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The Cointegration Analysis of the Relationships between Foreign Direct Investment Inflow and Gross Domestic Product in Indonesia

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Abstract
This research aims to analyze a long run relationship between Foreign Direct Investment (FDI) inflow and Gross Domestic Product (GDP) in Indonesian economic since 1981 until 2012. The analysis method used is Cointegration Test by using Johansen and Granger Causality Test Model. The result suggests that both variables do not have the same trend in Indonesian economy since 1981-2012. The GDP has increased more slowly, although FDI flow has fluctuated progress in Indonesia. In the long run, there isn't any relationship between FDI flow and GDP in Indonesia. But in the short run, GDP causes FDI flow in Indonesia during 1981-2012.
Keywords: Foreign Direct Investment, Gross Domestic Product, Cointegration Method, Granger Causality

1.Introduction

The progress of a nation can not be separated from the role of investment. Investment could theoretically push the economic growth of a country. In this perspective, the investment is considered to be something to fill the gap between the ability of the budget / fund in the country with the size of the budget for the purpose of financing the construction activities. In this case, according to the thought of Harrod Domar, a country's economic growth will be influenced by capital and labor. The capital can play a role in the formation of economic capital required to improve a country's economic development.

However, not all countries have the ability to fund the entire project development by relying on domestic economic resources. In this case, the developing countries would be stuck in a situation of capital shortage due to the low level of private savings. The low private savings is caused by the income levels which are still low, so it makes the society just have enough income to meet their daily needs alone. As a result, it will lead to a saving investment gap in the economy. This condition can certainly hamper the country's efforts to catch up economically with other countries that are more developed.

The economic condition of developing countries normally is lower in the provision of domestic capital but has considerable economic potential. The potential can be in the form of abundant natural resources and a high population growth. Both factors can be the economic potential to be a main attraction for investors of other countries to invest their funds in developing countries. In this case, the role of multinational corporations (MNCs) in developing countries, including in Indonesia is very important and full of purely economic interests. Furthermore, the availability of natural resources (raw materials) for industry in developed countries can be provided by the emerging economies. By building a plant in Indonesia, the foreign companies can save their production cost. This condition is also exacerbated by the fact that, a large population, indicating a broad market availability for commodities produced by MNCs companies.

The condition of the national economy during the period of 1981 to 2012 was marked by a series of phenomena. One of the most interesting economic phenomena is the economic crisis in many developed countries. Even a superpower like the USA that is known for its economic strength, may be stuck in the fiscal Clift when the USA was not able to manage their economies well. Other countries in Europe are also stuck in the economic crisis, which in turn also affects the security budget in each country. In the external environment in such a way, then inevitably the national economy will also face heavy pressure. In this case the weakening of foreign markets and the depreciation of the U.S. dollar as the currency used to transact internationally may impact on the international balance of payments instability in Indonesia.

International economic conditions which are fluctuated significantly affect the flow of FDI in Indonesia. FDI in Indonesia may be embodied in various forms of business managed by MNCs companies. The MNCs companies are subsidiary company incorporated outside the country with particular consideration, both related to the availability of raw materials and the number of people in the recipient country of FDI. The economic crisis which happens overseas has an impact on the behavior and expectations of foreign investors in investing efforts in Indonesia. The investors will conduct a recount of the business plan and budget in order to adjust to the new situation that developed in the economy. In such situations, the Indonesian economy showed its performance by increasing the value of GDP in the year of 1981 to 2012. The increase in GDP reflects the increase in capacity resulting output by production inputs available in the national economy. Meanwhile, the existing inputs can be used through a combination of economic resources so as to provide benefits in the wider economy. In this case, it can be explained theoretically that the flow of FDI can contribute an increasingly large in sustaining economic growth of a country. Based on this explanation, this article will discuss the relationship between FDI flows and GDP in Indonesia in the period of 1981-2012.

2.Literatur Riview

The inability of a country to increase the availability of domestic capital to finance economic development, there are many countries expect capital inflows. The capital inflow of the country involves the host country and a home country. Capital inflows can be categorized in the form of foreign investment / Foreign Direct Investment (FDI). FDI according to Casson (1982) built on the basis of the theory of integration, namely; international capital market theory, theory of the firm, and international trade theory. The third theory is integrated in the form of FDI theory that can explain in various things related to the flow of foreign capital into the country. In the context of today's modern economy, FDI flows can be expressed in terms of market penetration by multinational companies / MNCs. The flow of FDI through MNCs role is expected to provide spillover effect and the multiplier effect on the economy of the home country of FDI.

In this case the idea of FDI starts from a premise that capital ((ie, a production factor) is very important in a country's economic growth. In its development, there is a movement of capital across the countries. FDI flow in this case will move from capital abundant countries (where its return was low) towards capital scarce countries (where its return was high). This kind of thought is explicitly explained by Mundell (1957) and MacDougall (1960).

On the empirical perspectives, there are ambiguitas about relationship between FDI and economic growth. According to Eller,et.al. (2005) FDI as an important element in the solution to the problem of scarce local capital and overall low productivity in many developing countries. In this case flow of the foreign direct capital is argued to be a potential growth-enhancing player in the receiving country. But, on the empirical investigation, Carkovic and Levine (2002) show that there is no robust impact from FDI on growth if country-specific level differences, endogeneity of FDI inflows and convergence effects are taken into account. Empirical analysis by Chien and Zhang (2012) found that there is a strong bidirectional relationship between FDI and GDP in Vietnam. Research by Ekanayake and Ledgerwood (2010) indicated that FDI has positive and significant effect on economic growth in 85 developing countries covering Asia, Africa, and Latin America and the Caribbean for the period 1980-2007.

The empirical study by Khattak, et.al (2012) indicates that there is a short as well as long run relationship found between foreign direct investment and gross domestic product growth rate. The results also indicate that there is Uni-directional relationship (not Bi-directional) between foreign direct investment and gross domestic product in Pakistan which means FDI caused economic output in Pakistan. On the other result, according to Hansen and Rand (2006) FDI is found to have a lasting impact on the level of GDP, while GDP has no long run impact on the FDI/GDP ratio.

Hossain and Hossain (2012) suggest that there is no co-integration between FDI and GDP in the both long and short run in Bangladesh and India. However, he find the co-integration between them in the both short and long run in Pakistan. Conversely, the results also suggest that there is no causality relationship between GDP and FDI for Bangladesh and one way or unidirectional relationship found for Pakistan and India, which means FDI caused economic output in Pakistan. On the empirical study by Chowdur and Mavratos (2003) show that GDP causes FDI in the case of Chile and not vice versa, while for both Malaysia and Thailand, there is a strong evidence of a bi-directional causality between the two variables for 1969-2000.

3.Methodology

This research design is a quantitative research. This approach can be translated into a variety of narrative and presentation of data in the form of figures into the exposure of data analysis. Data collection technique consists of documents analysis in form of secondary data collection techniques that are performed by verifying the data, records, and data recording of relevant data sources. Meanwhile, the variables used in this study are the flow of FDI and GDP in Indonesia in the period of 1981-2012. While the source data from World Bank.

The stages in the analysis of the data include:

a. Stationary Data Test by using ADF test

The Dickey-Fuller test is used to determine if a variable is stationary. To overcome the problem of autocorrelation in the basic DF test, the test can be augmented by adding various lagged dependent variables. This would produce the following test:

$$\Delta y_t = (\rho - 1) y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta y_{t-i} + u_t$$

b. Cointegration Test by Using Johansen Method

$$\lambda_{Trace}(r) = -T \sum_{i=r+1}^{g} in(1-\hat{\lambda}_i)$$

$$\lambda_{Max}(r, r+1) = -T \ln(1-\hat{\lambda}_{r+1})$$

In which $\hat{\lambda}_i$ is the estimated value for the ith ordered Eigen value from the π matrix. The standard approach to the Johansen ML procedure is to first calculate the Trace and Maximum Eigen value statistics, then compare these to the appropriate critical values.

c. Granger Causality Test

$\Delta FDI_t = \alpha_1 + \sum\beta_{1i}\Delta FDI_{t-1} + \sum\theta_{1i}\Delta GDP_{t-1} + \varepsilon_{1t}$

$\Delta GDPt = \alpha_1 + \sum\beta_{1i}\Delta GDP_{t-1} + \sum\theta_{1i}\Delta FDI_{t-1} + \varepsilon_{1t}$

4. Result and Discussion

The analysis result of the application shows that the FDI data and GDP in Indonesia during 1981-2012 has stationery data on the level and first difference.

Table 1. The Result of Stationary Data Test

Variable	Level		First Difference	
	ADF Test	Critical Value (1%)	ADF Test	Critical Value (1%)
FDI	**0.521**	**-2.642**	**-4.577**	**-2.645**
GDP	**3.147**	**-2.642**		

Based on the above table, it can be concluded that the data in this study is stationary at different degrees. Data on FDI have stationary degree one, first difference (d (I)). Meanwhile, the GDP data have stationary at zero degrees (d (0)). Therefore, the data used in this study have a tendency for long-term relationships. Stationary or not, the data can be compared to the value of the ADF test with its critical value. If the test of stationary data by using the method of Dickey Fuller (ADF test) is larger than its critical value, then the data can be inferred stationary.

To test the long-term relationship between the variables studied, the cointegration test using the Johansen method. The results are as follows:

Table 2. Results of Johansen Cointegration Test Method

Ho:r	Eigen value (λ_i)	Trace Statistic	λ_{trace} (95%)	Probability
0	0.451565	23.79083	25.87211	0,088
1*	0.153597	5.169555	12.51798	0,572

Based on the above results, it indicates that the absence of one cointegration vector, or there is no linear combination of independent variables included in the model. It can be proven statistically that the trace statistic value is less than the critical value at α = 5% (compare statistical values in column 3 and 4 lines to 2). As a consequence, the main hypothesis is that states receive no cointegration relationship for the variables studied. In other words the variables studied did not show any long-term equilibrium relationship.

To determine whether there is a causal relationship between FDI and GDP, it can be tested by using the method of Granger Causality Test. The results are:

Table 3. Results of Granger Causality Test

Variable	Observation	F statistic	Probability
FDI does not Granger Cause GDP	30	0.28557	0.75400
GDP does not Granger Cause FDI		3.17776	0.05893

This implies that FDI does not cause GDP in Indonesia for 1981-2012. It is a simply a case of conducting an F test to establish the null hypotheses. Remember that the fact that meanwhile FDI does not granger-cause GDP doesn't necessarily imply that GDP is independent of FDI. Granger causality only refers to the capacity of FDI to forecast GDP. If we reject granger-causality tests between FDI and GDP, it just means that lead-lags of FDI could not be used to properly forecast GDP. Besides that, based on granger causality test, this research implies that the GDP causes FDI flow in Indonesia for 1981-2012.

The above results provide an explanation that the flow of FDI in Indonesia during that period have a tendency of not having a long-term relationship with the Indonesian GDP. In this case, although the flow of FDI can theoretically have an effect on the economy of a country, but the dynamics of the FDI flows that occur rapidly can cause instability in the national economy. In the context of causality, in fact what happens is that Indonesia's GDP can provide a causal relationship with FDI inflows in Indonesia. In other words, GDP growth in the previous period can make a forecast of the FDI flows that occurred in Indonesia. So that Indonesia's GDP may have the capacity to carry the flow forecast FDI to Indonesia.

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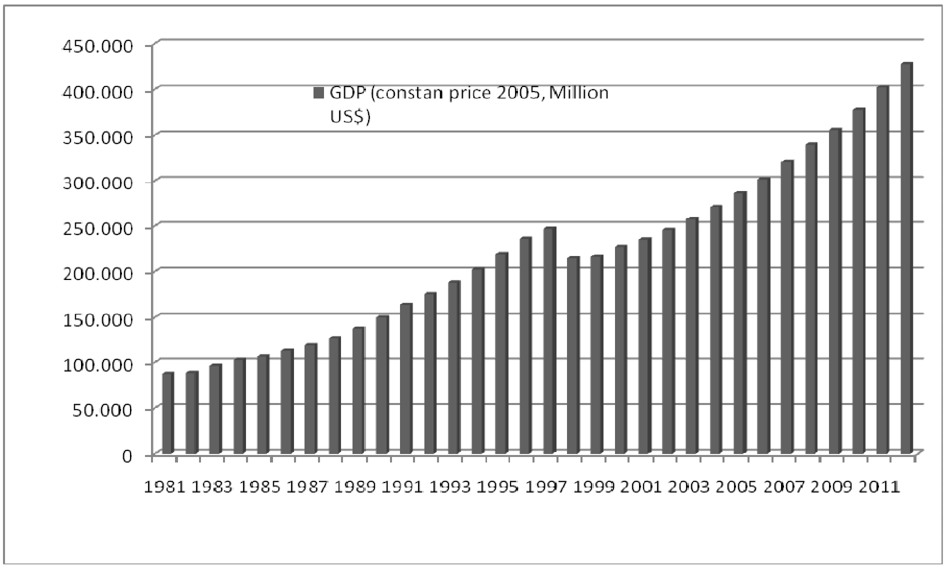
As an illustration of the dynamics that occur in the national economy during the period 1981-2012, it is showed a fluctuation in achieving economic stability. It happens because the national economy today has integrated empirically with the overseas economies, both regionally in the ASEAN region as well as internationally. As a result, there is an external shock that occur outside the country in the form of economic and financial crises in other countries which will be able to have an impact on the contagion effect of the domestic economy. The economic crisis experience in 1997 has provided a lesson for Indonesia in managing the economy affected by the economic crisis.

On the other hand, it can also be seen that the Indonesia is very active in various economic cooperation. Various economic cooperation agreements in various areas have been followed for long time and implemented by Indonesia. Various forms of economic cooperation in organizations such as the World Trade Organization (WTO), Asia Pacific Economic Cooperation (APEC), the ASEAN Free Trade Area (AFTA), and also the Asean Economic Community (AEC). Economic implications of this international collaboration can impact on strengthening the capacity of the domestic economy in the constellation of growing economy.

The instability of the world economy marked by the economic crisis that occurred in 2008 in developed countries gradually has an impact on the Indonesian economy. This impact can be seen from weakening growth in the aggregate on the main Indonesian exports abroad. Weakening economies of Indonesian exports significantly impact the performance of Indonesia's foreign trade. As an illustration, the value of Indonesian exports in January 2009 reached U.S. $ 7.15 billion, down 17.70 percent compared to December 2008. Meanwhile, if we compare to January 2008, it was also declined by 36.08 per cent. While the value of non-oil exports in January 2009 reached U.S. $ 6.21 billion, down 16.67 percent compared to December 2008, down 30.64 percent compared to January 2008 (BPS, 2010).

However, slowing performance in the foreign trade sector can be overcome with the performance of other sectors, such as consumption sector and corporate finance sectors. Consumption sector is still a mainstay in the national economic growth in some periods of development. This is understandable because Indonesia is a country with a large population like India and China. Strength of aspects of this population can form a component of consumer demand has a major contribution in the formation of Indonesia's GDP. As an illustration, in 2009 the share of individual consumption (private consumption) is based on the market price (market price) in Indonesia amounted to 58.6%. While the country's consumption expenditure by 9.6% (Asian Development Bank, 2010). Corporate finance sector also showed considerable value, which in 2009 contributed in building the financial sector in the country by value of its investment portfolio reached U.S. $ 10.104 million. This condition can certainly have an impact on the strengthening of economic activity, which in turn can increase the GDP of Indonesia.

As an illustration of the development of Indonesia's GDP in the period 1981 – 2012, it can be seen in the following table:

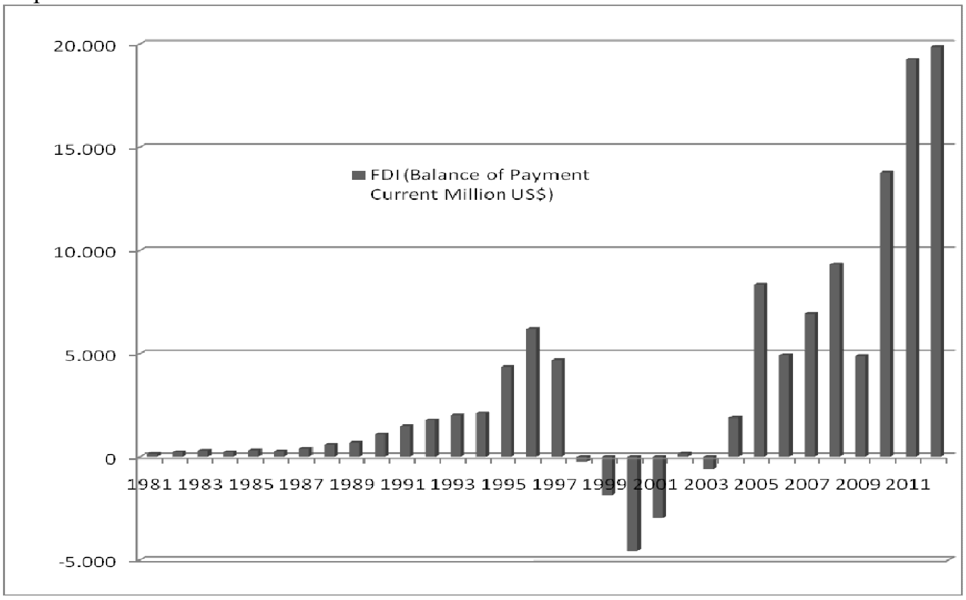


Source: World Bank, 2012

Figure 1.The Development GDP in Indonesia (Million US$)

In the period of 1981 to 2012, it showed an increase in the value of GDP. In 1981 the value of Indonesia's GDP reached US. $ 87,475 million, while in 2012 increased to US. $ 427,483 million. However, the increase in the value of the GDP showed a slowdown in output achievement from year to year. As an illustration, in 2008 Indonesia's economic growth reached 6.0% in 2009 and dropped to 4.6%.

The achievement of the output in the form of GDP in Indonesia can not be separated from the dynamics of the capital flow to Indonesia. Posititive performance in the Indonesian economy on the form of GDP make foreign investor to invest in Indonesia. In this way, the flow of FDI to Indonesia has been grow fluctuate over period. The flow of capital in the form of FDI into Indonesia can be drawn below.



Source: World Bank, 2012

Figure 2.The flow of FDI in the Development of Indonesia (Million US$)

Based on the picture above, it shows that the development of FDI in Indonesia in the period 1981 to 2012 indicate the presence of fluctuations. On the value of FDI flows in Indonesia reached US$. 133 million, then in 1997 the number of FDI in Indonesia amounted to US$. 4,667 million. In 2002, FDI inflows to Indonesia plummeted to US$. 145 million. To the developments in 2012 FDI flows into Indonesia reached US. $ 19,853 million. Fluctuations in the flow of FDI into Indonesia this can occur because the flow of FDI is a representation of the behavior and expectations of foreign investors, global economic conditions, economic conditions and the condition of the home country FDI recipient country's economy FDI. The decision of foreign investors to invest abroad in the form of FDI (Foreign Direct Investment) in Indonesia is of course based on the interests of maximum profit. Indonesian economic condition though buffeted by many disturbances due to external conditions are not stable, still gives a lot of hope for foreign investors to stay invested in Indonesia. In this case because of the potential market is large enough and the provision of physical infrastructure investment has been done by the Government, the various incentives that can be seen as an appeal to invest in Indonesia.

In this case, the form of FDI flow in Indonesia is taken by many multinational companies (MNCs) from USA, Europe, Asia and ASEAN. Companies from many different countries expand its business in Indonesia, particularly in relation to proximity to market products in Indonesia. Nevertheless, overseas crisis that occurred in developed countries have a significant impact on the flow of FDI in Indonesia. The economic crisis, particularly in developed countries may have an impact on the ability of companies or individuals investing abroad in allocating funds in Indonesia.

Based on a presentation on the value of GDP and FDI in Indonesia in the period 1981-2012, it showed that there was no similar pattern in its development trend. GDP value of Indonesia in this period had a tendency to increase over time, despite experiencing a slight increase. Meanwhile, the flow of FDI in Indonesia has experienced fluctuations, particularly experienced its lowest growth in 2000 and 2001. In this case the FDI flows can spread to various regions in Indonesia and in various sectors (industrial, mining, farming, forestry, agriculture, banking and finance).

This result suggest that the relationship between FDI flow with GDP in Indonesian economy still ambiguity. This research support the empirical study by Hossain and Hossain (2012) that suggest that there is no co-integration between FDI and GDP in the both long and short run in Bangladesh and India. Besides that this research also support the empirical study by Chowdur and Mavratos (2003) that conclude GDP causes FDI in the case of Chile for 1969-2000. This result have implication that good performance on the economy reflected by increasing GDP have relationhip with FDI flow to developing country. The goverment must design economic policy in order to increase economic activity. Besides that the government must facilitate the economic agent to invest in Indonesia by more insentif.

Conclusion

Based on the above results, it can be concluded that the flow of FDI and GDP in Indonesia do not have a long-term relationship in the period 1981-2012. Beside, this study also showed that Indonesia's GDP has a causal relationship with the flow of FDI in Indonesia. This suggests that FDI flows in Indonesia, its dynamics still see GDP growth in Indonesia. The higher the GDP of Indonesia, then it can provide a signal to the flow of FDI into Indonesia. Hence, the flow of FDI in Indonesia is heavily influenced by economic conditions in the various regions of the world. This occurs because the flow of FDI investors in understanding the behavior reflects a growing phenomenon, so the investment decision is expected to provide the maximum benefit.

Based on these results, it is appropriate to consider the expansion of government incentives for foreign investors who want to bring direct investment to Indonesia. Such incentives can be realized both in the form of provision of infrastructure and a conducive investment in the form of tax incentives and Administration licensing. Beside that, in order to improve the FDI flow to Indonesia, the government needs to maintain the stability of the domestic economy by involving local governments in an effort to simplify and speed up coordination in handling various matters related to the flow of FDI in Indonesia.

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