The impact of Rupiah/USD exchange, on the Indonesian manufacturing sectors in 2005-2016

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Abstract

Currently, Indonesia is developing its manufacturing sector. The purpose of this study is to examine and analyze the determinants of manufacturing sector output. Rupiah/USD exchange rate, credit interest, FDI, and import of the manufacturing sector have a significant effect on the output of Indonesia's manufacturing sector. Based on the results of the short-term estimation, it can be concluded that the output of the manufacturing sector in lag 2, credit interest rate in lag 1 and lag 2, FDI lag 1, and imports of manufacturing lag 1 have a significant effect on the output of Indonesia's manufacturing sector.

Keywords: VECM, rupiah/USD exchange rate, Manufacturing import, Credit interest rate, FDI, Manufacturing sector output.

El impacto del intercambio Rupia / USD en los sectores manufactureros indonesios en 2005-2016

Resumen

Actualmente, Indonesia está desarrollando su sector manufacturero. El propósito de este estudio es examinar y analizar los determinantes de la producción del sector manufacturero. El tipo de cambio Rupia / USD, el interés crediticio, la IED y la importación del sector manufacturero tienen un efecto significativo en la producción del sector manufacturero de Indonesia. Con base en los resultados de la estimación a corto plazo, se puede concluir que la producción del sector manufacturero en el rezago 2, la tasa de interés de crédito en el rezago 1 y el rezago 2, el rezago IED 1 y las importaciones del rezago manufacturero 1 tienen un efecto significativo sobre la producción del sector manufacturero de Indonesia.

1. INTRODUCTION

Distribution of the manufacturing industry is fluctuating. This condition shows that the role of the manufacturing industry in supporting the economy is not stable. The fluctuation in the distribution of the manufacturing industry sector in Indonesia is the result of the global economic crisis. The government runs an industrial revitalization, consolidation and restructuring program. The industries revitalized are those which employ a lot of labors and have export capability. The program aims to improve the performance of the manufacturing industry sector.

The Indonesian Government has implemented fiscal stimulus policy to increase the performance of the manufacturing sector. Bank Indonesia, through its monetary policy, has also played an important role in driving the performance of the manufacturing sector. Bank Indonesia has implemented monetary policy by holding the BI rate (B. INDONESIA 2016). The policy was implemented so that the manufacturing sector did not get more pressure due to internal and external factors. The decision to maintain the BI rate was in line with the tighter monetary policy stance to keep inflation under target.

Depreciation of the domestic currency has a positive or negative effect on the performance of a country's manufacturing sector. Thus,

the cycle of appreciation and depreciation of the exchange rate is often associated with the output of the manufacturing industry (ABDUL, ABDULLAH 2016). Theoretically, there are a number of reasons for the depreciation of the domestic exchange rate to affect the manufacturing sector. First, the depreciation of the domestic exchange rate results in an increase in the price of production factors from imports. This condition will push the manufacturing sector production. Second, the depreciation of the domestic exchange rate will result in the increase in exports and reduce imports, thereby increasing the trade balance. The domestic exchange rate depreciation will stimulate the production of the domestic manufacturing sector to be exported, if the effect of demand is greater than the cost effect (Abdul, Abdullah 2016). Based on the view of Abdul, ABDULLAH (2016), Rupiah/USD exchange rate is one of the variables that affects the performance of Indonesia's manufacturing sector.

The Rupiah/USD exchange rate moved from quarter 1 of 2015 to quarter IV of 2016. The exchange rate of Rupiah /USD fluctuated.

The increase of imports resulted in competition between imported goods and domestic manufactured goods (ABDUL, ABDULLAH 2016). Domestic manufactured goods are required to have competitiveness in the destination and domestic markets. If the goods do not have competitiveness, the imports will result in less competitive domestic industries, so that domestic manufacturing sector production experiences a slowdown (ABDUL, ABDULLAH 2016).

Foreign direct investment as capital is a very important input which influences the manufacturing sector. Based on the production function theory, capital in the form of investment is one of the inputs used in the production process (MOMONGAN 2013). The capital production factor can encourage an increase in the output of the manufacturing sector so that economic activity can develop (MOMONGAN 2013). Exchange rates and imports have a significant effect on the manufacturing sector in Ghana during 1986-2013 (ABDUL, ABDULLAH 2016). Manufacturing's employment rate has a significant effect on manufacturing's gross domestic product while manufacturing foreign private investment and Naira/US Dollar have no effect on manufacturing gross domestic product (DAVID 2010).

This study uses Rupiah/USD exchange rate, credit interest rate, manufacturing import, and foreign direct investment which influence the output of the manufacturing sector. The Rupiah/USD exchange rate is used in this study because the exchange rate movement will affect the price of input. Credit interest rate is used in this study because changes in credit interest rate will have an impact on the cost of capital. Manufacturing import is used in this study because the increase in imports resulted in competition between imported goods and domestic manufactured goods. FDI is used in this study because it becomes capital in the manufacturing sector.

Based on the above background, the reasons underlying this study are: (1) the manufacturing sector is one of the sectors that has contributed significantly to accelerating the growth of Indonesia's

economy; (2) the manufacturing sector has several advantages over the primary sector; (3) the manufacturing sector as the leading sector drives the development of other sectors in Indonesia; and (4) from quarter III of 2016 to quarter IV of 2016 the growth of the Indonesian manufacturing sector experienced a slowdown. This research is expected to provide an overview and solutions to the problems of Indonesia's manufacturing sector

2. METHODOLOGY

This study used the VECM approach and the research data were processed using views 9 software. The research was conducted in Indonesia from quarter I of 2005 to quarter IV of 2016. The dependent variable is the GDP of the manufacturing sector while the independent variables are the Rupiah /USD exchange rate, credit interest rate, manufacturing import, and foreign direct investment.

According to HARRIS (1997: 75), VECM can be used to identify the short-term behavior of a variable towards its long-term value. VECM can also be used to calculate short-term relationships between variables through standard coefficients and to estimate long-term relationships using residual lags from co integrated regression. This research used secondary data which were obtained from Bank Indonesia and the Federal Reserves.

The variables used consisted of four dependent variables and two independent variables. The variables used are:

1. The dependent variable is the GDP of the manufacturing sector.

2. Independent variables consist of the Rupiah/USD exchange rate, credit interest rate, manufacturing import, and foreign direct investment.

3. RESULTS AND DISCUSSION

Unit root tests were carried out at the first difference level for all variables, including manufacturing sector output, Rupiah/USD exchange rate, credit interest rate, FDI, and manufacturing sector import at a significance of 0.05. Determination of optimum lag is very important. Therefore, in this study several criteria were used for determining the optimum lag length, namely Akaike Information Criterion (AIC).

The optimal lag results based on the Akaike Information Criterion (AIC) are presented. The lag determination procedure was used to determine the optimal lag that included in the VECM (Vector Error Correction Model) model. Determining the number of lags in the VECM (Vector Error Correction Model) was carried out based on the AIC (Akaike Information Criterion) which recommends lag 4 as the optimal lag. In trace statistic and max-eigen values ranging from none to at most 1, there are asterisks and it is less than 5%. Thus, it can be concluded that the output of the manufacturing sector, Rupiah /USD

exchange rate, credit interest rate, FDI, and import of the manufacturing sector have a long-term relationship.

The long-term equation of the VECM estimation presented in the appendix is written as follows:

LNY (-1) = 7.96 + 0.013t − 1.748CR (-1) +   (1)
0.213Currency (-1) + 0.061LnFDI (-1) + 0.242LnIMP
(-1)

The long term equation above can be interpreted as follows:

1. If the credit interest rate increases by 1 unit, the output of the manufacturing sector decreases by 1.748 percent assuming other variables are constant.

2. If the Rupiah exchange rate depreciates by 1 unit, the output of the manufacturing sector increases by 0.213 percent assuming other variables are constant.

3. If FDI increases by 1 percent, the output of the manufacturing sector increases by 0.061 percent assuming other variables are constant.

4. If manufacturing import increases by 1 percent, the output of the manufacturing sector increases by 0.242 percent assuming other variables are constant.

The significance test in VECM compares the value of the t table with the t value of statistics. If the statistical value of t is greater than t table, the independent variable has a significant effect on the dependent variable, but if t statistic is smaller than t table, the independent variable does not significantly influence the dependent variable. Based on the equation above, it can be concluded that the Rupiah/USD exchange rate, credit interest rate, FDI, and import of the manufacturing sector have a significant effect on the output of Indonesia's manufacturing sector. This result is shown in the t-statistic value of each of the rupiah/USD exchange rate, credit interest rate, FDI, and import of the manufacturing sector, which are greater than t-table.

Based on Table 4.4., it can be concluded that the output of the manufacturing sector in lag 2, credit interest rate in lag 1 and lag 2, FDI lag 1, and import of manufacturing lag 1 have a significant effect on the output of Indonesia's manufacturing sector. This result is shown in the t-statistic value of each manufacturing variable greater than t-table. The ECT coefficient is negative and significant so that short-term estimates are valid.

Based on the long-term estimation results, it can be concluded that Rupiah/USD exchange rate, credit interest rate, FDI, and import of the manufacturing sector have a significant effect on the output of Indonesia's manufacturing sector. Based on the results of the short-term estimation, it can be concluded that the output of the manufacturing sector in lag 2, credit interest rate in lag 1 and lag 2,

FDI lag 1, and import of manufacturing lag 1 have a significant effect on the output of Indonesia's manufacturing sector.

One of the factors that influences the flow of goods and services between countries is the exchange rate of a country against foreign currencies. The exchange rate is very important in determining the competitiveness of an output. The exchange rate system that is implemented by a country depends on the policy used by the country, which is influenced by the position of the state and the general objectives of the economy, especially its monetary politics.

Exchange rate is the value of one currency in another currency. The economy and daily lives of people can be influenced by exchange rate. If the US dollar falls in value, goods for Americans will become more expensive and the goods will become cheaper for foreigners (MISHKIN 2009). According KRUGMAN (2009), exchange rate is "the value of one currency in terms of another". Exchange rate is the value of one country's currency in terms of another country's currency. Exchange rates play a role in expenditure decisions because they allow us to translate prices of various countries into comparable values.

The estimation results show that Rupiah/USD exchange rate has a positive and significant effect on the output of Indonesia's manufacturing sector. This is in line with the research of ORJI (2015) and OLANREWAJU (2015). Their results show that exchange rate has a significant effect on the output of the manufacturing sector. If the rupiah exchange rate depreciates by 1 percent, the output of the

manufacturing sector increases by 0.213 percent assuming other variables are constant.

Depreciation of the domestic currency has a positive or negative effect on the performance of a country's manufacturing sector. The cycle of appreciation and depreciation of the exchange rate is often associated with the output of the manufacturing industry in a country (ABDUL, ABDULLAH 2016). Theoretically, there are a number of reasons for the depreciation of the domestic exchange rate to affect the manufacturing sector. First, the depreciation of the domestic exchange rate results in an increase in the price of production factors originating from imports.

This condition will suppress manufacturing sector production. Second, the depreciation of the domestic exchange rate will encourage an increase in exports and reduce imports, thereby increasing the trade balance. The domestic exchange rate depreciation will stimulate the production of the domestic manufacturing sector to be exported, if the effect of demand is greater than the cost effect (ABDUL, ABDULLAH 2016).

These results indicate that exchange rate depreciation can drive manufacturing sector output. Theoretically, there are a number of reasons for the depreciation of the domestic exchange rate to affect the manufacturing sector. First, the depreciation of the domestic exchange rate results in an increase in the price of production factors originating from imports. This condition will suppress manufacturing sector

production. Second, the depreciation of the domestic exchange rate will encourage an increase in exports and reduce imports, thereby increasing the trade balance. The domestic exchange rate depreciation will stimulate the production of the domestic manufacturing sector to be exported, if the effect of demand is greater than the cost effect (ABDUL, ABDULLAH 2016).

Bank Indonesia's policy aims to stabilize exchange rate through some steps, such as intervening the foreign exchange market to control the volatility of the Rupiah exchange rate, purchasing Government Securities (SBN) in the secondary market, while taking into account the impact on the availability of SBN for money market inflow and liquidity, and strengthening the management of Rupiah liquidity through Open Market Operations (OPT) to divert daily liquidity to a longer tenor (B. INDONESIA 2016):

Interest rate is one of the factors that influences a country's output. The central bank of a country has the right to increase or even reduce interest rates, depending on the economic situation of the country. The interest rate set by the monetary authority is high; so, investors will be reluctant to invest in the real sector so that economic growth will slow down (UDOKA, CHRIS O. & ROLAND 2012).

Interest rates affect the economic decisions of businesses and households, such as decisions for using fund to invest in new equipments for the factory or to be deposited in a bank (MISHKIN 2009). Interest and investment have a negative relationship, the

amount of capital goods requested depends on the interest rate that measures the costs of the funds used to finance investments (MANKIW 2010). Interest and investment have a negative relationship; the amount of capital goods requested depends on the interest rate that measures the costs of the funds used to finance investments (MANKIW 2010).

The estimation results show that credit interest rates have a negative and significant effect on the output of Indonesia's manufacturing sector. This result is in line with the research of IMOUGHELE (2014) and OLANREWAJU (2015). Their results indicate that credit interest rates have a negative significant effect on the output of the manufacturing sector. If credit interest rate increase by 1 percent, the output of the manufacturing sector decreases by 1.748 percent assuming other variables are constant. These results indicate that credit interest rate plays a role in influencing the output of the manufacturing sector.

The second discussion is on the effect of credit interest rate on the output of Indonesia's manufacturing sector. The estimation results show that credit interest rate has a negative and significant effect on the output of Indonesia's manufacturing sector. This indicates that an increase in lending rates can reduce the output of the manufacturing sector. Credit interest rate plays a very important role in determining the output performance of the manufacturing sector. Credit interest rate has the potential to increase the level of output of the manufacturing industry when the credit rate given to low creditors.

NUALTARANEE (2001) supports the above ideas by showing that credit interest rates are a major factor in influencing the output of the manufacturing sector. Changes in credit interest rate will have an impact on the cost of capital, which will affect the value of assets and investment decisions. An increase in credit interest rate will result in a decline in real sector investment so that manufacturing output also decreases. An increase in the BI rate will stimulate an increase in lending rates; so, investors are reluctant to borrow money because investors feel disadvantaged. This condition can slow the growth of the Industrial sector.

Changes in BI Rate that affect changes in bank interest rates will affect people's expectations of the economy. Bank Indonesia reduces the BI Rate to decrease credit interest lending rate, which in turn will stimulate investment (B. (BI) INDONESIA 2015). That step is inadequate. It must be followed by other policies that can encourage the increase of investment. Such policies include a healthy and competitive investment climate, pro-investment bureaucracy, and economic infrastructure support both in terms of quantity and quality (B. INDONESIA 2016). Thus, monetary policy through the BI Rate instrument must be accompanied simultaneously by other fiscal and economic policies by the government in order to achieve optimal goals.

The Effect of FDI on Manufacturing Sector Output

Real investment includes the construction of factories, the procurement of various types of capital goods, the purchase of land for production purposes, and the purchase of various inventory equipments. Investment is usually carried out by multinational

companies. Investment funds are realized in the construction of factories, procurement of production facilities, and purchasing machinery. Investment can be a starting point for the success and sustainability of future development because it can absorb labors; thus, it can open new employment opportunities for the community, which in turn will have an impact on increasing community income.

Investment is an important thing in economic development because it is a supporting factor for increasing the production process. Investment has an active role in determining the level of output, and the rate of output growth depends on the rate of investment (ARSYAD 2003).

Based on the theory, investment will expand employment opportunities and improve people's welfare as a consequence of the increased income. When the community welfare increases, the income will increase, thereby reducing inequality in the income distribution of the community. The estimation results show that FDI has a significant and positive effect on the output of Indonesia's manufacturing sector. This result is in line with the research of Orji (2015). Orji's research showed that FDI has a significant effect on the output of the manufacturing sector. If FDI increases by 1 percent, the output of the manufacturing sector increases by 0.061 percent, assuming other variables are constant. This indicates that FDI plays influences the output of the manufacturing sector.

These results indicate that an increase of FDI will encourage increased output of the manufacturing sector. Foreign direct investment as capital is a very important input influencing the manufacturing sector. Based on the production function theory, capital

in the form of investment is one of the inputs used in the production process (MOMONGAN, 2013). The capital production factor can encourage an increase in the output of the manufacturing sector so that economic activity can develop. FDI has a positive influence on the output of the manufacturing sector, indicating that foreign investors are trade oriented. Trade-oriented investors then invests in host countries not only to find markets, but also conduct research to develop the quality of manufactured output products in the host countries, so that higher FDI in the manufacturing sector can drive the output of the manufacturing sector.

The flow of FDI entering Indonesia is basically expected to increase manufacturing output productivity. In other words, in order to increase production output, investment is absolutely necessary. The industrial sector open to foreign investment can also attract investors. The flow of FDI expected to increase manufacturing output can be realized; this is demonstrated by the positive impact of FDI on manufacturing output. It is due to the orientation of FDI entering Indonesia which still tends to seek technology and knowledge transfer.

Encouraging investment growth in Indonesia is the focus of the second economic policy package; one strategy has been prepared to achieve this goal, which is a simpler licensing process. The government has emphasized its commitment to realize a simpler licensing process in the investment process. This is expected to make the investment climate in Indonesia more conducive (B. INDONESIA, 2015).

The Effect of Manufacturing Import on Manufacturing Sector Output

Import activities from abroad and imports are reducing the national income. Imports are goods produced abroad and sold domestically (MANKIW, 2010). Imports of goods and services can reduce a country's foreign exchange income, exacerbate the pressure of the balance of payments deficit, and cause domestic goods to be uncompetitive (SHIHAB, 2014). Import activities are determined by the relative prices of domestic goods in foreign markets, the ability of domestic goods to compete in the world market, and the preference of the population in other countries on goods produced by a country (SHIRAZI, NASIM SHAH, and MANAP 2004). Imports are one of macroeconomic variables which can reduce the income of a country, meaning that if a country's import increases, the country's economy will decline because the domestic trade balance is deficit (SHIRAZI, NASIM SHAH, and MANAP, 2004)

The estimation results show that manufacturing imports have a significant and positive effect on the output of the manufacturing sector. This result is in line with the research of ABDULLAH (2016). This shows that import has a significant effect on the output of manufacturing sector. If manufacturing import increases by 1 percent, the output of the manufacturing sector increases by 0.242 percent, assuming that the other variables are constant. This indicates that manufacturing import influences the output of manufacturing sector.

The relationship between import and output is often researched. The relationship between import and output is based on the export-led

growth hypothesis (SHIRAZI, NASIM SHAH, and MANAP 2004). The export-led growth hypothesis emerges on the basis of the trade theory of comparative advantage. The export-led growth hypothesis assumes that export expansion will be able to reduce the trade deficit and increase domestic output while import expansion will push the trade deficit wider and reduce domestic output (assuming domestic output is less qualified) (SHIHAB, 2014).

The third discussion is on the effect of manufacturing import on the output of the manufacturing sector. The estimation results show that manufacturing import has a significant and positive effect on the output of the manufacturing sector. This result indicates that an increase in manufacturing import is driving an increase in manufacturing output. According to the Mundell-Fleming model, the increase in import due to the appreciation of the domestic exchange rate will result in a deficit in export. This condition will cause the number of outputs to decrease (SUKMANA, 2010). Increased import results in competition between imported goods and domestic manufactured goods.

Indonesia is required to have competitiveness in the markets of the destination and domestic markets. If the country does not have competitiveness, the import will result in less competitive domestic industries, so that domestic manufacturing sector production experiences a slowdown. Estimated results show that manufacturing import has a positive impact, so that domestic manufacturing output has strong competitiveness. It is expected that the Indonesian

Government can suppress import. In the short term, the Indonesian Government can reduce consumption level and increase (policy) import tariff. In the long-term, the Indonesian Government can advance the technology in manufacturing industry and reduce imports of raw materials / capital goods.

4. CONCLUSION

The Rupiah/USD exchange rate, credit interest rate, FDI, and import of the manufacturing sector have a significant effect on the output of Indonesia's manufacturing sector. Based on the results of the short-term estimation, it can be concluded that the output of the manufacturing sector in lag 2, credit interest rates in lag 1 and lag 2, FDI in lag 1, and import of manufacturing sector in lag 1 have a significant effect on the output of Indonesia's manufacturing sector.

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