DETERMINANT OF INDONESIAN MANUFACTURING OUTPUT PERIOD 2005:1 – 2017:4

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ABSTRACT

The role of manufacture in Indonesia influence the economic growth. This research aims to observe and analyze influencing factors of manufacturing sector output in Indonesia. The research method used Error Correction Model (ECM) at period 2005 in 1stquartal – 2017 in 4thquartal. This research used secondary data from Statistik Ekonomi dan Keuangan Indonesia (SEKI) and Federal Reserves. The results of the study show that in long term estimation lend interest rate and inflation have negative and significant impact, whereas FDI has positive and significant impact towards manufacturing sector output. Otherwise, in short term estimation show that lend interest rate has negative and significant impact, while inflation and FDI have no significant impact towards manufacturing sector output.

Keywords: ECM, real exchange rate rupiah/USD, inflation, lend interest rate, FDI, manufacturing sector output

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Introduction

The development of the Indonesian industrial sector Appropriate developments during the Long Term Development I, this can be seen from various fields, namely employment, ubiquitous, values generated, foreign exchange contributions, and GDP of Indonesia's GDP (Bank Indonesia, 2002). According to Damanyanthi (2008), the progress of the Indonesian industry relating to the large new order in industrial policy, such as the overhaul of the foreign exchange system, the reduction of special facilities reserved for state enterprises, and the government's policy to promote private sector growth together with the sector SOEs, and the enactment of foreign investment law.

The development of industry in Indonesia is now going very fast along with the progress of science and technology, but industrialization in Indonesia faces the problem of industrialization backwardness (Pasaribu, 2010). The Competitive Industrial Performance (CIP) report

is a statistical publication of UNIDO (United Nations Industrial Development Organization) on the performance of the industrial sector. Industrial competitiveness is defined as the capacity of developing countries and developed countries to increase industrial sector competition in the international market.

Technovation is needed, which is a continuous effort in making technological innovation to improve technological capability and work methods to a higher level, so that the resulting product gives high added value to the consumer, so that the product produced is always energized.
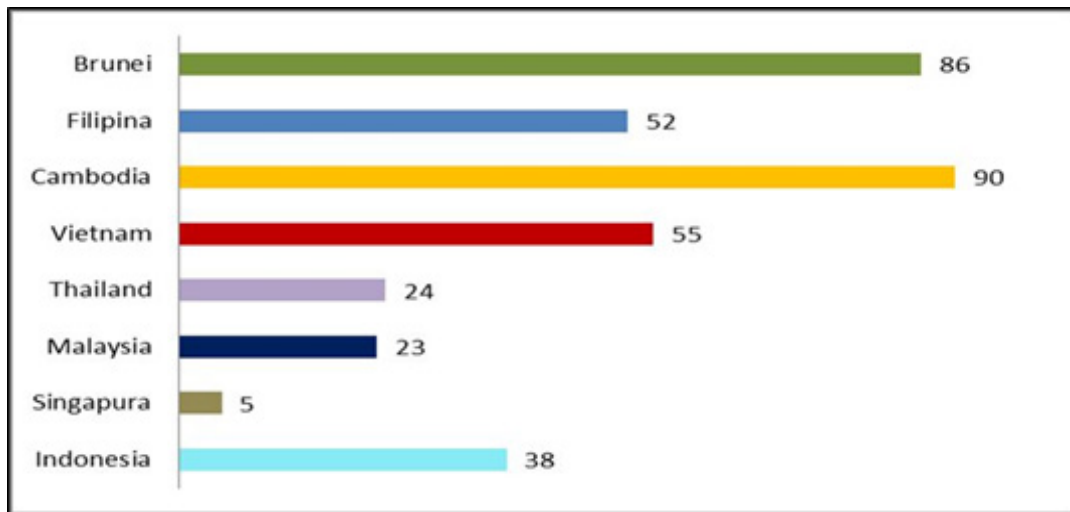

Figure 1: Competitive Industrial Performance of ASEAN Region 2015
Source: United Nations Industrial Development Organization, 2016

Figure 1 shows the performance competition of the manufacturing sector in the ASEAN region by 2015. Singapore's state-owned Competitive Industrial Performance ranks 5th in the world by 2015. Complete infrastructure, sophisticated technology use, and high-skill workforce, creating a new innovation makes Singapore state ranked 5th in the world by 2015 (UNIDO, 2016). Different conditions with the state of Indonesia, Competitive Industrial Performance country of Indonesia under the country of Thailand and Malaysia. The country of Indonesia is ranked 38th in the world while Thailand and Malaysia are ranked 24 and 23 in the world. Poor infrastructure conditions, poor logistics systems, and tortuous regulatory systems, and low productivity (Bank Indonesia, 2016). The development of industry in Indonesia in encouraging Indonesia's GDP can be seen in its contribution. The sectoral contributions are as follow:
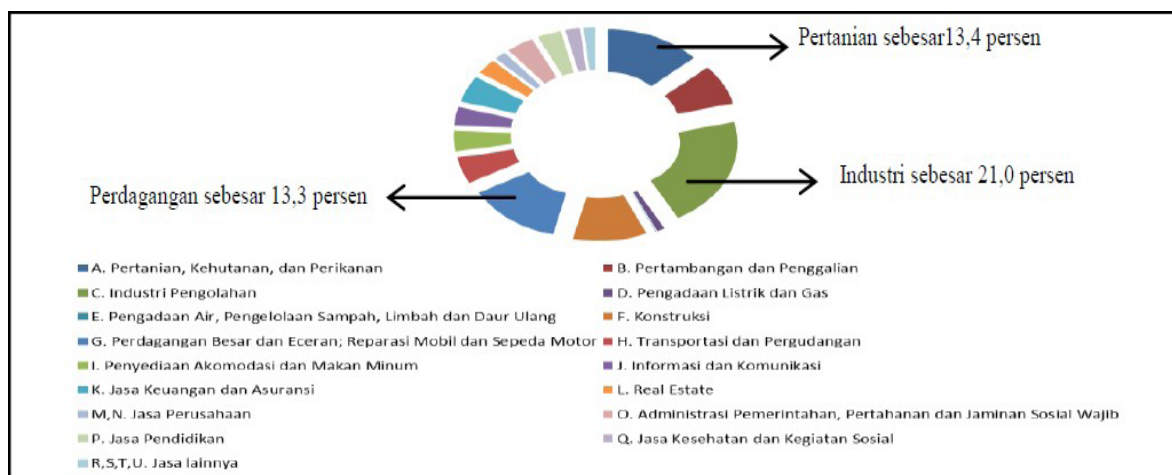
Figure 2(a): Sectoral Contribution by 2015 (in percent)
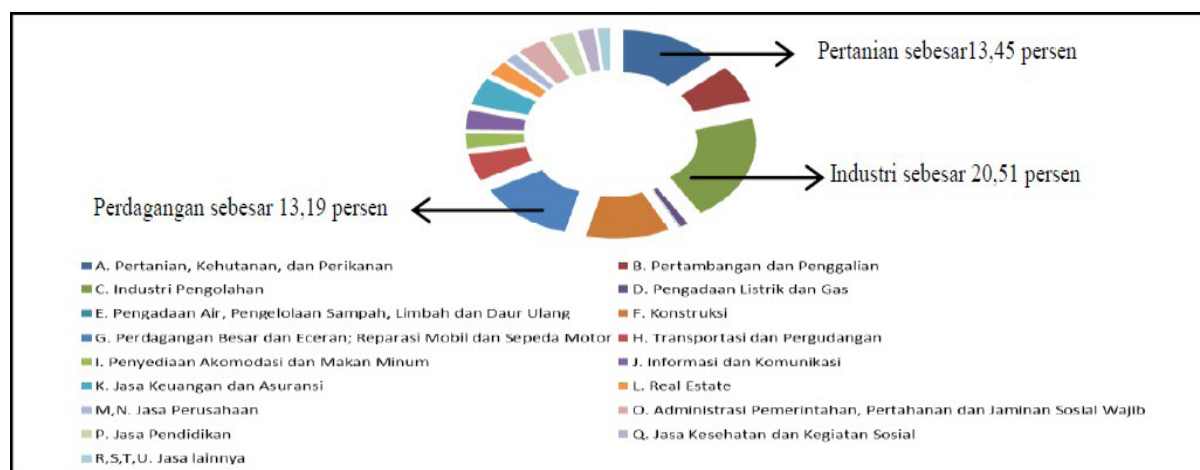
Source: Badan Pusat Statistik, 2017

Figure 2(b): Sectoral Contribution by 2016 (in percent)

Source: Badan Pusat Statistik, 2017

Indonesia's industrialization process can be seen in the development of industrial sector contribution. Figure 2 shows the development of the industrial sector and other sectors in encouraging the formation of GDP of Indonesia during the period 2015-2016. During the period 2015-2016, three major sectors that play a role in the formation of GDP of Indonesia are the agricultural sector, industrial sector, and trade sector.

The agricultural sector contributes 13.4 percent and 13.45 percent, the industrial sector contributes 21.0 percent and 20.51 percent, while the trade sector contributes 13.3 percent and 13.19 percent. The high distribution in the industrial sector reflects that the industrial sector is quite instrumental in job creation that is able to create job opportunities (Pasaribu, 2010).

Figure 2 also informed that the contribution of the manufacturing industry to Indonesia's GDP declined. According to Bank Indonesia (2016), the decline in the manufacturing sector in Indonesia is impacted by the global economic crisis. The Government carries out the Industrial Revitalization, Consolidation and Restructuring program. The revitalized industries are industries that employ large numbers of workers and those with export capability. The program aims to improve the performance of the manufacturing sector.

The development of the industrial sector can also be seen in the growth of the in-

dustrial sector. Figure 3 shows growth in the industrial sector in Indonesia during the period 2014- 2016 grew positively. Industrial sector growth in 2014 is 4.64 percent, by 2015 by 4.33 percent, and by 2016 by 4.29 percent.
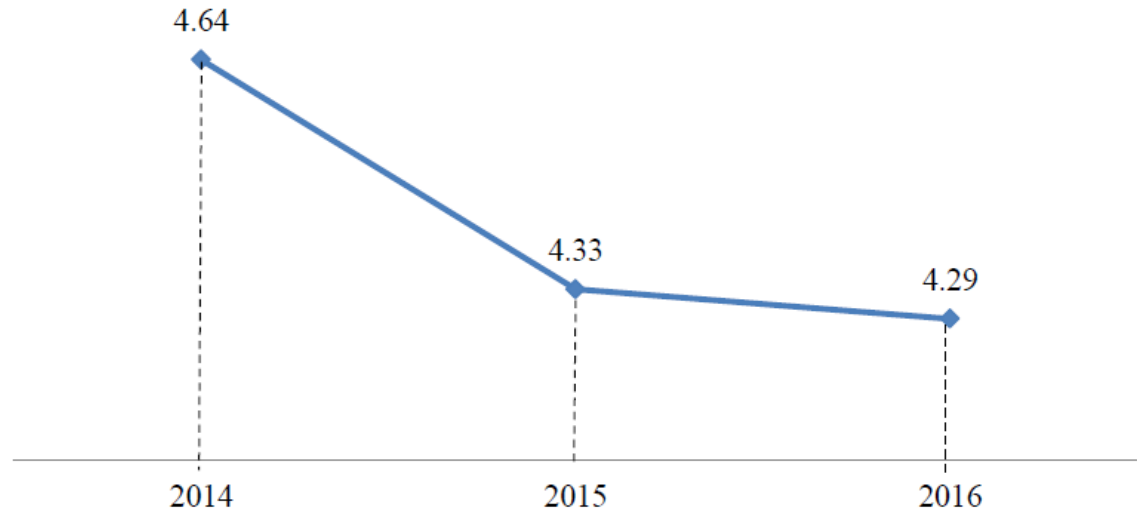

Figure 3: Indonesia Manufacturing Sector Growth Period 2014-2016 (in percent)
Source:Bank Indonesia,2016.

Figure 3 also shows that the growth of the industrial sector in Indonesia is slowing down. This condition is in line with the contribution of the declining industrial sector. According to Bank Indonesia (2016), the slowdown in growth in the industrial sector is due to internal and external factors such as the decline in global commodity prices due to weakening demand, rising world oil prices, weak export performance, rising interest rates on the fed and increasing fuel prices (Bank Indonesia, 2015). The Government of Indonesia has implemented fiscal stimulus policies to boost the performance of the manufacturing sector. Bank Indonesia with monetary policy also plays a role in boosting the performance of the manufacturing sector. The decision to keep the BI rate in line with the tight monetary policy stance to keep inflation in the target.

Theoretical Basis

The Concept of Industrialization

Industrialization is an important stage in developing countries' efforts to improve their prosperity, as well as addressing unemployment issues and increasing work productivity as one of the causes of low income (Damayanthi, 2008). Countries are trying to develop industries that can produce in a relatively short time and can save foreign exchange, therefore, the choice to develop the industry of import substitution.

Thinking Output Template Manufacturing Sector

Theoretically, there are a number of reasons for the depreciation of the domestic exchange rate affecting the manufacturing sector. First, the depreciation of the domestic exchange rate leads to an increase in the price of production factors derived from imports. This condition will depress the production sector. Second. Depreciation of the domestic exchange rate will lead to increased exports and reduced imports, thus increasing the trade balance. Depreciation of the domestic exchange rate will stimulate the production of the domestic manufacturing sector for export, if the demand effect is greater than the cost effect (Abdul and Accra, 2016). Based on the opinion of Abdul and Accra (2016), the rupiah / USD exchange

rate becomes one of the variables affecting the performance of the Indonesian manufacturing sector.

An increase in lending rates will lead to a decrease in investment in the real sector so that manufacturing output also declines. An increase in policy interest rates will stimulate an increase in lending rates so investors are unwilling to borrow money because investors feel disadvantaged. Such conditions may slow the growth of the manufacturing sector.

Inflation makes the purchasing power of Indonesian consumers reduced. Reduced purchasing power of Indonesian consumers occurs because the price of manufactured goods output more expensive so that it can complicate consumers to buy and consumers do not feel rich anymore. According to Madura (53: 2011), if the inflation of a country increases then the real money of society decreases so that people are reluctant to consume the goods of the manufacturing sector and choose to conduct saving activities. Indonesian consumers may buy more goods abroad compared to domestic goods so that the output of the manufacturing sector declines.

Foreign direct investment as a capital becomes a very important input in influencing the manufacturing sector. Based on the theory of production function, capital in the form of investment becomes one of the inputs used in the production process (Momongan, 2013). Capital production factors can boost output of the manufacturing sector so that economic activity can flourish (Momongan, 2013).

The framework drawing below shows that the output of the manufacturing sector is affected by the real exchange rate of Rupiah / USD, lending rates, inflation, and FDI. The use of real exchange rate of rupiah / USD, lending rate, inflation, and FDI is based on some journal literature that has been used as reference literature and supporting literature in previous studies.
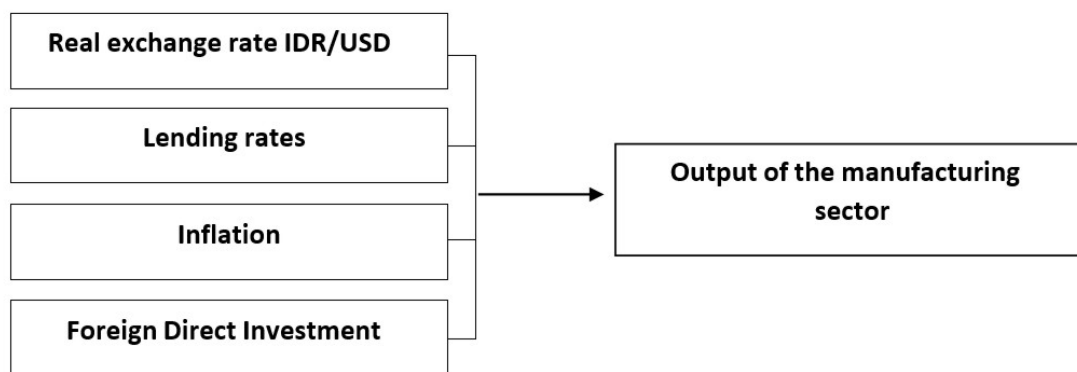

Figure 4: Thinking Output Template Manufacturing Sector

Methodology and Data

The approach used is through a quantitative approach using the Error Correction Model (ECM) method. Error Correction Model (ECM) is a model used to correct the regression equation between individual unstable variables in order to return to their long-run equilibrium value, with the main condition being the existence of a cointegration relationship between the constituent variables (Ali, 2014).

There are several steps that need to be done in the ECM (Error Correction Model) method. First, it starts with a stationary test. Second, Engle Grenger's calibration test. Third,

long-term and short-term test. The data used in the form of time series data from the year 2005 quarter I until 2017 IV quarter. Here are the long-term and short-term equations of the ECM method:

Long Term Estimation Equation

$$Y_t = \alpha_1 + \alpha_2 X_{2t} + \alpha_3 X_{3t} + ... + \alpha_n X_{nt} + s_t \tag{1}$$

Short Term Estimation Equation

$$\Delta Y_t = \beta_1 + \beta_2 \Delta X_{2t} + \beta_3 \Delta X_{3t} + ... + \beta_n \Delta X_{nt} + \beta_{n+1} ECT + s_t \tag{2}$$

The ECM model contains an ECT (Error Correction Model) form that ensures long-term relationships. ECT variable regression coefficient is the coefficient of adjustment which also shows the speed of adjustment between the actual value and the desired value which will be eliminated in one period. The characteristic of a valid ECM model is when it meets the stipulation that the ECT coefficient value lies within the range 0 < coefficient <1 and must be statistically significant. If the requirements are met then the ECM can be used for estimation (Yuliadi, 2007).

The type of data used in this study is secondary data. The data comes from Indonesian Economic and Financial Statistics (SEKI) and Federal Reserves. Data collection is done by visiting the website of Bank Indonesia and Federal Reserves. The collected and relevant data will be collected and tabulated and selected according to analysis or research needs. Furthermore the data that has been selected will be processed and analyzed as needed, in order to answer the problems that exist in this research.

Results and Discussion

Unit Root Test

Time series estimation must start with unit root test using Augmented Dickey-Fuller Test (ADF Test) to see the data stationerity. The stationarity of a time series data is very important because if the estimated data is not stationary then the regression results will be spurious.

Table 1 indicates unit root test. Table 1 shows that at the level level, only the output variables are stationary manufacturing sector, but the real exchange rate of rupiah / USD, lending rate, FDI, and inflation is not stationary. Table 1 also shows that unit root test at the first difference level of all variables such as, manufacturing sector output, rupiah / USD exchange rate, lending rate, FDI, and stationary inflation at 0.05 significance.

Table 1: Level Station Testing and First Difference

Variable	Level	Signification Level	Description	First Difference Level	Signification Level	Description
LnY	0.0131	5%	Significant	0.0006	Significant	5%
LnX1	0.0808	5%	NotSignificant	0.0001	Significant	5%
X2	0.7840	5%	NotSignificant	0.0021	Significant	5%
X3	0.1548	5%	NotSignificant	0.0000	Significant	5%
LnX4	0.3238	5%	NotSignificant	0.0000	Significant	5%

Notes:

Y = Output of the manufacturing sector; X1 = Real exchange rate IDR/USD; X2 = Lending Rate; X3 = Inflation; X4 = FDI; Ln = Logaritma Natural; e = Error term.

Grenger Cointegration Test

Cointegration test is used to see the long-term equilibrium relationship between variables, and to see the possibility of common stochastic trend over time (Calvi, 2010). Based on Table 2 there is cointegration, this can be shown in prob of ADF in ECT less than 5 percent, so it can be said that there is long-term relationship between variables.

Table 2: Grenger Cointegration Test at First Difference Level

Null Hypothesis: D(ECT) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.184124	0.0001
Test critical values:	1% level	-3.577723	
	5% level	-2.925169	
	10% level	-2.600658	

*MacKinnon (1996) one-sided p-values.

Long Term Estimation Equation

Table 3: Long Term Estimation Equation

Variable	Coefficient	Std.Error	t-Statistic	Prob.
LnX1	0.180416	0.282897	0.637746	0.5267
X2	-5.204517	2.211224	-2.353682	0.0228
X3	-3.309888	0.922214	-3.589066	0.0008
LnX4	0.296861	0.050421	5.887677	0.0000
C	8.489848	2.690559	3.155421	0.0028

Notes:

Y = Output of the manufacturing sector; X1 = Real exchange rate IDR/USD; X2 = Lending Rate; X3 = Inflation; X4 = FDI; Ln = Logaritma Natural; e = Error term.

Long-term estimates show that lending rates have a significant negative effect on manufacturing output, inflation has a significant negative impact on manufacturing output, and FDI has a significant positive effect on manufacturing output. These variables have a significant effect because the probability is less than 5 percent.

Table 4: Short Term Estimation Equation

Variable	Coefficient	Std.Error	t-Statistic	Prob.
D(LnX1)	-0.211271	0.104247	-2.026646	0.0486
D(X2)	-1.388295	1.028531	-1.349784	0.1838
D(X3)	0.357007	0.190804	1.871068	0.0678
D(LnX4)	0.007083	0.008435	0.839733	0.4055
ECT	-0.041653	0.025797	-1.614674	0.0134

Variable	Coefficient	Std.Error	t-Statistic	Prob.
C	0.024877	0.024877	6.331472	0.0000

Short-term estimates show that lending rates have a significant negative effect on manufacturing output, inflation has no significant effect on manufacturing output, and FDI has no significant effect on manufacturing output. The variables have no significant effect because the probability is more than 5 percent. The ECT coefficients show negative and significant results so that short-term estimates are valid.

Conclusion

The conclusion in this study is that, based on long-term estimation results, it can be concluded that:

1. Based on the estimation result, it can be seen that the interest rate of credit has a negative and significant effect to the output of Indonesian manufacturing sector. This indicates that an increase in lending rates will lead to a decrease in investment in the real sector so that manufacturing output also declines.

2. Based on the estimation results can be seen that the inflation significantly affects the output of Indonesia's manufacturing sector. This indicates that if the inflation of a country increases, it will cause the real money of society to decrease so that people are reluctant to consume the goods of the manufacturing sector and choose to conduct saving activities.

3. Based on the estimation results it can be seen that FDI has a significant and positive impact on the output of Indonesia's manufacturing sector. This shows that foreign investors are trade-oriented, investors are investing in host countries not only in search of markets but also researching for the development of manufactured output products in host countries, so that higher FDI in the manufacturing sector can boost manufacturing output.

4. Based on the estimation results it can be seen that imports of manufacturing have a significant and positive impact on the output of Indonesia's manufacturing sector. This shows that the domestic manufacturing output has a strong competitiveness. However, the amount of incoming imports should not be released, the government must set import restrictions.

5. Based on the results of short-term estimates indicate that lending rates have a significant negative effect, while inflation and FDI have no significant effect on the output of the manufacturing sector.

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