ANALYSIS OF THE EFFECT OF INFLATION, INTEREST RATE, AND GDP ON FOREIGN INVESTMENT IN INDONESIA, 1996 – 2020, THROUGH THE TAYLOR RULE APPROACH

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Abstract

Investment is a crucial factor in economic development, especially for developing countries such as Indonesia, one form of investment is in the form of foreign investment, many factors affect some of which are inflation, GDP and interest rates. This study aims to determine the influence of these factors through the Taylor rule approach. This research uses an ordinary least squares (OLS) analysis technique. Based on the results of the study found a significant and positive effect between inflation and gross domestic product, while interest rates have no significant and negative effect on foreign investment.

Keywords: Inflation, Interest Rate, Gross Domestic Product, PMA, Taylor Rule

INTRODUCTION

Investment is one of the pillars and crucial factors, especially in the field of development and economic growth of a country. Indonesia is one of the developing countries that utilizes investment, especially foreign investment, to be used as a source of development financing. Indonesia needs the role of foreign capital to support its economic growth. Therefore, investment, especially investors, is important to develop various economic sectors (Camenia Jamil & Restu Hayati, 2020).

The economy of a country depends on investment to solve several economic problems, crises and challenges. This is due to the fact that investing in certain sectors of the economy can quickly change the various economic challenges we face as a nation. One form of potential investment is foreign investment, especially foreign direct investment, which is an international flow of capital from companies in one country by establishing or expanding other companies in other countries and accompanied by transfer of technology and knowledge (Sasana & Fathoni, 2019).

Foreign investment is a business carried out by a foreign party in the context of investing in a country with the aim of making a profit through the creation of a production or service. (Letarisky, 2014). The definition of foreign investment or foreign direct investment according to the world trade organization (WTO) is an international flow of capital provided by investors from one country by acquiring assets in other countries with the aim of managing these assets. (Wang et al., 2022).

For Indonesia, foreign investment, especially foreign direct investment, has a major role in complementing domestic investment needs. Foreign direct investment increases production capabilities and becomes a medium for transferring knowledge and technology from abroad. In terms of production, technological improvements can increase the productivity of a company, the presence of foreign investment, especially foreign direct investment can also increase the competitiveness and quality of domestic products (Jufrida et al., 2017).

According (kairupan, 2013) Foreign investment is one of the strategic sources of foreign funding in supporting national development. Increased economic growth cannot be separated from the role of economic development. Economic development is able to increase the activities of producing goods and services in the economic sector. With the increase in the production process, it will encourage the creation of job opportunities and an increase in national income or income per capita of the community where national income is a proxy for economic growth. (Murwani, 2007) Indonesia has again shown positive economic growth and the Indonesian economy is starting to lead to a consistent increase in the economy every year. The following is the realization of foreign investment in Indonesia.

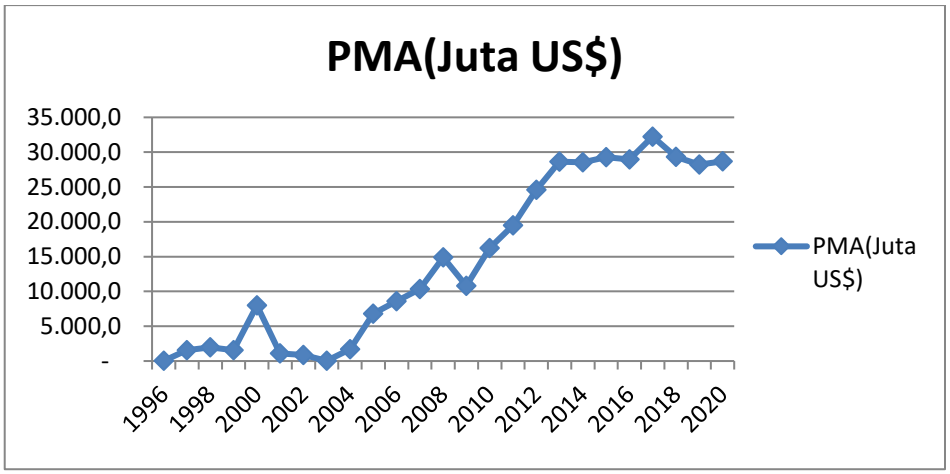

Figure 1. The Development of Realization Foreign Investment in Indonesia in 1996-2020
Source: BKPM (2022)

As a developing country, foreign investment in Indonesia tends to fluctuate from 1996-2020. In the period 1996-2005, foreign investment experienced an unstable movement, which at that time was caused by the economic impact of the global crisis and other events related to social, political, and cultural. 2017 was the highest year with a total investment of USD. 32,239 million, while the lowest occurred in 1996 with an investment value of USD 22.8 million. In 2013-2020 foreign investment tends to experience a stable movement, which is in the range of USD 28,000 million-USD 32,000 million.

Many factors influence the fluctuation of foreign investment in Indonesia, (Eliza, 2013) in his research indicates that macroeconomic fundamentals have an important role in attracting foreign capital flows. Macroeconomic fundamentals that affect foreign investment are the economic growth of a country, which is reflected in gross domestic product (GDP), inflation and the SBI interest rate.

Gross domestic product (GDP) is the value of goods and services (output) produced by the economy in a period of one year. (Sukirno, 2005) also revealed that gross domestic product (GDP) is the value of products and services produced by local and foreign communities in a country and within a certain period of time. The determining factor for investment is the overall level of output because the greater the output produced, the greater the GDP income of a country. This can be an illustration of the country having a very large market size, thus making product sales increase and develop. One of the objectives of foreign investment in a country is to make the market its product. So that the increasing product of a country, the more promising a country is to become a foreign investment destination.

In terms of the relationship between GDP and foreign investment, (Alshamsi et al., 2015) found a positive relationship between the two variables. Researchers believe that GDP has a significant influence on foreign investment in the United Arab Emirates, the same thing was also found by (Nurmasari & Arifin, 2018) in his research found that GDP had a positive and significant effect on foreign investment in Indonesia in 1997-2016.

Inflation is the tendency of general prices to attract in general and continuously or it can also be said to be a symptom of a continuous increase in goods and various general factors of production, continuously within a certain period (soebagiyo, 2016). A high inflation rate will have a negative effect on investment because of the decline in production and demand for goods as a result of higher goods prices. According to (Nopirin, 1992) An investor will tend to invest if the inflation rate in the country is stable. This is because if inflation is stable, the price of goods in general will not experience a significant increase. Investors will feel guaranteed if the inflation rate in the country is stable.

The relationship between the inflation rate and foreign investment is negative, where if the inflation rate is high then foreign investment will decrease, and vice versa. (Pratiwi et al., 2015) in his research revealed that inflation has a negative and significant effect on foreign investment, which means that high inflation in a country will reduce investor interest in investing as a result of high investment costs. This is in line with research conducted (FoEh et al., 2020) in research conducted on ASEAN countries found that inflation has a negative and significant effect on foreign investment in ASEAN countries.

According to (Ambarsari & Didit, 2015) The interest rate is the percentage of income received by savers from the savings they set aside, and is the percentage of income that must be paid by borrowers. Interest rates are one of the macroeconomic factors that must be considered for Indonesia, which adheres to an open economic system, where the movement of foreign capital flows is free to move in and out, one of the influencing factors is interest rates. (Sukirno, 2005) in his book said that the relationship between interest rates and investment is negative, i.e. when interest rates are low, the desire to invest increases. This is the same as the research conducted (Dewi & Triaryati, 2015). Interest rates

have a negative effect on foreign direct investment. This shows that the higher the interest rate prevailing in a country, the investors are reluctant to invest.

To be able to improve and maintain the stability of capital inflows in Indonesia, one way that the government can do is to strengthen its economic fundamentals.

In determining the choice of a monetary policy several studies have been carried out, one of which is a study on the use of interest rates as an instrument of monetary policy. This model is known as the *Taylor Rule*, which was first coined by Taylor in 1993. When Taylor recommended the interest rate that the United States central bank should set. This model explains how much interest rates must be set so that inflation is controlled and achieves the inflation target that has been set (within the framework of Inflation Targeting).

The basic principle of the *Taylor Rule* model is to regulate the nominal interest rate at a certain level carried out by the central bank so that in the long run the nominal interest rate is equivalent, namely the real interest rate plus inflation. The target inflation rate and the output gap that is suspected to be the cause of inflation are two factors that are considered in determining a reasonable nominal interest rate. so that the *taylor rule* has 2 scopes in the monetary target, namely low and stable inflation and sustainable output growth.

Several countries such as Germany, Canada, Sweden have conducted research related to the Taylor Rule model. According to research by world economists, the achievement of central bank goals and objectives for economic stability has been significantly helped by monetary policy. According to (Murwani, 2007) Taylor Rule model can be applied within the framework of Inflation Targeting. Which is where the interest rate is used as a goal to achieve the inflation target which is the final target of monetary policy. Therefore, this method can be used as a guideline in monetary policy analysis to choose the best course of action for Indonesia's economic stability, especially in relation to increasing foreign investment.

Reviewing several studies conducted by (Febriana, 2014) where this researcher examines the effect of GRDP, exchange rates, and exports on foreign direct investment in Indonesia. This study shows that the GRDP, exchange rate and export variables have a positive and significant influence on foreign direct investment in Indonesia. While in the long term only the GRDP variable has a positive and significant effect.

Research by (Sari & Baskara, 2018) testing the effect of economic growth, interest rates, and exchange rates on foreign direct investment, shows that the variables of economic growth and exchange rates have a positive influence but only the exchange rate has a significant effect on foreign direct investment in Indonesia, while interest rates have a negative and significant effect on foreign investment in Indonesia.

Research conducted by (Astuty & Siregar, 2018) shows that partially the variables of gross domestic product, infrastructure and the rupiah exchange rate have a positive and significant effect on foreign direct investment in Indonesia in global economic development. Meanwhile, the interest rate variable has a positive and insignificant effect on foreign direct investment in Indonesia in global economic developments.

RESEARCH METHOD

In this study, using multiple regression analysis techniques with the Ordinary Least Square (OLS) model. According to (Gujarati, 2004) the definition of Ordinary Least Square (OLS) is an econometric method in which there is an independent variable which is the explanatory variable and the dependent variable is the variable described in a linear equation.

$$\ln PMA = \beta 0 + \beta 1 \ln PDB t + \beta 2 SB t + \beta 3 INF t + \varepsilon t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

PMA	: Foreign investment, (Million US$)
PDB	: Gross domestic product
SB	: Interest rate (%)
INF	: Inflation (%)
ln	: Natural logarithm operation
ε_t	: Error term (Error Factors)
β_0	: Constanta
$\beta 1 \ldots \beta 3$	: Regression coefficients of indeendent
t	: Year to t

The study used annual *Time series* data with a time span of 1996-2020. Which includes data on foreign investment, gross domestic product, interest rate, and inflation. The data was obtained from, World Bank (IMF), Badan Pusat Statistik (BPS), Bank Indonesian, and Badan Koordinasi Penanaman Modal (BKPM).

Operational Variables

Foreign Investment

Foreign investment is a form of investment in the territory of Indonesia carried out by foreign investors, with the aim of making profits under direct supervision by the owner of the capital. Investment is the first step to carry out development and has affect on the economic growth of a country. In this study, foreign investment uses units of million US$.

Gross Domestic Bruto

Gross domestic product is an indicator that measures the amount of final output of goods and services produced by a country. in this study using data on gross domestic product taken from the world bank using units of million US$.

Inflation

Inflation is the tendency of prices to attract prices in general and occur continuously in a relatively fast period of time. an increase in one or two goods is not called inflation. unless the increase extends to a large part of the prices of other goods. Inflation data used in this study is taken from the World Bank and uses percent (%) units.

Interest Rate

The interest rate, in this case the SBI rate, is the interest rate issued by Indonesian banks to control the amount of money circulating in the public. the interest rate is also used by the government to control the price level. The data used in this study is the percentage value of the interest rate based on Bank Indonesia Certificates for the period of 1996-2020.

RESULTS AND DISCUSSION

The estimation results of the econometric model above and its complementary tests are summarized in the following table.

Table 1. Estimated Result

$lnPMA_t$= -4.7841 + 1.9129 $lnPDB_t$ – 0.1578SB_t + 0.0958INF_t
(0,0386)** (0,3227) (0,0817)**
R^2 = 0.5417; DW = 1.4183; *F* statistic = 8.2748; Prob. *F* = 0,0007
Diagnosis Test
(1) Multikolinieritas (*VIF*) *lnPDB* = 3.8356; *SB* =7.8674; *INF* = 3.6119
(2) Normalitas Residual (Jarque-Bera) JB(2) = 13.8389; Prob. JB(2) = 0,0009
(3) Autokorelasi (Breusch-Godfrey) χ^2(3) = 7.6248; Prob. χ^2(3) = 0,0544
(4) Heteroskedastisitas (White) χ^2(9) = 7.9048; Prob. χ^2(9) = 0.5438
(5) Linieritas (Ramsey RESET) *F*(1,20) = 0.6236; Prob. *F*(1,20) = 0.4389

Source: Eviews 10 (2022)

The diagnostic test shows the estimation results of all VIF values < 10, so the estimated model is free from multicollinearity problems. The empirical probability values of the Residual Normality, Autocorrelation, Heteroscedasticity, and Linearity tests, which are 0.0009 (< 0.10), 0.0544 (> 0.10), 0.5438 (> 0.10) and 0.4389 (> 0.10), indicating that the estimated model does not have a normal residual distribution, free from autocorrelation and heteroscedasticity problems, with exact model specifications (linear).

The goodness of fit statistic shows that the model exists, as seen from the empirical probability F statistic, which is 0.000 (< 0.01), with R2 or moderate predictive power, which is 0.5417. This means that overall, the independent variables, GDP (Gross Domestic Product), SB (Interest Rate), and Inflation (INF), can explain 54.17 percent of variations or fluctuations in the PMA (Foreign Investment) variable.

Separately, only GDP and inflation variables, which have a significant effect on foreign investment, with empirical probabilities t of 0.0386 (< 0.05) and 0.0817 (< 0.10), respectively. The Variable Interest Rate of Bank Indonesia Certificates has no significant effect on Foreign Investment, because it has an empirical probability of 0.3227 (> 0.10).

The GDP variable has a regression coefficient of 1.9129. The pattern of the relationship between GDP and FDI is logarithmic (log-log), so that if GDP increases by 1 percent, FDI will decrease by 1.9129 percent. On the other hand, if GDP falls 1 percent, FDI will increase by 1.9129 percent.

Inflation variable has a regression coefficient of 0.0958. The pattern of the relationship between Inflation and FDI is logarithmic-linear (log-line), meaning that if inflation increases by 1 percent, FDI will decrease by 0.0958 x 100 = 9.58 percent. On the other hand, if inflation falls by 1 percent, FDI will increase by 0.0958 x 100 = 9.58 percent.

Gross Domestic Product has a positive effect, showing that if GDP increases, Foreign Investment will increase. Theoretically this mechanism occurs because if GDP increases then Foreign Investment will experience a significant increase in the economy in a research area. This is in line with research conducted by(Fung et al., 2002) which states that the positive relationship caused by the GDP variable is a description of the market size of a country. The greater the GDP income in a country is evidence that the country has a very large market size, this makes product sales increase and grow. Where one of the objectives of foreign investment to a country is to make the market its product. So that the increasing product of a country, the more promising the country as a recipient country of foreign investment. This is as explained from the *Taylor rule* equation model where GDP or Real output is one of the targets to be achieved by the *Taylor Rule* equation model which regulates interest rates at a certain level to achieve inflation targets and sustainable output growth.

Likewise with inflation, which has a positive and significant impact on foreign investment, which means that when inflation increases, foreign investment will also increase. This is not in line with the research conducted (Pratiwi et al., 2015) where inflation has a negative and significant effect, which means that when inflation rises, foreign investment will decrease. Theoretically, when inflation increases, foreign investment will provide a reduced number of products. When rising high inflation will cause investors not to make foreign investments in a country, it will cause a decline in the economy in a country. However, in general, inflation does not always have a negative impact but also has a positive impact. This positive impact can occur when the price increase is mild and stable and in accordance with the inflation target set. In terms of setting an inflation target, the Taylor Rule regulates interest rates at a certain level by taking into account the inflation rate and the output gap so that a low and stable inflation target and sustainable output growth can be achieved. Which is where it will have a positive effect in the sense that it can encourage better economic growth, namely increasing national income.

In contrast to the interest rate which has a negative and insignificant effect on foreign investment, this indicates that when the cost of capital increases it will cause a decrease in investment. This result is in accordance with the theory which states that the higher the interest rate, the higher the cost of borrowing to the bank, so that investors do not lend funds to the bank because the risk that is borne is very large, therefore an increase in interest rates will increase costs so that they can lowering the level of investment. This research is in line with research that has been conducted by (Bunga & Sukarsa, 2012) where interest rates have a negative and insignificant effect on foreign investment in Indonesia. In the Taylor Rules approach, interest rates affect future inflation. Inflation expectations in the future will affect people's purchasing power in the future, which is one of the factors that influence investors' interest in investing in Indonesia considering the background of Indonesia which has a large population as a market for its products. The decline in people's purchasing power will reduce the interest of investors to invest (Setiawan & Mulyani, 2020).

CONCLUSION

From the series of discussions that have been explained from the model used, it can be concluded as follows:

1. Gross domestic product during the study period has an effect on foreign investment. The two variables have a positive and significant relationship, meaning that if the GDP is high then investors are interested in investing, if the GDP value is low, investors are interested in investing.
2. Inflation during the research period has a positive effect on foreign investment. So, if the inflation rate rises, foreign investment will increase, if the inflation rate decreases, foreign investment will decrease.
3. The interest rate during the study period has a negative effect on foreign investment, the relationship between the two variables is negative. So, if the interest rate is high. Then foreign investment weakens or investors are not interested in investing and vice versa if the interest rate decreases, foreign investment will increase.
4. Within the framework of the inflation target, the Taylor Rule makes inflation and output the final targets in order to encourage better economic growth.

Suggestion

To further develop an understanding of the concepts and applications of macroeconomic theory, especially the monetary policy material using the Taylor rule approach, it is recommended to other researchers to be able to conduct monetary policy analysis with several other approaches as a comparison concept so as to provide more optimal results.

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