained from FDI. According to Krugman and Obstfeld (2004), FDI is an international capital flows where a company from certain countries setting up or expanding its operation or its business networking in other countries.

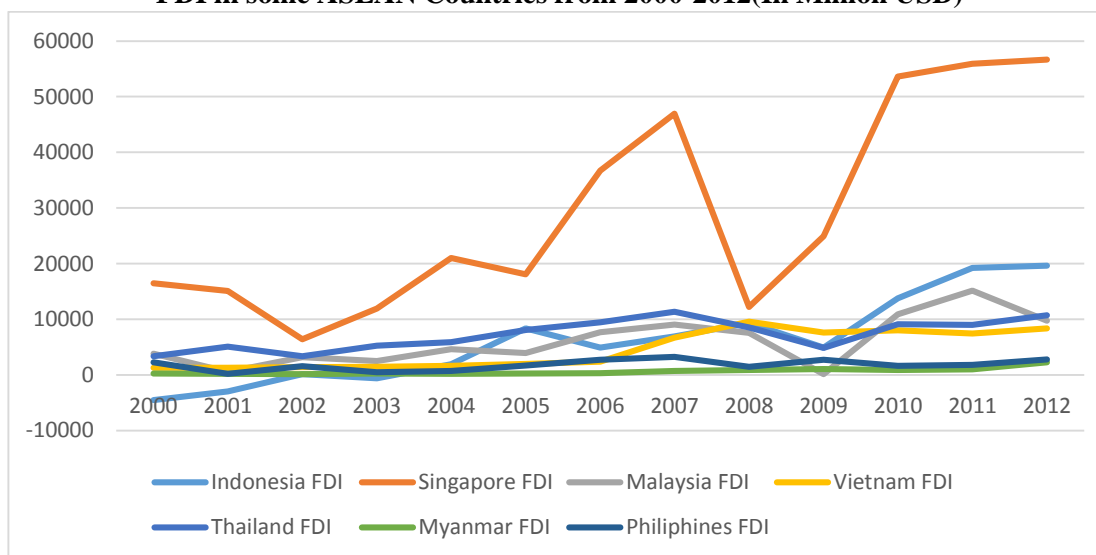
Figure 1 is a graph which explain the condition of FDI from before and after crisis in 1997-1998. In the graph, the left side of the red line is the condition of FDI before monetary crisis 1997-1998, while on the right side of the red line is the condition of FDI after monetary crisis 1997-1998. From the graph, FDI that flows into Indonesia during the period of 1990-2012 tends to be fluctuated. In 1990-1996, FDI is positively increasing, with the highest in 2006. However, because of the monetary crisis in 1997-1998, FDI goes down significantly until it deficit in 2000. But then from 2000, FDI inflows in Indonesia starting to show positive trend. It continue to increases until the highest is in 2012. The graph is also indicates that before monetary crisis 1997-1998, the value of FDI inflows to Indonesia is lower than the value of FDI inflows after the monetary crisis 1997-1998.

**Figure 1**  
**FDI Inflows from before and after crisis in 1997-1998 (in Million USD)**



Source: World Bank 2014 (Data Processed)

**Figure 2**  
**FDI in some ASEAN Countries from 2000-2012(In Million USD)**



Source: World Bank 2014 (Data Processed)

It can be observed that Indonesia FDI in 2000-2012 compared with other ASEAN countries still has a strong position. Indonesia is only below Singapore FDI with USD 19 billion in 2012 and Singapore FDI is USD 56 billion, which is much higher than other ASEAN countries. In the third place, there is Malaysia with USD 973 million, in sequence there are Thailand and Vietnam with USD 106 million and USD

836 million. Other countries such as Philippines and Myanmar are still left behind with FDI around USD 2 million as shown in figure 1.3 below.

Currently, there are many studies on the factors that influence FDI. However, the methods used and the results of the study are varied, since the factors that are used also vary, depending on the intention and purpose of the researcher. Although these factors are assumed to be constant (*ceteris paribus*), the effect is still very strong, such as on macroeconomics variables, namely national income, economic growth and inflation, and also there are still different conclusion which arise to various debates. FDI has an important role in ensuring the sustainability of economic development compared with foreign aid flow or foreign portfolio investment (FPI). This is because in FDI, economy changes in a country will be followed by transferring of technology and know-how skill, establishing businesses which are relatively less risky and more profitable. As a form of long-term investment flow and relatively invulnerable to economic shocks, FDI is expected to be able to help encourage the growth of sustainable investment in Indonesia.

According to Raihan (2006) a variety of empirical results indicate that macroeconomics fundamentals have quite an important role in attracting foreign capital flows in a country, thus implying that macroeconomics policy should be appropriate and incentives should be given to attract foreign investment, particularly for FDI. This research is more focused on macroeconomics determinants as pull factors (domestic) on FDI in Indonesia. Macroeconomics determinants as a reflection of the condition of a country's macroeconomics stability is one of the factors which are taken into account by foreign investor when they plan to invest their funds in the country concerned. Indicators typically used in macroeconomics determinants of a country are include economic growth (as a proxy for gross domestic product (GDP)), inflation rate, country openness and IDR exchange rate against dollar/exchange rate.

Based on the background that has been presented before, this study aims to analyze the influence of macroeconomics variables (GDP, inflation, exchange rates, openness) and infrastructure as control variable toward FDI inflows to Indonesia. Therefore, the title of the present study is “**Analysis of Macroeconomics Determinants Influencing Foreign Direct Investment (FDI) in Indonesia in the Period of 1982-2012**”

## **B. LITERATURE REVIEWS**

According to Madura (2008) in his book entitled International Financial Management stated that MNCs commonly capitalize foreign business opportunities by engaging in FDI, which is investment in real assets (such as land, buildings, or even existing plants) in foreign countries. FDI can also be known as supervised foreign long-term investments, it means that the investors directly supervise capital flow in the

importing country. Supervision can be done by setting up a branch of the company, establishing a company whose share majority-owned by investors or by storing the fixed assets in the importing country. Krugman, Obstfeld, and Melitz (2004) define FDI as a firm largely owned by foreign residents acquiring or expanding a subsidiary firm or factory located in the host developing country.

One prominent attribute of FDI is that it involves not only the transfer of resources, but also imposes foreign control, which means a branch or subsidiary is not only strapped by financial obligations to parent company but also has a role as a part of the whole organizational structure of parent company. So company's subsidiary or branch is an extension of the parent company in the country of origin.

In macro-level theory of FDI, Hymer (1960) stated that the level of profit generated by an investment leads to the trend of the occurrence of competition in the domestic investment climate of a country. It would encourage investors to engage in FDI by transferring production facilities to countries that have lack of capital and low investment costs to boost overall profit (Straker, 2000).

Krugman, Obstfeld, and Melitz (2004) identified four different categories of FDI. First category is when a multinational firm builds a new production facility or creates a new firm in a foreign country, it is known as Greenfield FDI. Second category is known as Brownfield FDI which is denoted as the acquisition or merger by a multinational firm with an already existing firm. While Greenfield FDI implies full ownership of the multinational affiliates, Brownfield FDI can involve either full or only partial ownership of the multinational affiliates. The other two categories of FDI are horizontal FDI and vertical FDI.

Horizontal FDI occurs when the affiliate replicates the production process (that the parent firm undertakes in its domestic facilities) elsewhere in the world. While vertical FDI occurs when the production chain is separated, and parts of the production processes are transferred to the affiliate location (Krugman, Obstfeld, and Melitz: 2004). Both horizontal FDI and vertical FDI are driven by an attempt to reduce costs of the multinational firms. Horizontal FDI takes place to reduce the costs of international trade such as transportation costs, tariffs, and quota controls by having the final production facility located in the foreign country. Vertical FDI is driven by the theory of comparative advantage.

### **Theoretical Approaches to FDI**

The strong growth of international trade and foreign direct investment (FDI) that we have witnessed in the past few decades has inspiring extensive research on the behavior of multinational firms and determinants of FDI. Many authors have concentrated on the issue of FDI determinants and put forward various (and complementary) theories to explain them. The summary of theories for FDI determinants are listed below in the table 1.

**Table 1**  
**Summary of Theories for FDI Determinants**

Theory/Theoretical approach	Determinants		Author(s) (year)
Heckscher-Ohlin Model / MacDougall-Kemp Model	Higher return on investment, lower labor costs, exchange risk		Heckscher and Ohlin (1933), Hobson (1914), Jasay (1960), MacDougall (1960), Kemp (1964), Aliber (1970)
Market imperfections	Ownership benefits (product differentiation), economies of scale, government incentives		Hymer (1976), Kindleberger (1969)
Product differentiation	Imperfect competition		Caves (1971)
Oligopoly markets	Following rivals, responding to competition in domestic market		Knickerbocker (1973)
Product life cycle Production	Function characteristics		Vernon (1966)
Behavior theory	Fear of loss of competitive edge, following rivals and increased competition at home		Aharoni (1966)
Internalization	Market failures/inefficiencies		Buckley and Casson (1976)
	Know-how (leads to horizontal internalization), market failures (leads to vertical internalization)		Hennart (1982, 1991), Teece (1981, 1985), Casson (1987)
Eclectic paradigm (OLI – Ownership, location, internalization)	Benefit of owning productive processes, patents, technology, management skills		Dunning (1977, 1979)
	Advantage of locating in protected markets, favorable tax systems, low production and transport costs, lower risk		
	Advantage of internalization cutting transaction costs, lowering risk of copying technology, quality control		
New theory of trade	Market size		Dixit and Grossman (1982), Sanyal and Jones (1982), Krugman (1983), Helpman (1984, 1985), Markusen (1984), Ethier (1986), Horstmann and Markusen (1987, 1992), Jones and Kierzkowski (1990, 2001, 2005), Brainard (1993, 1997), Eaton and Tamura (1994), Ekholm (1998), Markusen and Venables (1998, 2000), Zhang and Markusen (1999), Deardorff (2001)
	Transport costs		
	Barriers to entry		
	Factor endowments		
Institutional approach	Political variables	Financial and economic incentives	Root and Ahmed (1978), Bond and Samuelson (1986), Black and Hoyt (1989), Grubert and Mutti (1991), Rolfe et al. (1993), Loree and Guisinger (1995), Haaparanta (1996), Devereux and Griffith (1998), Haufler and Wooton (1999), Haaland and Wooton (1999, 2001), Mudambi (1999), Barros and Cabral (2001), Bénassy-Quéré et al. (2001), Hubert and Pain (2002)
		Tariffs	
		Tax rate	

Source: Assuncao (2011) and compiled by the author

In addition, Varma (2006) in her book explained strategic logic of FDI as motivation of foreign investors to invest its capital in the form of FDI, namely:

- 1) Resource seeking FDI attempts to acquire particular resources at a lower real cost than it could be obtained in the home country. Resource seekers can be further classified into three groups: those seeking physical resources; those seeking cheap and/or skilled labor; and those seeking technological, organizational, and managerial skills.
- 2) Market-seeking FDI attempts to secure market share and sales growth in the target foreign market. This strategy can be conducted as a defense strategy. Investment in the background above is used to find markets that are realized in the form of mergers and acquisitions.
- 3) Efficiency-seeking FDI attempts to rationalize the structure of established resource-based or marketing-seeking investment in such a way that the firm can gain from the common governance of geographically dispersed activities. MNEs with this motive generally aim to take advantage of different factor endowments, cultures, economic systems and policies, and market structures by concentrating production in a limited number of locations to supply multiple markets.
- 4) Strategic asset-seeking FDI attempts to acquire the assets of foreign firms to promote their long-term strategic objectives, especially advancing their international competitiveness. MNCs with this intention often establish global strategic alliances or acquire local firms.

### **Benefit of Foreign Direct Investment (FDI)**

FDI has become the largest capital flows in the world economy. Cheap labor cost and cheap investment cost as well as an increasing living standard in developing countries opens up opportunities for market develop more multinational companies. Many literatures have shown that FDI can affect economic growth in a country. Research conducted by Kumar (2002) on the relationship between FDI and economic growth in 81 developing countries including Indonesia, based on statistical theory which was done (Granger Causality between FDI and Economic Growth) in Indonesia has found the results that the relationship between FDI and economic growth is two-way or affecting with one and another. This suggests that the increase in the flow of FDI in a country can boost economic growth in the country of the recipient and conversely. FDI can be used as a source of financing for the long term and capital formation of the country.

Positive impact that can be obtained with the inflow of FDI in the country, according to Campos & Kinoshita (2002) is the transfer of technology and knowledge that is manifested in human capital. In this case the FDI provides important knowledge transfer in terms of training, acquisition of skills, new management practices and organizational arrangements in the country of the recipient, and efficient labor and corporate units will contribute greatly to the growth of output.

Benefits obtained by the recipient countries with the transfer of technology is the shift in the mechanisms of production, product design, increased activity of research and development, improved quality of the output produced and stronger domestic productivity. Due to advancement of technology a new way or an improvement over the old ways of dealing with work processes can be invented. .In addition, FDI can also increase employment rate so that it can reduce unemployment and profit generated by FDI can contribute to corporate tax income for the recipient countries.

### **The effect of Gross Domestic Product to FDI**

According to Dhakal et.al (2007), GDP could be described as the size of the market. By analyzing the size of the market, it suggests that investment will go mainly to market which is quite large to be able to support the scale of economy that is needed for the production of the company.

Kiat (2008) stated that the economic growth was one of the early signs for investors to consider its investments in a particular country. Furthermore, according to Nonnemberg & Cardoso (2004), strong GDP growth could increase the flow of FDI inflow, but a country is required to have good infrastructure capacity in order to take advantage of the FDI. Strong economic growth implies a higher return for foreign investors by the increased investment grade in economy.

### **The Effect of Inflation to FDI**

Inflation is one of the indicators that can describe the level of economic stability in a country. High inflation rate shows internal economic instability, it implies that country's Government is unable to balance the economy and central bank is fail in conducting an appropriate monetary policy. Due to high inflation rate, companies face uncertainty in terms of the prices of products and the price of inputs. Therefore, in these circumstances, multinational companies will avoid or reduce investment in countries that have high inflation rate (Dhakal, et al. 2007).

An economic instability can be a big barrier to the flow of FDI. Any form of instability can make investors distort their perceptions of future profitability in a country (Erramilli & D'Souza, 1995). When inflation increases in a country, it will make the price of goods and services become more expensive, so that the cost of inputs (raw materials and labor costs) of production will be increased. This condition can force business players to increase the price of output that results to lower competitiveness level. In addition, inflation can also lead to low purchasing power, and demand for goods and services will decrease, which is ended in sluggish trading activity and hence the investors will be difficult to generate profit. This matter can reduce the interest of investor to invest its capital in the country.

So, the effect of inflation on investment activity has a negative correlation, where high rates of inflation will reduce the level of investment because of the high



cost of the investment itself. In contrast, a low inflation rate will lead to lower investment costs that would stimulate foreign investment in the country.

### **The effect Exchange Rate to FDI**

Exchange rate or currency rate is the price of a currency against other currencies. Exchange rates is one of the important factor in an open economy given its influence to demand and international trade. It is because the exchange rate can be used to compare the prices of all goods and services, so as to show the amount of domestic currency needed to buy one unit of certain foreign exchange (Mankiw, 2006)

According to the theory of “relative production cost effect” raised by Cushman (1985) and the theory of “relative wealth hypothesis” summed up by Froot and Stein (1991), currency depreciation will promote the inflow of FDI. “Relative production cost effect” theory emphasizes the impact of exchange rate changes on the level of the cost of production of the host country. This theory believed that when other factors are held constant, the devaluation of the currency of a country will reduce local production cost relatively to foreign production costs, especially labor costs, raising the profits of export-oriented foreign investors accordingly. This suggests that higher returns naturally attract more FDI inflows. “Relative wealth hypothesis” theory holds that devaluation of host currency can improve the relative wealth of foreign investors relative to domestic investors, which is conducive for the acquisitions of the host country’s domestic enterprises. Because, all production inputs become cheaper for the foreign investor whose capital is in a foreign currency, and encourages the acquisition of more domestic assets

The effect of exchange rate volatility on FDI movement is also a fairly well studied topic. The existing literature has generally found a positive effect of local currency depreciation on FDI inflows. Klein and Rosengren (1994) found that depreciation of exchange rate in the host country will in turns increase FDI of the host country. Conversely, when the host country’s exchange rate appreciates, the FDI in that particular country will decrease. Nurudeen, Wafure and Auta (2011) had used the Ordinary Least Squares and Error Correction Techniques to study the relationship between FDI and exchange rate depreciation. Their finding was found to be in line with the research by Hara and Razafimahefa (2005) in which the exchange rate depreciation significantly and positively affects FDI inflows. This means that when a country’s exchange rate depreciates, it will attract the foreign investors to invest in the country as it has a lower dollar price in its domestic industries.

In contrast with the previous research, Cushman (1985) analyzed the annual level of FDI in the United States and other five major industrialized countries through empirical test s, with the conclusion that appreciation of the real exchange rate would have a positive impact on FDI. In addition, Goldberg and Kolstad (1995) found that depreciation of exchange rate did not have any large or significant impact on FDI;

however, the intensity of the fluctuations in exchange rates affected FDI positively. Dewenter (1995) concluded from empirical analysis that the relationship between the relative level of the exchange rate and FDI was not statistically significant, based on data in the United States from 1975 to 1989.

### **The Effect of Openness to FDI**

Trade openness is a significant factor affecting FDI inflows. Theoretically, trade restrictions or openness could affect FDI inflows positively or negatively. Some policies on trade openness might cause a significant impact on attracting FDI. For example, through the implementation of free trade agreements (FTA), several Latin American countries have been able to attract greater flows of FDI. Goldberg and Klein (1998) stated that FDI fosters exports, import substitution, or greater trade in intermediary inputs.

There are studies which have found a positive relationship between trade openness and FDI flows (Biglaiser and deRouen 2006; Chakrabarti 2001). On the other hand, (Seim 2009) find a negative relationship between FDI inflows and the degree of openness for countries in transition. In other words, the relationship between trade openness and FDI inflows is very complex, needs careful explanation and may depend on the characteristics of each case. Theoretically, the effect of trade openness on FDI inflow varies depending on the motivation for engaging in FDI activities (Markusen and Maskus 2002; Dunning 1993).

### **The effect of Infrastructure to FDI**

Infrastructure have important role to the development of FDI in developing countries. Poor infrastructure causes increase in transaction cost and limits access to both local and global markets which ultimately discourages FDI in developing countries. Quality of infrastructure has impact on FDI, in addition, it also facilitates export performance which ultimately a motivational factor for inward FDI for a country as well as trading blocks. Suh and Khan (2003) explore the impact of infrastructure in the form of increased exporting level of major trade blocks CEFTA and ASEAN/AFTA. The results show that the increase of investments in ICT infrastructure yields positive and significant returns in the national exporting level. In emerging economies, the role of infrastructure is two layers, first is promotion of FDI and second is greater return on investment to business owners.

Rehman, Ilyas, Alam, and Akram (2011) have argued that good infrastructure is a necessary condition for foreign investors to operate successfully. Asiedu (2002) who analyzed 34 countries in Africa over the period 1980-2000 using the number of telephones per 1000 population (as a measure of infrastructure development) and at the same time controlling for the classical FDI determinants supported it and concluded that countries that improved their infrastructure were “rewarded” with more investments.

Fung et al. (2005) classify Infrastructure as hard in the shape of roadways, communications installations and highways and soft infrastructure is termed with transparent institutions and intensive reforms. Soft infrastructure is far important as to hard infrastructure to FDI. Moreover, the study describes that soft infrastructure provides twice returns, economic reforms and particularly a more market friendly soft infrastructure invites higher inward FDI in emerging economies. With the help of above stated concise theoretical review, it is clear and convincing that infrastructure is of vital nature in developing economies with reference to inward FDI.

### C. RESEARCH METHODS

Research approach employed in this study is quantitative approach, where this approach can be used to reveal and predict estimations of data that have been processed by using research tool. This research aim to explain the level of FDI in Indonesia by seeing the effect of economic growth (GDP), inflation (INF), exchange rate (EXC), Openness (OPEN), and infrastructure (INFRA) as control variable while other factors are considered constant (*ceteris paribus*).

The data used in this study are secondary data in the form of time series, in the form of yearly data of 1982-2012. It covers the variables of FDI, gross domestic product, inflation, exchange rate and openness in Indonesia. The data were obtained from Bank Indonesia either directly or through the website and reported as Indonesian Financial Statistics (IFS). In addition, the data in the study will also obtained from World Bank, the International Financial Statistics (IFS) and CEIC Data.

A method of analysis used in this study is error correction model (ECM). ECM which developed by Engle and Granger is a means of reconciling the short-term behavior of an economic variable with its long-term behavior. An important theorem, known as the Granger representation theorem, states that if two variables Y and X are co-integrated, then the relationship between the two can be expressed as ECM, (Gujarati, 2002). There are several requirements that must be met for using the ECM method. First, at least one of the variables used are not stationary at level degree. Secondly, the equation used should have a cointegration relationship. Third, the equation used is univariate (only independent variable that affects the dependent). If all three requirements are met, then the ECM method can be used in analyzing the existing problems.

On the basis of theory and data, this study uses several stages of analysis, namely:

#### 1) **Unit-Root Test**

In this study, stationary test is performed by using the Augmented Dickey-Fuller Test (ADF). The procedure is to determine whether the data are stationary or not, by comparing the absolute value of the ADF statistic to the critical value in the table MacKinnon at various confidence levels, 1%, 5% dan 10%. If the absolute value of the ADF statistic is greater than the critical

value, then the observed data show stationary result. In contrast, if the absolute value of the ADF statistic is less than the critical value then the data is not stationary.

**2) Degree of Integration Test**

Degree of integration test is a continuation of the unit root test as a consequence of the non-fulfillment of the stationary assumption of zero degrees by  $I(0)$ . Degree of integration test is conducted to determine whether the variables used are not stationary and how many times the variables must be differenced to produce a stationary variable.

**3) Cointegration Test**

Cointegration is an econometric technique used to examine the correlation between non-stationary time series variables. In practice, many economic series which contain unit roots (non-stationary) move together over time, that is to say, although the variables under consideration may drift away from equilibrium for a while, there are some forces on the series that make them converge upon the some long-term value. Test of cointegration can be done by employing two-step Engle-Granger residual-based test and Johansen approach.

Regression equation for long-term with dependent variable FDI,

$$FDI(IND)_t = \beta_0 + \beta_1 GDP_t + \beta_2 INF_t + \beta_3 OPENT + \beta_4 EXC_t + e_t$$

Where:

$FDI_t$  = foreign direct investment in the  $t$  period

$GDP_t$  = Gross domestic product in the  $t$  period

$INF_t$  = Inflation in  $t$  period

$OPENT$  = Openness in the  $t$  period

$EXC_t$  = Exchange rate in  $t$  the period

$e_t$  = error term in the  $t$  period

**4) Analysis of Error Correction Models**

ECM has a number of uses, but the most important for the use of econometrics is in addressing the problem of time series data that are not stationary and spurious regression issues. In addition, the ECM can also analyze economic phenomena in the short term and long term to explain the explanatory variables. So, the appropriate model to describe data time series which are not stationary is ECM.

Regression equation for ECM with dependent variable FDI,

$$\Delta FDI(IND)_t = \beta_0 + \beta_1 \Delta GDP_t + \beta_2 \Delta INF_t + \beta_3 \Delta OPENT + \beta_4 \Delta EXC_t + \gamma \mu_{t-1} + e_t$$

**5) White Noise Test**

To test whether the model generated passes the classic assumption test multicollinearity, heteroscedasticity, autocorrelation and normality.

## D. FINDINGS AND DISCUSSIONS

### Unit Root Test (Stationary Test)

Based on Table 2 below, it can be seen that there are 3 variables that were stationary at the degree of level, namely INF, EXC and OPEN. As for the variables which are not stationary at the degree of level are FDI, GDP, and INFRA).

**Table 2**  
**Unit Root Test Level**

Variable	ADF Value	MacKinnon Critical Value			Remarks
		1%	5%	10%	
FDI	-1.968325	-3.67017	-2.963972	-2.62101	non-stationary
Log_GDP	0.49847	-3.67017	-2.963972	-2.62101	non-stationary
Log_INFRA	0.106643	-3.67017	-2.963972	-2.62101	non-stationary
INF	-5.691487	-3.67017	-2.963972	-2.62101	stationary
Log_EXC	-2.656035	-3.67017	-2.963972	-2.62101	stationary
OPEN	-3.106721	-3.67017	-2.963972	-2.62101	stationary

Source: Data of the Research (processed with Eviews 7)

This situation indicates that the model used in this study is qualified to be estimated by using the ECM method, because at least there is one variable that is not stationary at the degree of level. Thus it needs to be followed by a test to determine the degree of stationary to find out in what degree the model would be stationary. Furthermore, it needs to be followed by the unit root test at the level of the first difference.

Based on Table 3, all the variables are stationary on the degree of integration of single or first difference. That is because the value of the ADF statistics is greater than critical values of the MacKinnon.

**Table 3**  
**Unit Root Test First Difference**

Variable	ADF Value	MacKinnon Critical Value			Remarks
		1%	5%	10%	
FDI	-6.194524	-3.699871	-2.976263	-2.62742	stationary
Log_GDP	-5.514627	-3.679322	-2.967767	-2.62299	stationary
Log_INFRA	-3.226089	-3.679322	-2.967767	-2.62299	stationary
INF	-6.701251	-3.689194	-2.971853	-2.62512	stationary
Log_EXC	-6.192578	-3.689194	-2.971853	-2.62512	stationary
OPEN	-8.412942	-3.679322	-2.967767	-2.62299	stationary

Source: Data of the Research (processed with Eviews 7)

### Johannsen Cointegration Test

In order to apply cointegration, the author used Johanson's cointegration test to the series of same order to determine the long-term relationship between the variables.

**Tabel 3**  
**Johannsen Cointegration Test**

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.778017	122.2892	95.75366	0.0002
At most 1 *	0.692264	78.63975	69.81889	0.0084
At most 2	0.523771	44.46289	47.85613	0.1006

Source: Data of the Research (processed with Eviews 7)

If series are cointegrated of order 1, trace test (Johansen's approach) indicates a unique cointegrating vector of order 1 and hence indicates the long-term relationship. This is proven by the value of probability which less than 5% in order of at most 1\*.

### Regression Model

Table 4 indicates the result of regression estimation of the model for FDI in Indonesia in the period of 1982-2012.

**Table 4**  
**Foreign Direct Investment Regression Model**

Dependent Variable: Y\_LOG\_FDI

Method: Least Squares

Date: 08/06/14 Time: 08:03

Sample: 1982 2012

Included observations: 31

Variable	Coefficient	Std. Error	t-Statistic	Prob.
X1_LOG_GDP	9.305448	3.226942	2.883673	0.0080
X2_LOG_INFRA	1.429282	0.811131	1.762085	0.0903
X3_INF	-0.033986	0.018674	-1.819926	0.0808
X4_OPEN	5.892384	3.167815	1.860078	0.0747
X5_LOG_RER	1.578829	1.318339	1.197590	0.2423
C	-79.30299	34.74281	-2.282573	0.0312
R-squared	0.774374	Mean dependent var		21.26236
Adjusted R-squared	0.729249	S.D. dependent var		1.460815
S.E. of regression	0.760116	Akaike info criterion		2.461295
Sum squared resid	14.44442	Schwarz criterion		2.738841
Log likelihood	-32.15007	Hannan-Quinn criter.		2.551768
F-statistic	17.16060	Durbin-Watson stat		1.159443
Prob(F-statistic)	0.000000			

Source: Data of the Research (processed by Eviews 7)

From the estimation result, it is known that variables including GDP, INFRA, INF, and OPEN have significant effect on FDI in Indonesia in the period of 1982-2012. The GDP factor has positive significant impact to FDI with coefficient value of 9.305448 and the level of significant is less than 1%. This means that if the GDP increases by 1 USD, then FDI will be increased for 9.305448 USD in average. Infrastructure also has positive significant impact to FI inflows in Indonesia. Infrastructure has coefficients for 1.429282 with level of significance is less than 10%, it means that every 1 unit increase in infrastructure will cause FDI to increase for 1.429282 USD in average. In addition, inflation factor has negative significant impact to FDI with less than 10% level of significance. This means every 1% increase in Inflation will cause FDI to decrease for 0.033986 USD in average. Openness also has some impact to FDI inflows to Indonesia. With the level of significant is less than 10%, Indonesia's openness to globalization has positive impact to the development of FDI inflows to Indonesia. This also means that in average, if trade openness increases for 1 USD then it will makes FDI to increase for 5.892384 USD. Furthermore, it can be seen from the table that exchange rate in Indonesia has positive but insignificant value. EXC coefficient value is 1.578829, it means that if Exchange rate factor increases for 1 Rupiah then it will make FDI to increase for 1.578829 USD.

Table 5 below indicates that the regression equations for the residual of FDI are stationary at rate of level. It can be seen from the statistics value of the ADF which is greater than all of the critical value of MacKinnon. From the results of these tests, the more encouraging fact is that among the variables used, they are co-integrated or have a long-term equilibrium between the variable, so that the formulation of the ECM can be proceeded.

**Table 5**

**Unit Root Test for FDI's Residual in the Degree of Level**

Variable	ADF Value	MacKinnon Critical Value			Remarks
		1%	5%	10%	
ECT	-3.51262	-3.670170	-2.963972	-2.621007	Stationary

Source: Data of the Research (processed with Eviews 7)

**Error Correction Model (ECM)**

ECM is used to analyze the dynamic short-term relationship of the regression model equation by estimating the error correction term (ECT). Table 4.6 is the result of the estimation of the ECM test which has been carried out:

Table 4.6 indicates that in the short-term, variables including Gross Domestic Product (GDP), Inflation (INF), Openness (OPEN) and exchange rate (EXC) have significant effect on Indonesia's FDI inflows. GDP has positive significant impact to FDI inflows in Indonesia. With coefficient value amounted for 17.36041, meaning that in short term every increase of GDP for 1 USD will cause FDI to Increase as much as 17.36041 USD in average. Inflation (INF) has a negative significant impact to FDI in short term for 0.063665. This means that in the short term, every 1% increase in inflation (INF) will decrease Indonesia FDI for 0.063665 USD in average. Openness

(OPEN) has a positive significant impact to FDI in the short term for 7.693720. This means that in the short term, every 1 USD increase in openness (OPEN) will make FDI in Indonesia to increase for 7.693720 USD in average. Exchange rate (EXC) also has positive significant impact to FDI inflows in Indonesia. It means that if exchange rate depreciates it means the nominal of rupiah currency will increase but the currency value is decreasing comparing to USD, it has impact to increase FDI inflows to Indonesia in the short run.

**Table 6**  
**Indonesia's FDI Error correction Model (ECM)**

Dependent Variable: D(Y\_LOG\_FDI)  
Method: Least Squares  
Date: 08/06/14 Time: 08:04  
Sample (adjusted): 1983 2012  
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(X1_LOG_GDP)	17.36041	4.821251	3.600810	0.0015
D(X2_LOG_INFRA)	0.983096	1.032256	0.952377	0.3508
D(X3_INF)	-0.063665	0.014202	-4.482657	0.0002
D(X4_OPEN)	7.693720	2.862022	2.688211	0.0131
D(X5_LOG_RER)	6.899328	2.679827	2.574542	0.0169
ECT(-1)	-0.664670	0.151514	-4.386850	0.0002
C	-0.729668	0.274392	-2.659216	0.0140
R-squared	0.776583	Mean dependent var		0.148937
Adjusted R-squared	0.718301	S.D. dependent var		1.046920
S.E. of regression	0.555657	Akaike info criterion		1.863631
Sum squared resid	7.101351	Schwarz criterion		2.190577
Log likelihood	-20.95447	Hannan-Quinn criter.		1.968224
F-statistic	13.32443	Durbin-Watson stat		2.242371
Prob(F-statistic)	0.000002			

Source: Data of the Research (processed with Eviews 7)

Statistically, table 4.6 indicates that ECT has significant value less than 1%. ECT shows how fast the equilibrium will be achieved in the long-term. ECT coefficient value for -0.664670, it shows that disequilibrium in the previous period is corrected in the present period for 0.66%.

### White Noise Test (Classical Assumption Test)

#### a. Normality Test

Normality test is performed to check whether the error term approaches a normal distribution or not. The Kolmogorov-Smirnov test is used to decide if sample comes from population has a specific distribution. If the level of significant is more



than 5% then  $H_0$  is rejected, this means the model used passes the normality test. Normality test results for FDI can be seen in Table 7 below:

**Table 7**

**One-Sample Kolmogorov-Smirnov Test**

		ECT
N		31
Normal Parameters <sup>a,b</sup>	Mean	.0000
	Std. Deviation	.69389
Most Extreme Differences	Absolute	.150
	Positive	.096
	Negative	-.150
Kolmogorov-Smirnov Z		.835
Asymp. Sig. (2-tailed)		.488

a. Test distribution is Normal.

Source: Data of the Research (processed with SPSS 20)

Table 4.7 indicates that the model used for this study passes the normality test performed by using Kolmogorov Smirnov. It is proven by the value of sig. which is more than 5%. It means that, the model rejected  $H_0$  and thus passes the normality test.

**b. Multicollinearity Test**

Multicollinearity test is a test performed to see whether there is a perfect linear relationship or a definite relationship among some or all of the independent variables from the regression model. The presence or absence of multicollinearity can be seen from the VIF coefficients of independent variable, where if the VIF coefficient between independent variable is less than 10 then there is no multicollinearity. Multicollinearity test results for the equation of FDI can be seen in Table 8 below:

**Table 8**  
**Multicollinearity Test**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics		
	B	Std. Error	Beta			Tolerance	VIF	
1	(Constant)	-27.152	11.896		-2.282	.032		
	Log_GDP	4.446	1.184	.932	3.754	.001	.160	6.269
	Log_RER	-1.848	.847	-.528	-2.181	.039	.167	5.973
	Log_INFRA	.056	.070	.176	.800	.432	.203	4.926
	INF	-.050	.020	-.461	-2.428	.023	.273	3.669
	OPEN	8.895	3.293	.679	2.701	.012	.155	6.438

a. Dependent Variable: log\_FDI

Source: Data of the Research (processed by SPSS 20)

The multicollinearity test results show that equations of FDI have no multicollinearity or doesn't have perfect linear relationship between all independent variables in the model. It is shown from the VIF coefficient of each independent variable which is smaller than 10.

### c. Heteroscedasticity Test

Heteroscedasticity is a condition when confounding factors (error) is not constant and the correlation between the explanatory variables and confounding factors occur as a result of imbalance data or the data are too varied. Tests were carried out to detect whether the observed data have heteroscedasticity or not, by using Glejser Test. If the probability value of Obs \* R-Squared is smaller than the significance level, it means that there is heteroscedasticity in the model. Meanwhile, if the value of Obs \* R Squared probability is greater than significance level, then there is no heteroscedasticity in the model. Significance level used was 5%. Heteroscedasticity test results from the equation of FDI and foreign portfolio investment can be seen in the following Table 9:

**Table 9**  
**Result of Heteroscedasticity Test**

Heteroskedasticity Test: Glejser

F-statistic	0.568248	Prob. F(5,25)	0.7235
Obs*R-squared	3.163597	Prob. Chi-Square(5)	0.6748
Scaled explained SS	3.527317	Prob. Chi-Square(5)	0.6193

**Source: Data of the Research (processed by Eviews 7)**

From the heteroscedasticity test results above, it can be seen that for FDI equation there is no heteroscedasticity problem. It is shown from the value of the probability Obs \* R-Squared which is greater than the significance level of 5% that used.

### d. Autocorrelation Test

Autocorrelation occurs in a series of time series data, where the error term in one period of time depending on the systematic error term periods of time to another. The test is used to detect whether the observed data autocorrelation test or not is by utilizes Serial Correlation LM BreuschGodfrey Test. If the probability value of Obs \* R-Squared is smaller than the significance level, autocorrelation is found in the models. Whereas if the probability value of Obs \* R-Squared is greater than significance level, then there is no presence of autocorrelation in the model. Significance level used is 5%. Autocorrelation test results for the equation of FDI can be seen in Table 10:

**Table 10**  
**Result of Autocorrelation Test**

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.847540	Prob. F(2,21)	0.4426
Obs*R-squared	2.240680	Prob. Chi-Square(2)	0.3262

**Source: Data of the Research (processed by Eviews 7)**

From the autocorrelation test results, it can be seen that there is no autocorrelation found in the model of FDI. It is shown from the value of the probability Obs \* R-Squared which is greater than the significance level used by 5%.

Based on the result of all classical assumption test above, it can be concluded that ECM models is free from multicollinearity, heteroscedasticity, autocorrelation and error terms are normally distributed. This means that the model can be declared free from the classical assumptions and the results of model estimation can be declared valid.

## **E. CONCLUSION AND RECOMMENDATIONS**

### **Conclusion**

Based on the analysis and discussion that have been described in the previous chapter, it can be concluded, as follows:

Of the five macroeconomic variables employed in this study, GDP, inflation rates and trade openness have significant effect to FDI in Indonesia both in the short term and long term. Infrastructure is found to have positive significant impact to FDI in the long term. However, in the short term infrastructure have positive but insignificant impact to FDI inflows in Indonesia. As for the exchange rate variable, it has positive insignificant effect to FDI inflows to Indonesia for the long term. However, it is proven to have positive and significant effect on the FDI inflows to Indonesia for short term. The conclusions of each variable are as follows:

- A. Gross domestic product is an indicator used for assessing the level of national income in a country. The greater the income of a country, the larger the market size is. Then, the result of the study is an evidence that Indonesia has a large market size and potential to support the sale of products in the country. It is proven by the GDP value which has positive significant influence to the FDI inflows both in the long term and short term for Indonesia during the given period. This proves that Indonesia FDI inflows will increase given the level of Indonesia increase. Increase in national income will increase revenues received by the community and which in turn the community will increase their demand for goods and services. Charkrabarti (2001) also supported the findings as it explains large market size means the resources of the country and exploitation of economies of scale will be utilized more efficiently. Hence, it is the key for investors who aim for long term investment.
- B. Infrastructure is proven to have important role in determining the FDI inflows in Indonesia. In the long term, Infrastructure have positive significant impact to FDI inflows in Indonesia in the period of 1982-2012. As public inputs, infrastructure can reduce the cost of doing business and still remain as important factors for attracting FDI inflows. The proxy telephone mainlines is included in the model as measurement of infrastructure. Asiedu (2006) studied infrastructure impact to FDI inflows by using telephone lines as proxy for infrastructure. Good infrastructure such as increased number of telephone line in the country allows firms to operate or promote their businesses more easily. This in turns, increase the opportunity of foreign investor investing in the country. So, in the future the government policy

makers should also pay attention to the key consideration of infrastructure along with other factors while making policies in respect to improve FDI inflows.

- C. Based on the analysis of inflation which is conducted previously, both in the short term and long term, inflation has negative significant influence toward the growth of FDI inflows in Indonesia during the period of 1982-2012. The findings show that the high inflation in the domestic country can reduce the level of foreign investment in the country. When the rise in prices causes inflation, then in order to increase production (raw materials, transportation, production equipment, etc.) the company has to increase the operational costs while the earned income is fixed. In addition, the price increase also causes community consumption to decline due to cost pressures (cost push). The decline in the purchasing power of the community will lead to the decline of national consumption. Therefore, a company or an industry has to reduce the number of supplies of goods and services produced, which in turn also reduces the level of revenue and profit production. All of these will certainly affect the domestic investment climate to be not conducive for investment because of the level of domestic investment risk which can lead to high losses on their assets and investment gains which are not worth the profit of investment.
- D. Exchange rates have insignificant influence in the long term for FDI inflows in Indonesia during the period of 1982-2012. This is assumed because the movement of the exchange rate is changing in a relatively short time, and therefore investors would consider the change of exchange rate to the profitability of company in the short term, not in the long term. In the short term, exchange rates has positive significant influence toward FDI inflows to Indonesia during the period of 1982-2012. Exchange rate has positive significant impact in the short term, because of foreign investors in emerging markets such as Indonesia do respond to the exchange rate, for instance, devaluation attracts FDI (reduces the price), although expected devaluation sometimes postpones FDI inflows because of the “wait and see” behavior of the investors. Indonesia investors are discouraged by volatile exchange rates, because this is correlated with economic and political uncertainty, which also appear to discourage FDI.
- E. For both long term and short term, trade openness has positive significant impact to FDI in Indonesia during period of 1982-2012. These could happen because the high level of exports reflects that production activities in Indonesia have increased as a result of increasing global demand for domestic goods and services. The high level of import reflects that the market in Indonesia is attractive from the perspective of foreign investors. The impact of the high exports and imports in a country is the income will increase, so that labor wages will also rise, followed by community’s revenues which also increase. Because of the investment opportunity, the excess in people's income is not likely to be used for consumption, but to be used for saving and investment. So, the additional capital from the community will stimulate domestic production, resulting increases in production output, which will be followed by the greater production of profits. With the greater domestic production and profit expectations, it will be able to attract foreign investors to invest in the domestic country.

Based on the conclusion above, decision for the hypotheses concluded as follows:

**Table 11**  
**Decision for the hypotheses of the Study**

Hypotheses	Decision
H <sub>1</sub> : GDP has a significant positive effect on FDI for both long and short term in Indonesia in the period of 1982-2012	Reject H <sub>0</sub>
H <sub>2</sub> : Infrastructure has a significant positive effect on FDI at least on in long or short term in Indonesia in the period of 1982-2012.	Reject H <sub>0</sub>
H <sub>3</sub> : Inflation has a significant negative effect on FDI for both long and short term in Indonesia in the period of 1982-2012.	Reject H <sub>0</sub>
H <sub>4</sub> : Exchange rate depreciation has a significant positive effect on FDI at least one in the long or short term in Indonesia in the period of 1982-2012.	Reject H <sub>0</sub>
H <sub>5</sub> : Trade openness has a significant and positive effect on FDI for both long and short term in Indonesia in the period of 1982-2012.	Reject H <sub>0</sub>

*Source: Developed in the Study*

### **Recommendation**

Based on the conclusions of the study, the recommendations in this study are as follows:

- A. The results of this study recommends policymakers such as government, Bank Indonesia and *Otoritas Jasa Keuangan* (OJK) to ensure the stability of macroeconomic determinants such as GDP, Exchange Rate, Inflation, and Trade Openness, because this is significantly influence the FDI inflows to Indonesia.
- B. In the future the government should also improve its expenditure on the key consideration of infrastructure such as telephone lines, as a ways to accelerate the improvement of FDI inflows.
- C. To increase the interest of foreign investors to invest in Indonesia, the government's incentive policy should be more focused on the improvement of the needed macroeconomic fundamentals, especially for domestic export performance. The policies that can be taken are in the form of reduced tax rate in the industrial sector, simplifying export procedures and production empowerment by increasing production of export and product promotion through exhibitions or websites, business partnership programs and export marketing management training.

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