The Effect of National Income, Exchange Rates, Foreign Exchange Reserves, and Inflation on Capital Goods Imports in Indonesia

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ABSTRACT
Capital goods are man-made products that play a crucial role in the production of commodities or services. This study conducts a comprehensive analysis, both in the long-term and short-term, to examine the influence of national income, exchange rates, foreign exchange reserves, and inflation on capital imports. Utilizing secondary data in the form of time series from Bank Indonesia and BPS (Central Statistics Agency) spanning from Q1 2005 to Q4 2020, the research employs the Error Correction Model (ECM) analysis technique. The findings reveal that, in the long term, national income and inflation exhibit positive yet insignificant effects, whereas exchange rates exert a considerable negative impact, and foreign exchange reserves yield a substantial positive effect. Interestingly, in the short term, national income, exchange rates, foreign exchange reserves, and inflation demonstrate no discernible impact on Indonesia’s imports of capital goods.

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INTRODUCTION
Capital goods are man-made goods that are useful in the production of goods or the provision of services. Such as machinery, buildings, equipment, and logistics. For example, in manufacturing, capital goods investment, in this case, the means of commodity production can be depreciated. However, production equipment can increase production capacity. When investment exceeds depreciation of capital goods, a firm or economy can produce more goods and services, especially for that economy and raise potential output.

Capital goods are different from raw materials. Both are used in the manufacturing process. However, the raw material will be further processed and turned into products. Therefore, raw materials will be part of the production process. On the other hand, the means of production are not part of production. Like machines, manufacturing companies use them to help transform and process finished materials. Capital goods are also different from consumer goods. In marketing we categorize goods into these two categories. Because capital goods are used to help convert inputs into outputs, be it other capital goods, intermediate goods, or consumer goods. In other words, we use it to do other things. In addition, capital goods are also used for other production activities such as shipping goods from warehouses to customers.

While consumer goods are used by consumers to meet the needs and desires of consumers. Consumer goods are for end use and are not intended for effective future use. Consumer goods directly satisfy the needs and desires of consumers. But capital goods do not, but we use capital goods as a tool to produce consumer goods, meaning that capital goods indirectly meet consumer needs. In principle, Indonesia’s import activities are aimed at meeting existing industrial needs. Importing is the legitimate transfer of products or goods from one country to another, often in the context of trade. Customs officers from supplier and receiving countries often need to be involved in the import process. Imports have an important role in global trade.

In this case, imports are intended to strengthen the balance of payments and reduce the country’s foreign exchange and allow a country’s import activities to obtain materials, goods, and services from limited quantities at the national level or cannot be produced at the national level. This indirectly supports the stability of the country.

The Decree of the Director General of Customs and Excise Number KEP-07/BC/2003 establishes the framework of laws and regulations relating to import management. According to Customs guidelines for imports, goods that are
outside the customs area (domestic) but within the customs area (abroad) are subject to import duties unless exempted or exempted.

The high value of Indonesia's imports compared to the previous year regarding Indonesia's current economic conditions which support economic growth, and Many components of raw and auxiliary materials are still imported due to limited supply. will cause havoc in many of the country's manufacturing industries (Yuliadi, 2008). The import of these goods cannot be avoided, but it is believed that it will facilitate local production and encourage the development of high export value.

The import of capital goods is directly related to the manufacturing process. If a country continues to depend on imports for local manufacturing, government actions will affect investment and production for that country's growth. The availability of foreign exchange in the context of expansion is thus one of the policies. Therefore, it is important to understand where to determine import demand and how these factors can change it (Ayodotun and Farayibi, 2016).

Import of Capital Goods

Imports correspond to the raw material needs of a country in the international market. Imports are the flow of goods and services to the consumer market of a country. The state improves the progress of society by importing a wide variety of quality goods and services at prices below prices that can be produced locally (Groumpos, 2016). In developing countries many industries turned to import substitution strategies in the development of urban industries in the post-World War II decades.

Some countries are still following strategies for economic and political reasons. Where import substitution requires efforts to replace imported goods, general consumer products are produced with domestic sources of production and supply. These efforts involved joint ventures with foreign companies that were given the impetus to create factories, they were with tariff protection and given tax and investment incentives. Although the cost of the first production may be higher than imports, this economic motive is emphasized more in the establishment of the import substitution manufacturing sector i.e. that this industry will eventually be able to profit from large-scale production and lower costs or what is known as the argument of the newly developed industry / infant industry for active protection.

National Income

National income is the sum of the final accounting figures issued by the state on all products, goods and services that have been produced during the year. The range of data included in this record includes the total income earned by domestic companies, the total payment of wages to domestic and foreign workers, as well as the total income for income and sales taxes by individuals and business entities. In addition, the national income data obtained can be used to make predictions about the country's economy in the future. These predictions can be used by business people to make economic plans to achieve future development (Sukirno, 2010). National income includes a slightly different concept of income from GDP. There are several concepts of alternative income that are interrelated starting with GDP and an increase or decrease in different amounts. The following is a formula for calculating the gross national product (GNP).

Foreign Exchange Reserves

A country's foreign exchange reserves are influenced by trade and import flows according to Tjahjono. The development of a country's current account must be closely monitored, as a short-term current account deficit can weigh on foreign exchange reserves in the long run. Therefore, the current account deficit is often seen as a signal of macroeconomic imbalance, which requires exchange rate adjustment or tightening macroeconomic policy. The formula for calculating foreign exchange reserves is:

\[ \text{FER}_t = (\text{FER}_{t-1} + \text{Tbt} + \text{Tmt}) \]

Inflation

The macro interest rate is the price of using money over a certain period of time. Interest is the price of credit because interest is a reward for the inconvenience of spending money. Interest rates relate to the role of time in
economic activity. Interest rates come from the preference to own money at the moment. In classical theory, interest is the price of money that can be borrowed (mutual funds), so interest is the price issued in the market or investment. According to Keynes, interest rates are a financial phenomenon, and interest rates are determined by the demand and supply of money that occurs in the financial market. The interest rate also means the income earned by those who temporarily transfer excess funds or surplus units of expenditure to those in need and use that money to cover the deficit or shortage of units of expenditure (Judissen, 2005).

The Relationship of National Income to Imports of Capital

Goods The increase in gross domestic product can reflect the welfare of the people experienced by a country, the increase in gross domestic product indicates an increase in people’s income. The increase in income led to a change in the tastes of people who increasingly liked imported products. It is believed that the use of imported goods is consistent with an increase in gross domestic product (Mankiw and Scarth, 2008). According to Pakpahan, the increase in imports should be supported by GDP. Imports are highly dependent on GDP, since GDP is a source of financing imports. Imports have a positive relationship with GDP, meaning that if imports increase, Indonesia’s GDP will also increase (Pakpahan, 2012).

Foreign Exchange Reserves Relationship to Imports of Capital Goods

Foreign exchange reserves play a very important role in a country’s international trade. So without strong foreign exchange reserves, the country’s economy will be in chaos. Therefore, the impact of reserve financing is very important for import purposes, debt financing, and to protect our economy from shocks that occur in the economy. Foreign exchange reserves have a positive effect. Because the more foreign exchange reserves a country has, the better the country can meet its import needs.

The Relationship of Inflation to Imports of Capital Goods

Inflation affects imports of capital goods both in the long and short term. Inflation causes the price of domestic goods to rise steadily, among other things because the demand for domestic goods increases and the supply is scarce (Fuji, 2005).

METHOD

This study refers to the basic model of multiple linear regression using the error correction model (ECM) method. The Error Correction Model (ECM) method is a form of model to estimate the short-term and long-term relationship between the variables of national income, exchange rate, inflation, interest rates, and imports of capital goods in Indonesia. ECM models can determine not only the effects of short-term and long-term economic models, but also their usefulness, such as overcoming problems with non-stationary data and slow regression.

Error Correction Model (ECM) assumes the existence of a long-term equilibrium relationship between two or more economic variables, but the imbalance occurs in the short term. The error correction mechanism corrects several imbalances in one period in the next. Adaptive processes become tools for reconciling short-term and long-term behaviors. Based on this concept, long-term relationships are evaluated with short-term relationships (De Fretes, Utomo, and Manongga, 2012). If the coefficient of ECT (λ) is insignificant and the value is not between 0 and 1, it means that no balance or long-term relationship occurs. The results of the estimates do not correspond to economic theory. The ECM model for this study is:

$$ IBMt^* = \beta_0 + \beta_1 PEND.NASIONAL_{t-1} + \beta_2 KURS_{t-1} + \beta_3 CAD.DEVIS_{t-1} + \beta_4 INF_{t-1} + \epsilon $$

Furthermore, the equation is formulated in the form of an ECM then the equation is as follows:

$$ IBMt^* = \beta_0 + \beta_1 PEND.NASIONAL_{t-1} + \beta_2 KURS_{t-1} + \beta_3 CAD.DEVIS_{t-1} + \beta_4 INF_{t-1} + \epsilon $$

Where:

- **IBM** = Import of capital goods
- **PEND.NASIONAL** = Nasional income
- **KURS** = US dollar exchange rate
- **INF** = Inflation
- **CAD.DEVIS** = Foreign Exchange Reserves
- \( \beta_1, \beta_2, \beta_3, \beta_4 \) = regression coefficient
RESULTS AND DISCUSSION

Unit Root Test

*Augmented Fuller Test* (ADF) is a test developed by Dickey Fuller that aims to find out the stationarity of data on a field. In this study, a root unit test was carried out using the Augmented Dickey Fuller (ADF) test, with the rule that the data is stationary if the calculated ADF value is greater than Mackinnon Critical Values = 0.05. Conversely, if the calculated ADF value is smaller than the Mackinnon Critical Values at a 5% confidence level, then the data is not stationary. The following root unit test results can be seen in the following table:

<table>
<thead>
<tr>
<th>Variable</th>
<th>ADF T - Statistic</th>
<th>Critic Value a = 5%</th>
<th>Prob</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM</td>
<td>-3.780899</td>
<td>-2.911730</td>
<td>0.0052</td>
<td>Stationer</td>
</tr>
<tr>
<td>PENDAPATAN</td>
<td>-10.60602</td>
<td>-2.909206</td>
<td>0.0000</td>
<td>Stationer</td>
</tr>
<tr>
<td>KURS</td>
<td>-9.446038</td>
<td>-2.909206</td>
<td>0.0000</td>
<td>Stationer</td>
</tr>
<tr>
<td>CADEV</td>
<td>-6.451996</td>
<td>-2.909206</td>
<td>0.0000</td>
<td>Stationer</td>
</tr>
<tr>
<td>INFLASI</td>
<td>-5.50169</td>
<td>-2.914517</td>
<td>0.0000</td>
<td>Stationer</td>
</tr>
</tbody>
</table>

Cointegration Test

This method uses the Augmented Dickey Fuller (ADF) statistical test by observing residual regression of stationary cognition or not. Then this residual value will use the Augmented Dickey Fuller (ADF) test to find out whether the residual value is stationary or not. The results of the ADF test can be seen in the following table:

Table 2. Cointegration Test Results

Null Hypothesis: ECT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=10)

<table>
<thead>
<tr>
<th>Test critical values:</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1% level</td>
<td>-3.538362</td>
<td>0.0000</td>
</tr>
<tr>
<td>5% level</td>
<td>-2.908420</td>
<td></td>
</tr>
<tr>
<td>10% level</td>
<td>-2.591799</td>
<td></td>
</tr>
</tbody>
</table>


The results of the cointegration test can be seen, where the ADF test value (-5.526904) > critical value (-2.908420) and with an ECT probability value of 0.0000 < 0.05. The stationary ECT value at the level means that the residual equation has been stationary at degree zero (0) or level. This means that there is a significant relationship (cointegration) in the long term between imports of capital goods and the variables that affect it, namely national income, exchange rates, foreign exchange reserves and inflation.

Correction Model (ECM) Error Results

The Error Correction Model (ECM) has uses, but the most important use is to solve the problem of non-stationary time series data or the problem of continuous regression. The ECM aims to correct short-term imbalances towards long-term balances. Here are the long-term and short-term estimation models:

Table 3. Long-term Error Correction Model (ECM) results

Dependent Variable: IBM
Method: Least Squares
Date: 12/29/23  Time: 21:41
Sample: 2005Q1 2020Q4
Included observations: 64

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income</td>
<td>0.250279</td>
<td>0.315776</td>
<td>0.792584</td>
<td>0.4312</td>
</tr>
<tr>
<td>Course</td>
<td>-185.1649</td>
<td>51.61805</td>
<td>-3.587212</td>
<td>0.0007</td>
</tr>
</tbody>
</table>
The Error Correction Model (ECM) model in the long term is as follows: IBM = 2076885 + 0.250279 Income - 189.1649 Course + 1719192 Caddev + 2868.406 Inflation + + εi ECM. Estimation results that show that in the long run the variables of national income, foreign exchange reserves, and inflation have a positive effect on imports of capital goods and only variable rates that negatively affect imports of capital goods and variables that a significant effect on the import of capital goods in the long term is the exchange rate and foreign exchange reserves with a significant level below 5%. Meanwhile, the variables of national income, inflation and interest rates have no significant effect because the resulting value is above 5%.

Table 3. Short-term Error Correction Model (ECM) results

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>Coefficient</td>
<td>Std. Error</td>
<td>t-Statistic</td>
<td>Prob.</td>
</tr>
<tr>
<td>Income</td>
<td>-0.077157</td>
<td>0.483890</td>
<td>-0.159452</td>
<td>0.8739</td>
</tr>
<tr>
<td>Course</td>
<td>4.317498</td>
<td>9.907198</td>
<td>0.435794</td>
<td>0.6646</td>
</tr>
<tr>
<td>Caddev</td>
<td>-25066.23</td>
<td>21804.49</td>
<td>-1.149590</td>
<td>0.2551</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.682530</td>
<td>0.113761</td>
<td>-5.999673</td>
<td>0.0000</td>
</tr>
<tr>
<td>C</td>
<td>22599.21</td>
<td>51345.18</td>
<td>0.440143</td>
<td>0.6615</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.405158</td>
<td>Mean dependent var</td>
<td>26213.35</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.352979</td>
<td>S.D. dependent var</td>
<td>414733.5</td>
<td></td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>333601.7</td>
<td>Akaike info criterion</td>
<td>28.36368</td>
<td></td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>6.34E+12</td>
<td>Schwarz criterion</td>
<td>28.56778</td>
<td></td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-887.4558</td>
<td>Hannan-Quinn criter.</td>
<td>28.44395</td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>7.764766</td>
<td>Durbin-Watson stat</td>
<td>2.176010</td>
<td></td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000013</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The ECM model in the short term is as follows: DIBM = 22599.21 – 0.077157t – 24.13609t + 4.317498t – 25066.23t + εi. The ecm estimation results above explain that in the short term the variables of national income, exchange rate, and inflation negatively affect imports of capital goods while the variables of foreign exchange reserves in the short term have a positive effect. However, the regression results of all variables have no significant effect on the import of capital goods in the short term, where the value obtained from each variable does not provide a condition that is greater than 5%.

Normality Test Results

The normality test is a test used to view data on independent variables, dependent variables and in regression models have a normal distribution or not. The normality test was carried out by comparing the probability value of JB (Jarque – Fallow) count with an alpha level of 0.05 (5%), the results of the normality test can be seen in the following figure.
Based on figure, it is known that the J-B statistical probability value of 0.320062 > 0.05 thus it is said that the data used in the ECM model have a normally distributed residual.

CONCLUSION

International economic and political policies pose challenges to international trade, leading countries to safeguard their raw materials from foreign control through measures like import restrictions and duties. While these measures may deter entrepreneurs engaged in importing goods, they benefit local small businesses by maintaining lower commodity prices. Moreover, the quality of production is significantly influenced by the level of education in a country. Rich in natural resources but lacking adequate human resources for processing, a country may struggle to compete globally. To address this, governments should focus on fostering human resource development through training programs to enhance community mindsets and competitiveness in creating essential tools and capital goods.

The Indonesian Government actively strives to sustain economic growth stability by boosting national income and ensuring sufficient local goods and services. A robust domestic supply can reduce imports, preventing negative impacts on the country's economic growth due to excessive importing. The local population’s ability to compete with foreign products lies in maintaining competitive prices and adopting alternatives to imported goods and services, fostering a resilient economy. Government and Bank Indonesia, as monetary authorities, play crucial roles in maintaining exchange rate stability to influence Indonesia’s import trends. Fluctuations in the rupiah exchange rate against the dollar significantly impact import demand, requiring strategic efforts to ensure stable foreign exchange availability. Besides promoting foreign exchange exports, diversifying forex can be leveraged to acquire more valuable commodities, allowing countries to compete for capital goods both domestically and internationally. New models and additional variables can further enhance our understanding of the dynamics of capital goods importation.

REFERENCES


