THE FACTORS INFLUENCING ECONOMIC GROWTH IN INDONESIA PERIOD 1981-2014 ERROR CORRECTION MODEL APPROACH

Imamudin Yuliadi
University of Muhammadiyah Yogyakarta
Email: imamudin2006@yahoo.co.id

Nadya Rose .P
University of Muhammadiyah Yogyakarta
Email: nrosenadya@gmail.com

ABSTRACT

This study aims to analyze the factors influencing economic growth in Indonesia. The study employed the quantitative approach by using secondary data from 1981 to 2014. Analysis tool that is used in this study is Error Correction Model (ECM). Variables that are used namely Foreign Direct Investment (FDI), Export, Infrastructure (Road Length), and Inflation Rate, in which economic growth represented by Gross Domestic Product (GDP).

The result of this study indicates that Foreign Direct Investment (FDI) and export have positive and significant impact in short and long run. Meanwhile, both in short and long run, the inflation rate has negative and significant impact. The different result shows by infrastructure (Road Length) that has negative and insignificant relationship on economic growth in Indonesia, both in short and long run.

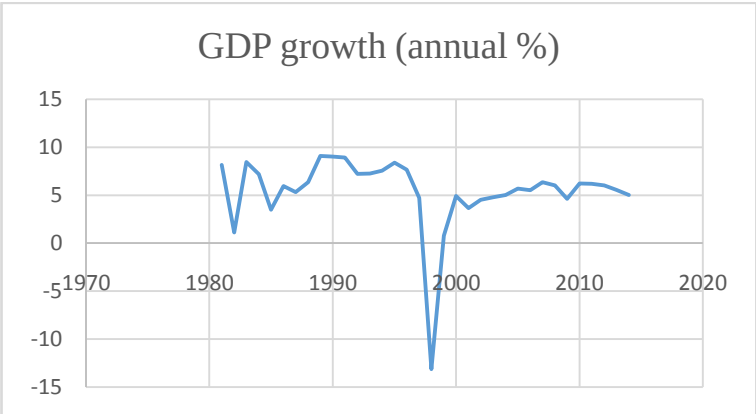
Keywords: Foreign Direct Investment (FDI), Export, Infrastructure (Road Length), Inflation Rate, Gross Domestic Product (GDP), Error Correction Model (ECM)

INTRODUCTION

Economic performance is an assessment of its success in areas related to its assets, liabilities and overall market strength. Many countries take regular stock in either formal or less formal basis of the general economic performance of their countries to make sure that it remains on the right track financially. Economic performance can be seen from economic growth. Economic growth is an indicator to perceive a country's performance whether in good or bad performance. The success of the development of a country can be seen from the level of economic growth. Therefore, each country always set target of high economic growth rates in the planning and development objectives. By high sustainable economic growth means as the main condition for sustainable development economy.

In the narrow sense, economic growth means the increase in total production of both goods and services. This is measured by the change in real gross domestic product (GDP) and by the change of real gross domestic product per capita. GDP is the total value of all final goods and services produce in a country in a one-year period. The value of GDP would give a view of how a country's ability to manage and utilizing existing resources.

Indonesia is one of the developing countries in the world. As a developing country Indonesia has been joined as a member in G-20 major economies and classified as the newly industrialized country. Based on the data from world-bank in 2013, the gross domestic product of Indonesia reached 3,475.25 USD. Indonesia experienced a GDP growth of 5.8% per 2013, it is of course a good hope for the Indonesian's government to realize the improvement of people's welfare.



Source: World Bank

FIGURE 1. The Annual GDP Growth in Indonesia

The graph above explained about the development of economic growth in Indonesia for 34 years from 1981 until 2014. Given the fact from World Bank, it can be concluded that the economic growth in Indonesia moving into fluctuation ways for 34 years. In the crisis 1998, the economic growth in Indonesia decreased dramatically around -13.12%. As for Indonesia, the main cause of financial crisis happens because of the internal source at that time. The crisis started when huge capital flight out from Indonesia. The direct result of capital flight that occurred in Indonesia, result in Indonesia's national currency (rupiah) then deteriorated against the US dollar. Moreover, many companies bankrupted and the national banking sector collapsed (Tambunan T. , 2010).

In macroeconomic analysis, besides explaining the supporting factor that possibly affect the economic growth, it also discusses on the issues such as; inflation. Inflation is a process of rising prices in general and continuous (continuous) for a certain time. In other words, inflation is also a

process in which the declining in currency values continuously. Inflation is a process of an event, not the high-low level of a price. That is, if the high price level it has not conclusively point to inflation. If a process of price increase continues to happen and influence each other means there is inflation. To achieve sustainable economic growth along with price stability continues to be the main objective of economic policy macro to most countries in the world today.

Based on the data from World Bank, the rate of inflation in Indonesia has fluctuated over the time. The highest level of inflation is happen when Asia financial crisis in 1997. Because of that problem, the inflation rate reach 58.3% and 20.48% in 1999. It became the hardest-hit country because the crisis not only had economic but also significant and far-reaching political and social implications. And after that, the inflation rate in Indonesia gradually back to normal.

In this globalization era, foreign direct Investment (FDI) plays an important role in international business. Economic integration occurs between the countries in the world encourage the emergence of cooperation in the economic, political, social and cultural. As the developing country in the world, Indonesia requires substantial funds in implementing national development. It is due to the undertakings in pursuit of the underdevelopment of the developed countries in the world globally. The fact that Indonesia itself is not able to provide the fund for development itself.

Foreign investment in Indonesia, has become a funding source that can be used as financing for development and economic growth. By using foreign investment, it is intended to replace the use of foreign debt as a source of financing. Because with the increasing uncontrolled interest rates on foreign debt and the rupiah exchange rate against foreign currencies make Indonesia will decrease the difficulties in the repayment of the debt.

Beside investments, Export also play an important role in the economic activities of a country. Exports will generate income that will be used to finance imports of raw materials and capital goods needed in the production process that will create value-added. Aggregation value added generated by all production units in the economy is the value of products GDP (Sutawijaya & Zulfahmi, 2010).

Through productivity gains, from the micro level, infrastructure can promote economic growth. Kuznets in his theory mentioned that the economic growth of a country is affected by the accumulation of capital, natural resources, human resources, with a view of quantity and quality. On the other hand, infrastructure can be categorized as capital accumulation. So, infrastructure can be used as inputs to production indirectly.

The developing countries has made an investment of 200 billion US dollars each year for the construction of the new infrastructure (World Bank, 1994). With the investments were acquired, the expected increase value of infrastructure will be better in the future, in fact sometimes the performance of infrastructure is disappointing. One of the causes is an error in the allocation of funds. For example, the development of infrastructure continued without maintaining the existing infrastructure.

The effort to revamp the infrastructure conditions to realize an important role in reducing inequalities of income and long-term effects for gross domestic product is important. Improvements in infrastructure have contributed to increasing productivity and is expected to support economic growth in the long term (Maryaningsih, Hermansyah, & Savitri, 2014). In this research, it focuses on the long road infrastructure in Indonesia in Kilometer units. By having the best quantity and quality road infrastructure in Indonesia, country will able to provide convenience in the distribution of economic activities in the community. Based on World Bank in 2013, Roads are the main transport in Indonesia, and the total road network recorded more than 477,000 km with an asset value of more than 15% of

GDP. However, the number and quality of road infrastructure in Indonesia is still below neighboring countries. The Indonesian government has increased infrastructure spending way to 70 trillion Rupiah per year (USD 7 billion per year), representing 40% of total spending on infrastructure.

However, the level of investment of this magnitude cannot pursue increased demand and growth in the last ten years. Productivity and efficiency management of national roads are still less than optimal. The spending of national roads has tripled in real terms between 2005 and 2011, but output which is generated in the road length only rose 20% whether if counted from the existing road or the road under construction.

Based on the terms describe above, the need for scientific assessments of the factors that affecting economic growth in Indonesia is highly needed. In this case the factors that will be analyzed are the factors in economic which are foreign direct investment, export, infrastructure, and inflation rate.

LITERATURE REVIEW

Economic growth can be defined as an increase in per capita real output. It also defined as a broad perception that refers to the process of economic growth that has capacity to raise the welfare of its people (Berg, 2001). The economic growth represent as the development of the activity in the economy that causes the good and services produced increases in economic activity in the community, regarding growth and development dimensional measured by the increased production and income (Sukirno, 2002). It also can be said as one indicator is in seeing the development of a country. A growth is not synonymous with development, growth is one of the conditions required in a development (Meier, 1989).

Economic growth occurs when an increase in the production of goods and services. In the real world to record the number of units of goods and services is a difficult thing to do. This is due to a wide variety of goods and services produced in one period that have different sizes. Therefore, the calculation uses to estimate the change in output which is the value of money is reflected in the value Gross Domestic Product (GDP). Gross Domestic Product (GDP) is the market value of all final goods and services, produced in the economy in a country in a period (Mankiw G. N., 2006).

Based on Adam Smith's Theory in Sukirno (2002) total output in the economy is affected by the factors of production. The factors of production namely capital, labor, and technology. From those factors, it can be seen from the formulas the following equation:

$$\Delta Y = f(C, L, T)$$

Where,
Y= Economic Growth
C= Capital
L= Labor
T= technology

Smith explains that country's production system consists of three elements namely, available natural resources, human resources or population, and the stock of capital goods.

There are 4 assumptions in economic growth in Harrod-Domar Theory. Firstly, in the economy there are full employment and maximum use of capital. Secondly, the economy consists of two sectors, namely the household sector and the corporate sector. Thirdly is the amount of public savings is proportional to the amount of national income, which means saving function starting from the zero

point. The last is the propensity to save in fixed amount, as well as the capital output ratio and the incremental capital output ratio (Jones, 1975).

Harrord-Domar theory doesn't focus the requirement to reach the maximum capacity if the economic is consisted with 3 sectors or 4 sectors. On that condition, the capital increases if AE1 = C + I1 + G1 + (X – M)1, where equal with I1 + G1 + (X – M)1. The conclusion from Harrord Domar theory is that the theory completes the Keynesian analysis. Keynesian focuses on the short-term economic problem. While on Harrord Domar theory, it describes the long-run economic problem. It describes the long aggregate is needed to be reached to realize the economic growth. The robust economic growth can be reached if I + G + (X – M) increases significantly with positive relationship.

Moreover, Harrod- Domar theory model focuses on how the population growth, capital accumulation, technological progress and outputs interact each other in the process of economic growth (Boediono, 1982). Although the general framework of the Solow-Swan model is similar with Harrod- Domar model, the Solow- Swan model is more flexible. This is because the Solow- Swan models more easily manipulated algebraically.

In contradict to the Harror-Domar theory that assumes a constant return with raw coefficients, meanwhile the neo-classical solow growth model uses the concept of diminishing return from worker and capital amount, if the two use distinct analysis. When analyzed simultaneously, the assumption of neoclassical also use the concept of constant return to scale. The advances in technology are just set as residual factor to explain the long-term economic growth. High or low growth is assumed to be exogenous or not influenced by other factors.

Foreign Direct Investment

There are two kinds of foreign investments in Indonesia which are foreign direct investment and foreign indirect investment. Foreign direct investment is the investment that apply in Indonesia territory by foreign investor which investment comes in form of building and buying a company or acquiring a company. Based on the UU No. 25 year 2007 in (Agma) represent the purpose of investment as follows: increase national economic growth, to create a vocation, to Increase the sustainable economic development, to increase the capacity and capability of national technology, and to develop community economy. Meanwhile, indirect foreign investment is made by the capital market instrument such as securities, stock, and bond.

Export

Export is the activity of selling and sending goods from the origin country to other countries. These activities can bring the flow of expenditure will be flowed into the enterprise sector. Furthermore, the aggregate expenditure will increase, this is because the export activities of goods and services, and therefore the national income will also increase. If net exports in a positive state, the aggregate expenditure will increase. Then this will increase the national income and employment (Sukirno, 2013).

Exports are one of the component in aggregate spending on the open-economy. Aggregate expenditure in an open economy means that the household expenditure on domestic production, investment, government spending, spending on imported goods and foreigner who spend the export goods. The aggregate expenditure can be expressed by this following formula:

$$AE = C_{dn} + I + G + (X - M)$$

Another theory that is used in the export is the basic theory of export. The basis theory is that the economic basis that is developing from the basis export becomes the city basis. From all of the theories, all are stressing on the demand from the external sides. On the city theory, there is a division which is its environment and external.

In export theory it can be described as the autonomic factor. It means that export is a factor to increase the income and economic growth directly. To reach the high export level, then it needs the strategy to increase the appropriate export value and appropriate investment with the high technology to be implemented punctually (Adisasmita, 2013).

Infrastructure

Infrastructure is the capital stock that provides public goods and services. Infrastructure will affect the production activities and quality of life for the households. Infrastructure is a fundamental factor behind economic growth. This variable has shown its long-enduring significance (Yoshino & Nakahigashi, 2000).

Infrastructure refers to the physical facility and organizational framework, knowledge and technology that is essential to society and economic growth. Infrastructure includes laws, public health and education systems, distribution systems, and transportation systems and public utilities.

In the economics, infrastructure is a form of public capital, which formed from the investment made by the government. In this study, infrastructure including roads, bridges, and sewer system (Mankiw G. , 2003).

Inflation Rate

Inflation is an increase in the general price level of commodities and services during a specific time period. Inflation is regarded as a monetary phenomenon due to the impairment of the monetary calculation unit to a commodity (Greenwald, 1998).

Inflation is one of the problems that need most attention by the government. The long term goal of government is to keep the inflation rate at the lowest level. The three kinds of inflation based on the causes of inflation that is demand-pull inflation, cost-push inflation, and imported inflation (Sukirno, 2013).

Besides inflation give a bad effect on the country, inflation can also give a bad effect on the individual and society. Firstly, inflation will reduce the real income of the people who have a fixed income. Generally, the increasing of wage level not as fast as the increasing of price level. Therefore, inflation will decrease the individual real wage who have the fixed income. Secondly, inflation will reduce the amount of wealth (money-from). Thirdly, inflation makes the distribution of wealth unwell. As explained earlier, the fixed income will experience the degradation in the real-income, but the owner of the fixed asset such as; land, houses can maintain or increase the value of real asset.

Previous Studies

According to Pranoto (2016), simultaneously exports has a significant and positive effect on the gross domestic product, while foreign direct investment has a significant and negative impact in Indonesia 2004 until 2013. This analysis was performed using linear regression analysis.

Based on Irsania and Noveria (2014) in their research titled “the Relationship among Foreign Direct Investment, Inflation Rate, Unemployment Rate, and Exchange Rate to Economic Growth” reveals that FDI, inflation rate, and exchange rate has a significant influence towards economic

growth. But FDI and unemployment have a positive correlation. The rest variables have negative correlation. This research used multiple regression as a method.

From the result of Koojaroenprasit (2012) by using the multiple regression, the findings shows that foreign direct investment has a strong positive impact on South Korean Economic Growth. Furthermore, this finding indicates that human capital, employment and export also have positive and significant impact, while domestic investment has no significant impact on economic growth in South Korea.

Research from Mofrad (2012) shows the study on The Relationship between GDP, Export, and Investment: Case Study Iran shows that there exist a positive and significant long-term and short-term relationship between investment and export with GDP in 95% confidence level. This study used the vector error correction model as the method period 1991 until 2008.

According to Sojodi, et al. (2012) the research that used ARDL Method indicated the transportation facilities distinctively length of railway. Roadway, and telecommunication infrastructure (fixed phone line) have positive and significant impact on economic growth.

Study from Wibowo (2016) explains that the road infrastructure has no significant impact on economic growth in Indonesia period 2006 until 2013. On the other hand, electricity, health, and education has positive significant impact on economic growth in Indonesia.

The development of infrastructure in a country is a major influence on economic growth in a country (macro and micro) and the development of a country. However, it is not easy to apply in Indonesia. Moreover, since the 1997 crisis which eventually widened into a multidimensional crisis impact can still be felt today (Haris, 2005).

The other study finds that foreign direct investment has significant impact on gross domestic product in Indonesia and vice versa. This study shows that there is two way relationship between FDI and GDP. This study used Engle Granger (EG-ECM) based on the theorem of granger's representation (Wuryaningsih, Setyowati, & Kuswati, 2008).

Research from Kasidi and Mwakanemeda (2013) investigated that inflation has a negative impact on economic growth in Tanzania. There was no co-integration between inflation and economic growth during the period 1990 until 2011. In addition, no long-run relationship between inflation and economic growth in Tanzania. This research used regression equation as the method.

Study from Acyumida and Eko (2013) employs that the Granger Causality of GDP has no causality relationship on inflation. On the contrary, there is a causality relationship between Inflation on GDP in Indonesia period 2000 until 2013.

Finally, from the result of Izuchukwu and Patricia (2015) noted in their study about the Impact of Inflation on Economic Growth in Nigeria period 2000 until 2009 that the inflation has a significant impact on economic growth in Nigeria. In addition, exchange rate has a positive impact on economic growth and that high interest rate discourages investment and hence forestalls economic growth.

Hypotheses

On the paragraph below are the hypotheses based on the previous study and theoretical framework:

1) Foreign Direct Investment has a significant and positive impact on economic growth in Indonesia both in long-run and short-run.
2) Export has a significant and positive impact on economic growth in Indonesia both in long-run and short-run.

3) Infrastructure has a significant and positive impact on economic growth in Indonesia both in long-run and short-run.
4) Inflation has a significant and negative impact on economic growth in Indonesia both in long-run and short-run.

RESEARCH METHODOLOGY

The study employed the quantitative approach by using secondary data from 1981 to 2014.Quantitative method is a method that stems from numerical data to be processed into information. So that the quantitative method is a method that is numeric and statistical analysis and then processed into information (Kuncoro, 2003).

Variables that are used namely Foreign Direct Investment (FDI), Export, Infrastructure (Road Length), and Inflation Rate, in which economic growth represented by Gross Domestic Product (GDP).Data collection technique that is used in this study was a non-participant observer, where researchers only looked at data that is already available without become part of a data system.

The analysis method in this research is Error Correction Model (ECM). By using descriptive quantitative approach, error correction model is used to determine the effect of independent variables on the dependent variable in the long term and short term. The steps to be performed first before conducting the ecm step is Classical Assumption. This test use to determine whether it meets the assumptions BLUE or not, it needs to do some testing such as multicollinearity test, autocorrelation test, heteroscedasticity test and normality to ensure that the data are normally distributed. After performing the classical assumption test, the further step is dynamic test encompassing stationary test, integration test, co- integration test, and the last is performing the error correction model. This research will be run by using E-views 4.

RESULT AND ANALYSIS

Classical Assumption Test

1. **Autocorrelation Test.**

   In this study, to determine whether there is autocorrelation in a model or not, then it will be used the Lagrange Multiplier test (LM test). This test useful to determine there is a correlation between the independent variable with the disturbance variable. If the *Obs*R-Squared*value less than the table value, so there is no autocorrelation in the model. Besides that, the autocorrelation can be seen by the *chi-squares* probability value. If the probability value is more than the value of α = 10%, it is safe to say that; there is no autocorrelation problem (Basuki & Yuliadi, 2014). Based on the result, LM test in short term with the smallest Akaike value on the first lag can be seen that the probability value of *Obs*R-Squared* is 0.113302. Because the probability value of the *Obs*R-Squared* is more than α = 10%, so there is no autocorrelation problem in the Error Correction Model.

2. **Normality Test.**

   The aims of normality test is to know the variable normally distributed or not. This test can be done through *Jarque-Berra* test (J-B test). If the J-B test is more than α = 10%, so it shows that the datanormally distributed. But, if the J-B test is less than α = 10%, so the data is not normally distributed.Based on the result, the *p- value* of J-B test is 0.533376. The result shows that the p- value is more than α = 10%, so it means that the data in the Error Correction Model is normally distributed.

3. **Heteroskedasticity Test**

Heteroskedasticity is one of the regression problems which becomes the factor of disturbance has no similar variant. In other word, there is no consistency in its variant. It means that the *heteroskedasticity* has no similar variant for all the research. Because the *heteroskedasticity* problem, the result will be bias. In this research, the heteroskedasticity will be tested by the *White Heteroskedasticity* (cross term) test. If the probability of *Obs*R-Squared* is smaller than the critical value of α = 10%; so that, there is *heteroskedasticity* occurred in the Error Correction Model. But, if the probability *Obs*R-Squared* is more than the critical value of α = 10%; so that, there is no *heteroskedasticity* occurred in the model. Based on the result, the probability of *Obs*R-Squared* in Error Correction Model is 0.216175. The probability of the *Obs*R-Squared* is more than α = 10%. It can be concluded that there is no *heteroskedasticity* problem in Error Correction Model.

4. **Multicollinearity Test.**

Multicollinearity is useful to test the regression model whether it has correlation among independent variables or not. Multicolinearity can be detected by seeing the coefficient value of independent variables in the matrix result. If the value of coefficient is less than 0.8, it means there is multicolinearity problem in the variables. But, if the coefficient value is less than the 0.8, it can be concluded that there is multicollinearity problem in the variables. It can be conclude from the result that, the correlation among two independent variables is less than 0.8. It means that there is no multicollinearity problem in the regression model.

Dynamic Assumption Test

1. **Stationary Test**

Stationary test is the first step in dynamic assumption test before estimating time series data. If the estimation is not stationary, it will cause the spurious regression and the model cannot be used.

The concept that used to test the stationary is a unit root test. A variable is said to be stationary if the average value and variance constant over time and the value of the covariance between the two time periods only depending on the difference or interval between the two time periods is not the actual time when the covariance is calculated (Gujarati, 2003).

This study will be used Augmented Dickey-Fuller test to determine whether a time series data contains the root unit or non-stationary. If the ADF t-statistic value is more than the critical value, so that the variable has a unit root, then it can be said that the variable is stationary in the certain level. In the contrary, if the ADF t-statistic is less than the critical value, so that the variable has no a unit root, then it can conclude that the variable is non-stationary.

Unit root test can be tested through each variable that will be analyzed either dependent variable or independent variables. This can be seen by the table below:

TABLE 1. The Unit Root Test Result in Level Degree by *Augmented Dickey-Fuller Test* Method

Variable	ADF	Critical Value			Note
	T-Statistic	1%	5%	10%	
LOG(GDP)					Non Stationary
	0.173178	-3.646342	-2.954021	-2.615817	
LOG(FDI)					Non Stationary
	-2.488691	-3.646342	-2.954021	-2.615817	
LOG(EX)					Non Stationary
	0.527809	-3.646342	-2.954021	-2.615817	
LOG(INFR)					Non Stationary
	-3.169615	-3.646342	-2.954021	-2.615817	
INFL					Stationary
	-4.792234	-3.646342	-2.954021	-2.615817	

The result shows the unit root test through the Augmented Dickey-Fuller (ADF) test method. The result shows that there is only one variable which is stationary in level degree, and the rest variables are non-stationary in this degree because the ADF t-statistic is less than the critical value.

If the data is not stationary in level degree, so that the data cannot be used in the model, because it will cause of the spurious regression. In conclusion, in order to get the stationary variables, it is urgent to do the unit root test in the first difference degree.

2. Integration Degree Test.

The integration test is a continuation of the unit root test, if the data is not stationary in the level degree. So that, the unit root test will be tested into first difference degree. The integration degree test will be used the Augmented Dickey-fuller method. But if the data is not stationary in first difference degree, so that it will continue into second difference, until the data is stationary. Then, the result of the unit root test in first difference degree can be seen from the following table:

TABLE 2. The Unit Root Test Result in First Difference Degree by *Augmented Dickey-FullerTest* Method

Variable	ADF	Critical Value			Note
	T-Statistic	1%	5%	10%	
LOG(GDP)					Stationary
	-5.639789	-3.65373	-2.95711	-2.617434	
LOG(FDI)					Stationary
	-8.162684	-3.65373	-2.95711	-2.617434	
LOG(EX)					Stationary
	-5.368711	-3.65373	-2.95711	-2.617434	
LOG(INFR)					Stationary
	-4.741483	-3.65373	-2.95711	-2.617434	
INFL					Stationary
	-6.970533	-3.661661	-2.960411	-2.619160	

The result shows that the unit root test result in the first difference degree by the ADF test. The result shows that the all variables are already stationary in first difference degree, including foreign direct investment, net export, infrastructure, and inflation rate. All in all, based on the ADF test, the data that is used in this research integrated in the first difference degree.

3. Co-integration test.

Co-integration test is the next procedure that should be passed after the integration degree test. In this test, there will be a test of time series data validation through co-integration test. Co-integration test is required to provide an early indication that the model has a long-term relationship in this study.

The method that is used in the co-integration test is the Engle-granger (EG). The co-integration test can be done, if the all variables integrated in the same degree. The first step of the co-integration test is by doing the regression of the ordinary least square equation between dependent variable and independent variables. The result from the co-integration test is that we can obtained the residual. The regression equation is as follow:

$$LOG(GDP) = \beta_0 + \beta_1\, LOG(FDI) + \beta_2 LOG(EX) - \beta_3 LOG(INFR) - \beta_4 INFL + e$$

The result of the Eagel-Granger co-integration test is as follow:

$$LOG(GDP) = \beta_0 + \beta_1\, LOG(FDI) + \beta_2 LOG(EX) - \beta_3 LOG(INFR) - \beta_4 INFL + e$$

$$LOG(GDP) = 2.162427 + 0.028365\, LOG(FDI) + 1.053247\, LOG(EX) - 0.223223 LOG(INFR) - 0.010121\, INFL$$

TABLE 3. The Result of Co-integration Test in Long Term

Variable	Coefficient	Standard Error	Probability
C	2.162427	0.700476	0.0044
LOG(FDI)	0.028365	0.006596	0.0002
LOG(EX)	1.053247	0.087556	0.0000
LOG(INFR)	-0.223223	0.149462	0.1461
INFL	-0.010121	0.002681	0.0007
R-squared	0.980389		
Adjusted R-squared	0.977684		
Durbin-Watson stat	1.122951		
F-statistic	362.4409		
Prob(F-statistic)	0.000000		

Based on the result above, the variable of FDI, export, and inflation rate give the significant result on GDP (economic growth) at level 10%. Meanwhile, the infrastructure variable is not significant. The determination coefficient (R-squared) is 0.980389 which means the endogen variable can be explained in linear way by the independent variables in the

equation for about 98% and the remaining which is 2% can be explained with the other factors outside equation.

From the regression equation, then it will be estimated the residual variable, as explain below:

$ect =$ LOG(GDP) = β_0+$\beta_1 LOG(FDI)$ + $\beta_2 LOG(EX)$ + $\beta_3 LOG(INFR)$ + $\beta_4 INFL$ +e

If the residual variable is already obtained, it will be followed by testing it. The test aims to observe whether the variable is stationary or not. Form the result of data processing can be seen as follow:

TABLE 4. The Unit Root Test Result toward the Residual Long Term Equation

Variable	ADF	MacKinnon Critical Value			Prob.	Note
	T-statistic	1%	5%	10%		
Ect	-4.512906	-3.6463	-2.954	-2.6158	0.0010	Stasionary

Based on the result above, the variable passed because of the probability is lower than critical value 1%, 5%, 10% which is 0.0010. Thus, it proofs that the co-integration occurs in the model, so that Error Correction Model can be performed. And it also means that the stability occurs in the variable of this research.

4. Error Correction Model Test.

The next step is to create the Error Correction Model (ECM) equation. The equation that will be formulated by this following equation:

$\Delta LOG(GDP) = \Delta\beta_0 + \Delta\beta_1 LOG(FDI) + \Delta\beta_2 LOG(EX) + \Delta\beta_3 LOG(INFR) + \beta_4 INFL + \Delta\beta_5 ECT - 1 + e$

Information:

LOG(GDP) = Gross Domestic Product (reps of economic growth)
LOG(FDI) = Foreign Direct Investment
LOG(EX) = Export
LOG(INFR) = Infrastructure (in KM^2)
INFL = Inflation rate
ECT-1 = Residual Equation

The equation is formulated based on the variable which is stationary in first difference degree that is being showed as Δ notation. The Error Correction model aims to determine the short term model of Economic Growth (GDP). By using the ECM, it can combine the short term effect and long term effect that is caused by the fluctuation and time lag from each variable. Based on the ECM result, then it will obtain the following result:

TABLE 5. The Result of Error Correction Model Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.034813	0.023264	1.496471	0.1461
D(LOG(FDI))	0.012275	0.004883	2.513597	0.0182
D(LOG(EX))	0.557367	0.112073	4.973265	0.0000
D(LOG(INFR))	-0.052909	0.373788	-0.141547	0.8885
D(INFL)	-0.011567	0.00131	-8.830922	0.0000
ECT(-1)	-0.417701	0.137322	-3.041768	0.0052
R-squared	0.855998	Mean dependent var		0.071001
Adjusted R-squared	0.829331	S.D. dependent var		0.193346
S.E. of regression	0.079875	Akaike info criterion		-2.053732
Sum squared resid	0.172262	Schwarz criterion		-1.781640
Log likelihood	39.88658	F-statistic		32.09946
Durbin-Watson stat	1.456933	Prob(F-statistic)		0.000000

The equation from error correction model can be seen as follow:

$$\Delta LOG(GDP) = \Delta\beta_0 + \Delta\beta_1 LOG(FDI) + \Delta\beta_2 LOG(EX) - \Delta\beta_3 LOG(INFR) - INFL - \Delta\beta_5 ECT - 1 + e$$

$$\Delta LOG(GDP) = 0.034813 + 0.012275 LOG(FDI) + 0.55736 LOG(EX) - 0.052909 LOG(INFR) - 0.011567 INFL - 0.417701 ECT(-1) + e$$

The result shows the dynamic model of gross domestic product in short term, where the variable of gross domestic product as the denotation of economic growth is not only influence by FDI, export, infrastructure, and inflation rate but also influence by the error correction term (ECT) variable. The less value of ECT the faster of correction process through the long run equilibrium. Besides that, the error correction term variable is also said as the factor of inaction which has a value less than zero (ECT<0). In this research the value of ECT is less than zero. The coefficient of ECT reach -0.417701 which means the gross domestic product higher than its long term value.

Based on the calculation above through error correction model, the constant value about 0.034813 which means that if all the variables are constant, so that the gross domestic product or the economic growth is about 0.034813 %. Then, the estimation result in long term shows that the value of R-squared is 0.855998 which means 85.59% of GDP(economic growth) model can be explained by these variables, namely: FDI, export, infrastructure (in KM^2), and inflation rate. Meanwhile, 14.41% of the model can be explained by the other factors outside the model.

CONCLUSION

Based on the research and data analysis, the result from regression model by using Error Correction Model aims to measure the relationship among foreign direct investment, export, infrastructure, and inflation on economic growth which is represented by gross domestic product in Indonesia.

As one of the alternatives financing in Indonesia, based on the result, FDI has positive and significant influence on the economic growth in Indonesia, whether in short or long run which is relevant with the research done by Mofrad (2012). The capitalization is a media to pool the saving and investment to be allocated to the more productive, such as the land opening that lead to the more job opportunities. In the end it will stimulate the economic growth. In order to increase the FDI, government should evaluate the policy performance to ease the bureaucracy for the foreign companies. The government should also keep the decent condition in order to have stabile foreign investment in this country.

The export has positive and significant influence in short and long run. It also becomes the highest contributor for the economy. This result is relevant with a number of researches such as Pranoto (2016), Koojaroenprasit (2012) and Mofrad (2012). According to Pranoto (2012), with the high export, it helps to maintenance the trade balance and add more state budget to be used as the capital in the economic development that results in economic growth. Export has an important role in the economic growth in Indonesia, because it is one of the variables in the spending aggregate equation. Government has to keep and to protect the goods made within the country. From time to time, there are a number of foreign goods invade the country. The protection should be done to keep the positive influence on the export value.

Infrastructure variable that is represented by road length has no significant and negative influence on the economic growth in Indonesia in short run and long run which is relevant with the research from Wibowo (2016). It can be causes that this variable is not the principal variable on the economic growth nationally. It is estimated that there is the decreasing quality on the road in Indonesia. That leads to the negative sign of the coefficient in short run, it also caused, by the huge capital from government that is used for establishing the road. Despite having a negative relationship, but the relationship between the length of road infrastructure and the Indonesian economic growth (GDP) is not significant it is proved that the budgetary resources for the length of road infrastructure in Indonesia is not only derived from the GDP, but also from other sources such as investments. Infrastructure is an important thing in Indonesia economy, because it eases the distribution from one region to another. From the finding, the government is hoping to allocate the budget efficiently in order to avoid mistakes. With the road development in Indonesia, the maintenance should be performed as well as the pivot in doing the economic activities.

Inflation has significant and negative influence on the economic growth both for short and long run. The negative value might be caused by the decreasing of economic growth that results in the decreasing of income and it hampers the economic growth in Indonesia. This result is relevant with the research Kasidi and Mwakenda (2013) that inflation has negative and significant influence on economic growth. With the inflation problem, it is a need to have a precise decision from Central Bank (BI) as a monetary decision maker. It needs an appropriate strategy to anticipate the inflation rate which is the Inflation Targeting Framework (ITF).The government should do strict action on deciding which instrument to be used, either base money or the interest rate, to keep the price stabile.

REFERENCES

Acyumida, D., & Eko, U. (2013). Analisis Hubungan Antara Inflasi dan Pertumbuhan Ekonomi Menggunakan Pendekatan Kointegrasi dan Kasualitas Granger Pada Periode 2000-2012.

Adisasmita, R. (2013). *Teori-Teori Pembangunan konomi Pertumbuhan Ekonomi dan Pertumbuhan Wilayah.* Yogyakarta: Graha Ilmu.

Agma, S. F. (n.d.). Peranan Foreign Direct Investment terhadap Pertumbuhan Ekonomi Indonesia.

Basuki, A. T. (2017). *Ekonometrika dan Aplikasi dalam Ekonomi (Dilengkapi Aplikasi EVIEWS 7).* Yogyakarta.

Basuki, A. T., & Yuliadi, I. (2014). *Elektronik Data Prosesing (SPSS 15 dan EVIEWS 7).*

Berg, H. V. (2001). *Economic Growth and Development.* McGraw-Hill Higher Education.

Boediono, D. (1982). *Teori Pertumbuhan Ekonomi.* BPFE Yogyakarta.

Greenwald, D. (1998). *Encyclopedia of Economic*. London: The MIT Press Cambridge.

Gujarati, D. (2003). *Ekonometri Dasar.* Jakarta: Erlangga.

Haris, A. (2005). PENGARUH PENATAGUNAAN TANAH TERHADAP KEBERHASILAN PEMBANGUNAN INFRASTRUKTUR DAN EKONOMI.

Irsania, D. V., & Noveria, A. (2014). The Relationship among Foreign Direct Investment, Inflation Rate, Unemployement Rate, and Exchange Rate to Economic Growth in Indonesia. *Journal of Business and Management*.

Izuchukwu, D., & Patricia, N. (2015, June). Impact of Inflation on Economic Growth in Nigeria (2000-2009). *International Journal of Business and Management Review*.

Jones, H. G. (1975). *An Introduction to Modern Theories of Economic Growth.* Great Britain: Thomas Nelson and Sons, Ltd.

Kasidi, F., & Mwakanemeda, K. (2013). The Impact of Inflation on Economic Growth: A Case study of Tanzania. *Asian Journal of Empirical Research* .

Koojaroenprasit, S. (2012, November). The Impact of FDI on Economic Growth: A Case Study of South Koreaa. *International Journal of Business and Social Science, 3*.

Kuncoro, M. (2003). *Metode Riset Untuk Bisnis dan Ekonomi.* Jakarta: Erlangga.

Mankiw, G. (2003). *Teori Makroekonomi.*

Mankiw, G. N. (2006). *Pengantar Ekonomi Makro-Edisi Tiga.* Jakarta: Salemba Empat.

Maryaningsih, N., Hermansyah, O., & Savitri, M. (2014, July). Pengaruh Infrastruktur terhadap Pertumbuhan Ekonomi Indonesia. *Buletin Ekonomi Moneter dan Perbankan, 14*.

Meier, G. M. (1989). *Leadding Issues in Economic Development.* Cambridge: Oxford University Press.

Mofrad, M. A. (2012). The Relationship between GDP, Export, and Investment: Case Study IRAN. *Business Intelligence Journal*.

Pranoto, O. S. (2016, February). Pengaruh Ekspor dan Foreign Direct Investment terhadap Pertumbuhan Domestik Bruto Indonesia. *Jurnal JIBEKA.*

Sojodi, S., Mohsoni, F., & Mehin, N. (2012). The Role of Infrastructure in Promoting Economic Growth in IRAN. *Iranian Economic Review*.

Sukirno, S. (2002). *Makroekonomi Modern: Perkembangan Pemikiran dari Klasik Hingga Keynesian Baru.* Jakarta: Raja Grafindo Persada.

Sukirno, S. (2013). *Makroekonomi Teori Pengantar.* Jakarta: Rajawali pers.

Sutawijaya, A., & Zulfahmi. (2010, March). PENGARUH EKSPOR DAN INVESTASI TERHADAP PERTUMBUHAN EKONOMI INDONESIA TAHUN 1980-2006. *Jurnal Organisasi dan Manajemen, 6*.

Tambunan, T. (2010). Socio-Economic Impacts of the Global Economic Crisis: The Indonesian Story. *Afro Asian Journal of Social Sciences*, 1.

Wibowo, A. B. (2016). Pengaruh Infrastruktur Ekonomi dan Sosial Terhadap Pertumbuhan Ekonomi Indonesia. *Skripsi*.

Wuryaningsih, Setyowati, E., & Kuswati, R. (2008, April). KAUSALITAS INVESTASI ASING TERHADAP PERTUMBUHAN EKONOMI: Error Correction Model. *9*.

Yoshino, N., & Nakahigashi, M. (2000). The Role of Infrastructure in Economic.