Journal of Business and Economics, ISSN 2155-7950, USA
August 2021, Volume 12, No. 8, pp. 825-834
DOI: 10.15341/jbe(2155-7950)/08.12.2021/002

http://www.academicstar.us

Analysis of the Effect of the Rupiah Exchange Rate on the US Dollar, GDP per Capita, Term of Trade, and Dwelling Time to Imports of Goods and Services Indonesia Year 2001-2018

Arnidya Puspa Martha[1], Ferdinandus Klea Latuan[2], Lailatul Pitriyah[3]

(1. Economic Development Department, University of Pembangunan Nasional "Veteran" Yogyakarta, Indonesia;

2. Petroleum Engineering Department, University of Pembangunan Nasional "Veteran" Yogyakarta, Indonesia;

3. Management Department, University of Pembangunan Nasional "Veteran" Yogyakarta, Indonesia)

Abstract: Indonesia, with its strategic location and abundant natural resources, is still in fact imports of goods and services to meet the domestic needs. Therefore, this study will discuss the effects of the rupiah exchange rate of the USD, GDP per capita, terms of trade, and dwelling time on imports of goods and services in Indonesia. This study uses Error Correction Model (ECM) analysis tool to see the long and short-term effects of each independent variable to the dependent variable. The analysis begins with data preparation, stationary test, cointegration test, followed by statistical tests and classical assumption tests. Based on the ECM, the results show that GDP per capita and term of trade give an effect on changes in imports of Indonesian goods and services in the long term. The short term of effect on changes only affected by GDP, while both the exchange rate and dwelling time give no effect.

Key words: error correction model; rupiah exchange rate against USD; GDP per capita; terms of trade; dwelling time

JEL code: O

1. Introduction

Indonesia is a country with abundant natural resources. Apart from that, Indonesia's geographical location is also very strategic, which is right on the world trade route. Indonesia, with its strategic location and abundant natural resources, is in fact still unable to meet domestic needs, so it still imports goods and services. The import policy is carried out because the Indonesian government has not been able to produce all domestic needs (Ayu et al., 2014). Not only that, due to the lack of experts capable of processing these resources, Indonesia must still import raw materials in order to produce a product that will be exported later.

According to Purnamawati (2013), import is one component of expenditure or consumption for goods or services from abroad. The imports of Indonesian goods and services from 2001-2018 tended to increase every year. In line with Mankiw's (2006) theory that the exchange rate (exchange rate) is one of the factors that influence

Arnidya Puspa Martha, Ferdinandus Klea Latuan, and Lailatul Pitriyah, University of Pembangunan Nasional "Veteran" Yogyakarta. E-mail: arnidyapm@gmail.com.

imports in a country, fluctuations in foreign exchange supply and demand will have an impact on export and import activities for countries that adopt an open economic system, including Indonesia. Another factor that affects imports of Indonesian goods and services is GDP per capita. An increase in national income will increase the purchasing power of the community to import, however, on the other hand, an increase in national income will also increase the community's ability to carry out the production process which will later be exported to other countries.

In addition, the basis of international exchange is closely related to international trade to determine how much profit is derived from this trade. If the export price is higher than the import price, the country's position is considered good because it generates profits. Conversely, if the import price is higher than the export price, the country's position is considered unfavorable. Efficient logistics will connect the company with domestic and international markets. However, the reality is that in Indonesia there are still many problems in realizing maritime prosperity. One of these problems is that dwelling time is Indonesia's still high (46th in the ranking Logistic Performance Index ASEAN).

Based on the above description, it is necessary to analyze the effect of the rupiah exchange rate on the US dollar, GDP per capita, international exchange rates, and dwelling. time on imports of Indonesian goods and services, in order to see the short-term and long-term effects of these variables on imports of Indonesian goods and services in 2001-2018. The analytical tool used in this study is the Error Correction Model (ECM). This method has been used in previous research by Posma Sariguna Johnson Kennedy (2019); Kuswantoro and Gita Rosianawati (2016); Vita Agustarita Singgih and I Wayan Sudirman (2015); Popy Anggasari (2008); Teddy Christianto Leasiwal (2012); Francisca Sestri Goestjahjanti (2016); I Putu Agung Baskara Dananjaya, AA Ketut Jayawarsa and AA Sri Purnami (2019); and many others.

Our hope is that this paper can provide knowledge about the factors that influence the import of goods and services in Indonesia and can contribute in the form of insights or knowledge related to the factors that affect the import of Indonesian goods and services.

2. Literature Review

2.1 Imports of Goods and Services

According to Purnamawati (2013) Import is one component of expenditure or consumption for goods or services from abroad. In the theory of consumption, it is stated that consumption is determined by the level of income. Likewise for the consumption of goods and services from abroad, the amount will be largely determined by the factor of income, although in fact imports are also determined by other factors. There are several factors that can affect imports, including the level of income, the relative price of goods at home and abroad and the domestic exchange rate against foreign currencies.

Based on Adam Smith's theory of absolute advantage, international trade can only occur in countries that have absolute advantage. If a country is more efficient than another country in producing a commodity, but less efficient than another country in producing another commodity, then the two countries can benefit from their respective specialization in producing commodities that have absolute advantages and exchange them for other commodities. which has an absolute loss. Through this process, the resources in both countries are used in the most efficient manner.

2.2 Rupiah Exchange Rate against US Dollar Currency

Exchange rate is a very important macroeconomic variable, because exchange rate movements can affect economic stability and activity, especially international economic transactions which include trade and investment. So, the rupiah exchange rate is the value of one rupiah currency which is translated into the currency of another country.

International trade, both export and import, cannot be separated from the payment process. Therefore, the emergence of foreign currency or what is often referred to as foreign exchange (forex). Pakpahan (2012) argues that the exchange rate has a negative relationship with imports. Meanwhile, Indrayani and Swara (2014) stated that the depreciation or appreciation of the currency value will result in changes in imports. The exchange rate which always fluctuates will have an impact on the country of Indonesia where the Indonesian state imports many industrial raw materials. This can lead to a crisis of confidence in the domestic currency, which can lead to a decline in the credibility of the rupiah and cause difficulties in importing goods that are needed domestically.

According to Mankiw's theory based on Figure 1, the lower the exchange rate, the cheaper the price of domestic goods is relative to foreign goods and the greater the net export.

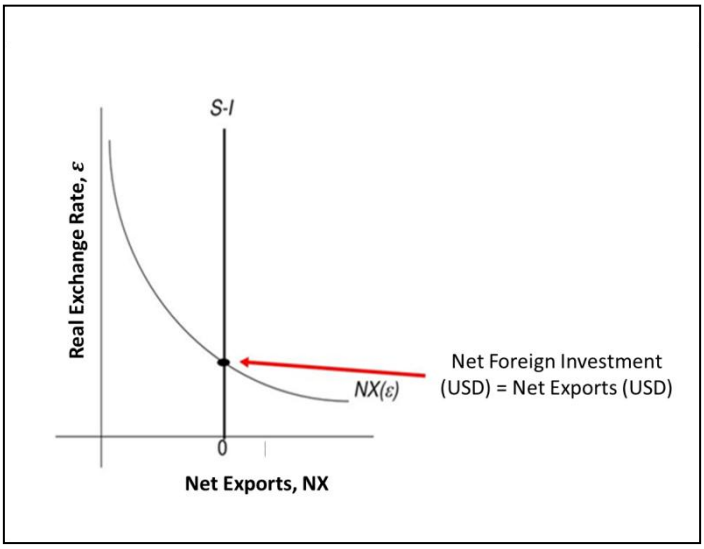

Figure 1 Mankiw Exchange Rate Theory

2.3 Gross Domestic Product per Capita

In a country's economy, there is an indicator used to assess whether the economy is running well or badly. Indicators in assessing the economy must be able to be used to find out the total income earned by everyone in the economy. The indicator that fits in making this measurement is Gross Domestic Product (GDP). GDP also measures two things at the same time, namely the total income of all people in the economy and the total expenditure of the country to buy goods and services from the economy.

Real GDP per capita has a relationship to international trade, especially on imports of a commodity. If the GDP per capita of a country increases, the country will have more purchasing power, the increased income has an important role to play in the demand for imported goods, so it will tend to increase. That is why GDP per capita in a country affects changes in the volume of trade between countries.

2.4 Term of Trade

The term of trade is measured as an index number which represents the ratio of the average export price to the average import price. If export prices improve relative to import prices, this indicator is said to have improved (the international exchange rate is greater than 100%), because the country will be able to buy more imports with the same amount exports. A value of more than 100% indicates that the country accumulates more capital from exports than its expenditures on imports. Conversely, if import prices rise faster than export prices, the basis of international exchange deteriorates. A larger volume of exports must be sold to finance a certain amount of imported goods and services. Usually this leads to lower living standards because imports of food and technology are more expensive.

According to Imamudin Yuliadi (2008) the basis of international exchange (term of trade) has a positive effect. This is because the basis of international exchange is a real factor that affects the pattern and direction of Indonesian trade with trading partner countries in several types of commodities.

2.5 Dwelling Time

According to the definition of The World Bank, dwelling time is the time calculated from the time a container is unloaded and lifted (unloading) from the ship until the container leaves the port terminal through the main gate.

According to Sandee (2012), high dwelling time will affect the economy from two sides. First, dwelling time adds uncertainty to the export process making it difficult for local industries to sell goods abroad. Second, delays in the import process increase costs for domestic businesses and consumer prices. Dwelling time can also affect logistics performance. Where the poor performance of logistics with very expensive freight costs will be one of the obstacles to the competitiveness of Indonesian industry and trade at the international level (Yuliarahmah, 2013).

2.6 Error Correction Model (ECM)

ECM (Error Correction Model) is a model used to see the long and short-term effects of each independent variable on the dependent variable (Satria, 2004). In this study, the independent variables determine the long-term and short-term, namely the US dollar exchange rate, GDP per capita, and international exchange rates, and dwelling time on imports of Indonesian goods and services. The following is a form of ECM (Error Correction Model):

$$LNY_t = \beta + \beta_1 LNX_{1t} + \beta_2 LNX_{2t} + +\beta_3 LNX_{3t} + \beta_4 LNX_{4t} + e_t \quad (1)$$

$$DY_t = \alpha + \alpha_1 DLNX_{1t} + \alpha_2 DLNX_{2t} + \alpha_3 DLNX_{3t} + \alpha_4 DLNX_{4t} + \alpha_5 ECT(-1) \quad (2)$$

where LNY is the imports of goods and services; LNX_1 is the rupiah exchange rate against USD (in natural logarithms); LNX_2 is GDP per capita (in natural logarithms); LNX_3 is term of trade (in natural logarithms); LNX_4 is dwelling time (in natural logarithms); α and β are constant; α_1, α_2, α_3, β_1, β_2, and β_3 are the regression coefficient; t is the time series; e is the error term; D is the delta; and ECT is the error correction term.

This form of ECM provides an advantage for researchers where first the researcher can get an idea of whether the variables in the equation are cointegrated or not. Second, researchers can observe the process towards equilibrium which is reflected in the short-term dynamic model and can observe long-term equilibrium conditions. In addition, researchers can observe the speed of adjustment towards equilibrium in the event of a shock in the economy.

3. Methodology

The research begins with the data preparation, includes imports of goods and services as a variable "Y", Rupiah exchange rates against US dollars, GDP per capita, term of trade, and dwelling time. Furthermore, the stationarity test was carried out using the Augmented Dickey-Fuller (ADF) method to see the strata of each variable. If the strata of each variable are *first difference* or *second difference*, the ECM can be continued to regression to see the long-term effect of other variables on the variable "Y". Furthermore, the cointegration test is carried out to see the value of ECT. It should be noted that ECM can only be continued if the strata of the ECM level is at the maximum at the *level* strata (cannot be used at the *first difference* or *second difference* strata). The next stage is to carry out the Statistical Test and Classical Assumption Test to draw conclusions. The flowchart of the methodology we use in this paper is shown on Figure 2.

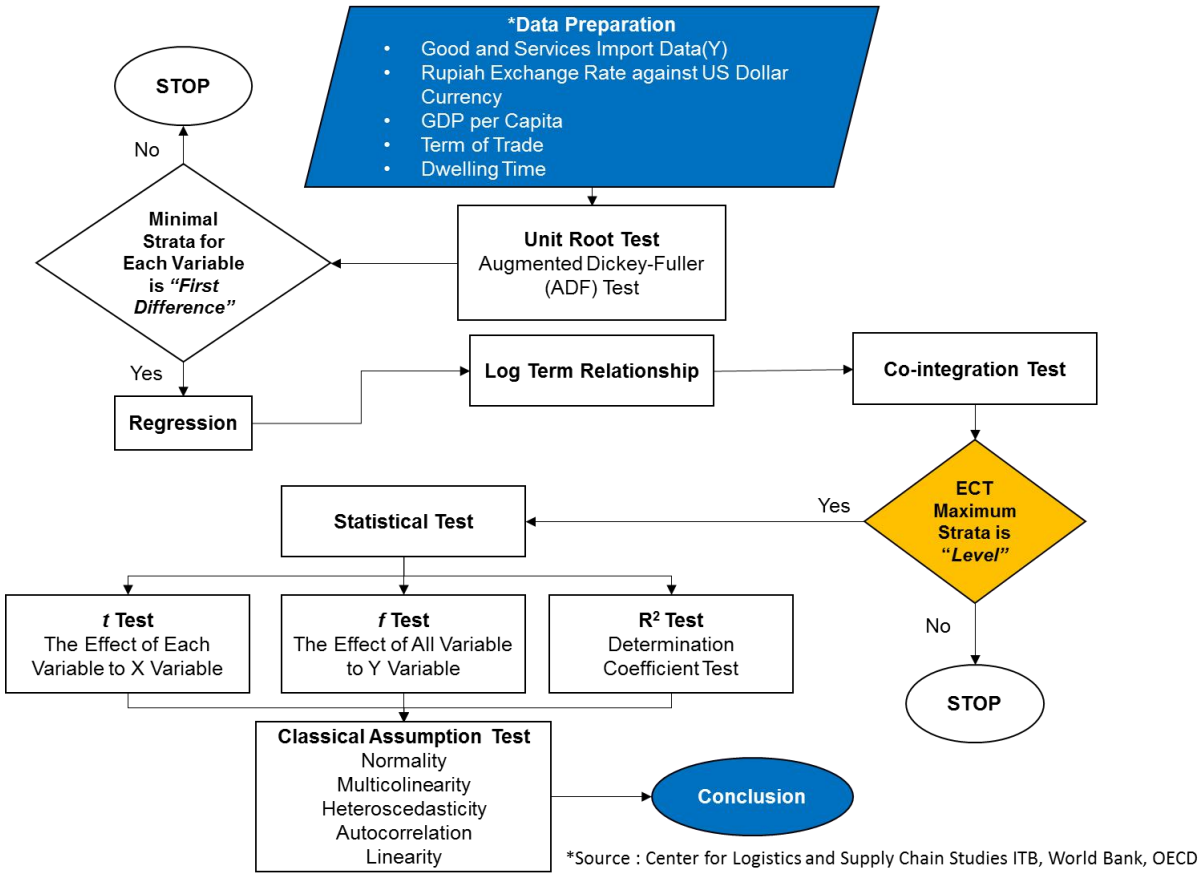

Figure 2 Methodology of Analysis

4. Case Study

4.1 Analysis

The analysis was done according to the flow chart on Figure 2. Table 1 shows the stationary test results; Table 2 shows the ECM Model Estimation results; Table 3 shows the long term estimation results; Figure 3 shows the normality test results; Table 4 shows the multicollinearity test results; Table 5 shows the heteroscedasticity test results; Table 6 shows the autocorrelation test results; and Table 7 shows the linearity test results.

Table 1 Stationary Test Results

Variabel	Unit Root Test					
	Level		First Difference		Second Difference	
	ADF	Prob	ADF	Prob	ADF	Prob
LNY	-1.134689	0.6763	-3.485806	0.0229	-4.984869	0.0015
LNX_1	-1.288151	0.6098	-2.463469	0.1418	-5.963860	0.0003
LNX_2	0.332084	0.9727	-2.951025	0.0615	-4.751884	0.0023
LNX_3	-1.859093	0.3418	-3.830664	0.0119	-5.880443	0.0003
LNX_4	-0.946701	0.7470	-4.069033	0.0075	-7.568129	0.0000

Table 1 Stationary Test Results (Continue)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.762417	0.0023
Test critical values:	1% level	-4.004425	
	5% level	-3.098896	
	10% level	-2.690439	

Table 2 ECM Model Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	t-tabel
$D(LNX_1)$	0.153196	0.580317	0.263986	0.7967	-1,77093
$D(LNX_2)$	8.576955	3.232491	2.653358	0.0225	1,77093
$D(LNX_3)$	0.867316	0.532389	1.629102	0.1316	1,77093
$D(LNX_4)$	0.158073	0.159878	0.988710	0.3441	-1,77093
ECT(-1)	-0.803910	0.262582	-3.061559	0.0108	
C	-0.300961	0.123433	-2.438248	0.0329	
R-squared	0.717069				
Adjusted R-squared	0.588464				

Table 3 Long Term Estimation Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.	t-tabel
LNX_1	-0.938817	0.676346	-1.388072	0.1884	-1,77093
LNX_2	2.447169	1.056986	2.315233	0.0376	1,77093
LNX_3	2.362331	0.712247	3.316728	0.0056	1,77093
LNX_4	0.342896	0.212016	1.617315	0.1298	-1,77093
C	0.692765	6.431095	0.107721	0.9159	
R-squared	0.951955				
Adjusted R-squared	0.937172				

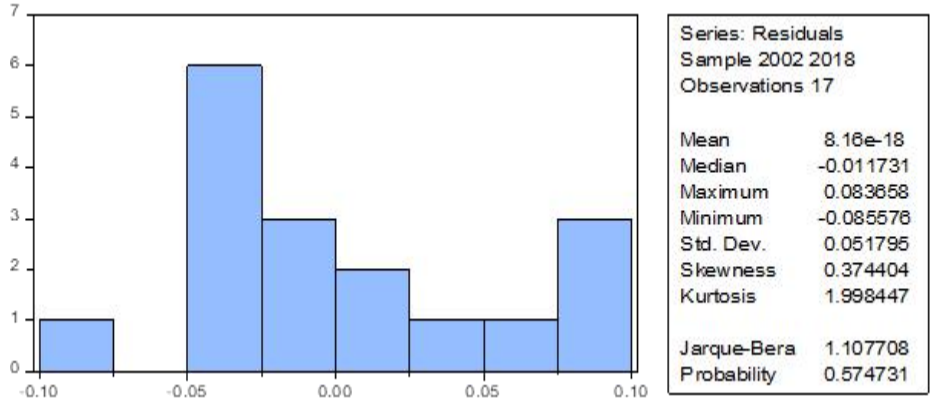

Figure 3 Normality Test Results

Table 4 Multicollinearity Test Results

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
$D(LNX_1)$	0.336768	8.356402	1.954140
$D(LNX_2)$	10.44900	72.19428	1.275230
$D(LNX_3)$	0.283438	2.018399	1.796288
$D(LNX_4)$	0.025561	1.523436	1.441902
ECT(-1)	0.068949	1.580034	1.574784
C	0.015236	66.37531	NA

Table 5 Heteroscedasticity Test Results

F-statistic	1.397300	Prob. F(5,11)	0.2983
Obs*R-squared	6.603313	Prob. Chi-Square(5)	0.2519

Table 6 Autocorrelation Test Results

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.811425	Prob. F(2,9)	0.2182
Obs*R-squared	4.879124	Prob. Chi-Square(2)	0.0872

Table 7 Linearity Test Results

Ramsey RESET Test			
	Value	df	Probability
t-statistic	1.098813	10	0.2976
F-statistic	1.207389	(1, 10)	0.2976
Likelihood ratio	1.937800	1	0.1639

4.2 Discussion

The term of trade is measured as an index number which represents the ratio of the average export price to The GDP per capita variable in the short-term test or ECM has a regression coefficient of 8.576955. This means that in the short term the relationship between GDP per capita and imports of Indonesian goods and services has a positive relationship, meaning that the growth in the variable GDP per capita period t is 1%, it will cause the variable imports of Indonesian goods and services to increase by 8.576955.

This estimation result is in accordance with the hypothesis which states that GDP per capita has a positive effect on imports of Indonesian goods and services. Generally, a country's economic growth is measured by GDP.

GDP greatly affects the pattern of public consumption, whereas the consumption pattern of the country's population increases, imports will also tend to increase. Nopirin (2009) stated that the higher the GDP in a country, the greater the possibility for that country to import. As with other countries, Indonesia also needs imports to meet the country's needs. In 2018 the growth of Indonesian consumer goods was 12.49%, the growth of Indonesian capital goods was 15.68%, and Indonesia's supporting raw materials was 75%.

Based on the increasing class of goods such as fruit, iron and steel, fertilizers, weapons and ammunition. Meanwhile, items that experienced a decline were organic chemicals, plastic goods, and jewelry and gems. Meanwhile, imports of raw materials meanwhile decreased imports of raw materials in December, namely crude oil and several chemicals.

The results of this study are in accordance with the research of Vita Agustarita Singgih and I Wayan Sudirman (2015) which states that partially, the GDP variable has a positive and significant effect on Indonesian maize imports in 1997-2013. Based on Kuswantoro's research, Gita Rosianawati (2016) in the short term shows that the GDP variable has a positive and significant effect on non-oil and gas imports in Indonesia.

The GDP per capita variable in the long-run test or OLS has a regression coefficient of 2.447169. This means that in the long run the relationship between GDP per capita and imports of Indonesian goods and services has a positive relationship, meaning that the growth in the variable GDP per capita period t is 1%, it will result in the variable imports of Indonesian goods and services experiencing a growth of 2.447169.

This estimation result is in accordance with the hypothesis which states that GDP per capita has a positive effect on imports of Indonesian goods and services. According to Mankiw (2006) an increase in GDP reflects the welfare of a country. Increased income can lead to an increase in purchasing power followed by changes in taste for products. Not only that, an increase in GDP per capita indicates that there are sources of financing from other countries that rely on GDP per capita. This requires Indonesia to safeguard foreign exchange reserves. Where foreign exchange reserves have a function for financing purposes and foreign liabilities including import financing and other financing to foreign parties (Tambunan, 2011). If the amount of foreign exchange reserves is increasing, the availability for import payments will also be better.

This is in accordance with the research of I Gusti Agung Ayu Apsari Anandari and I Wayan Yogi Swara (2015) that partially, GDP, IHPB, and PMA have a positive influence on imports of capital goods. In addition, according to Fitri Kurniawati and Anak Agung Ayu Surasmiati (2015), the partial test results, namely gross domestic product have a significant positive effect, but foreign exchange reserves do not have a significant effect on imports of industrial raw materials. Kuswantoro and Gita Rosianawati (2016) in the long run Real GDP in the long run has a positive and significant effect on non-oil and gas imports.

The basic international exchange variable in the long-run test or OLS has a regression coefficient of 2.362331. This means that in the long run the relationship between the international exchange base and imports of Indonesian goods and services has a positive relationship, meaning that the growth in the international exchange base variable period t is 1%, it will result in the variable import of imports of Indonesian goods and services growing by 2.362331.

This estimation result is in accordance with the hypothesis which states that the basis of international exchange has a positive effect on imports of Indonesian goods and services. The basic concept of international exchange (term of trade) is the most common using the Net Barter Term of Trade or also known as Commodity Terms of Trade. Term of trade is a real factor affecting the direction of trade between Indonesia and countries that cooperate on several types of commodities. This is said to be good because amid the swift inflow of imported

products from other countries, the competitiveness of Indonesia's domestic products remains strong.

5. Conclusion

Based on the results of this study, it is known that both in the short and long term, the GDP per capita variable has a positive and significant effect on imports of Indonesian goods and services. In addition, there is a balance between the short term to the long term on term of trade variables which have a positive and significant effect on imports of Indonesian goods and services. Based on the results of the F test, the results show that the variables of the rupiah exchange rate against the US dollar, per capita GDP, term of trade, and dwelling time have an effect on changes in imports of Indonesian goods and services both in the short term and in the short term..

Acknowledgements

Thanks to University of Pembangunan Nasional "Veteran" Yogyakarta, Indonesia for supporting this paper writing.

References:

Anandari, I. Gusti Agung Ayu Apsari and I Wayan Yogi Swara (2015). *E-Jurnal EP Unud*, Vol. 4, No. 3, pp. 150-158.

Anggasari Popy (2008). "Analisis Faktor-Faktor Yang Mempengaruhi Volume Impor Kedelai Indonesia", Skripsi. Departemen Ilmu Ekonomi Fakultas Ekonomi Dan Manajemen Institut Pertanian Bogor.

Agustin Grisvia. (2009). "Analisis Paritas Daya Beli Pada Kurs Rupiah terhadap Dolar Amerika Serikat Periode September 1997 – Desember 2007 dengan Menggunakan Metode Error Correction Model", *JESP*, Vol. 1, No. 1.

Dananjaya I Putu Agung Baskara, Ketut Jayawarsa A. A. and Sri Purnami A. A. (2019). "Pengaruh Ekspor, Impor, Kurs Nilai Tukar Rupian, Dan Tingkat Inflasi Terhadap Cadangan Devisa Indonesia Periode 1999-2018", *Warmadewa Economic Development Journal*, Vol. 2, No. 2, pp. 64-67.

Ghozali Imam (2013). "Aplikasi Analisis Multivariate dengan Program IBM SPSS 21 Update PLS Regresi", Semarang: Badan Penerbit Universitas Diponegoro.

Goestjahjanti Francisca Sestri (2016). "Pengaruh Fluktuatif Kurs Terhadap Term of Trade Dan Implikasinya Kepada Daya Saing Indonesia", Pamulang. *Jurnal KREATIF: Pemasaran, Sumberdaya Manusia dan Keuangan*.

Imamudin Yuliadi (2008). "Analisis Impor Indonesia", *Jurnal Ekonomi dan Studi Pembangunan*, Vol. 9, No. 1, pp. 89-104.

Indrayani, Ayu, Ni Kadek and I. Wayan Yogi Swara (2014). "Pengaruh Konsumsi, Produksi, Kurs Dolaar AS Dan PDB Pertanian Terhadap Impor Bawang Putih Indonesia", *Jurnal Ekonomi Pembangunan*, Vol. 3, No. 5, pp. 209-218.

Kurniawati, Fitri dan Anak Agung Ayu Suresmiathi D. (2015). "Pengaruh Cadangan Devisa, Pdbdan Kurs Dollar Amerika Serikatterhadap Impor Bahan Baku Industri di Indonesia", *E-Jurnal EP Unud*, Vol. 4, No. 7, pp. 840-854.

Kuswantoro Gita Rosianawati. (2016). "Analisis Pengaruh Pdb Riil, Cadangan Devisa Dan Nilai Tukar Rupiah Terhadap Impor Nonmigas Di Indonesia", *Jurnal Ekonomi-Qu*.

Leasiwal Teddy Christianto (2012). "The analysis of Indonesia economic growth: A study in six big islands In Indonesia", *Journal of Economics, Business, and Accountancy.*

Nopirin. (2009). *Ekonomi Moneter* (1st ed.), BPFE Publisher. Jakarta.

OECD. Available online at: https://data.oecd.org/trade/terms-of-trade.

Pakpahan Asima Ronitua Samosir (2012). "Analisis Faktor-Faktor yang Mempengaruhi Impor Daging Sapi di Indonesia", *EDAJ*, Vol. 1, No. 2.

Purnamawati A. and Fatmawati S. (2013). *Dasar-dasar Ekspor Impor: Teori, Praktik, dan Prosedur*, Upp Stim Ykpn, Yogyakarta.

Sadono Sukirno (2010). *Makroekonomi: Teori Pengantar* (Edisi Ketiga), PT, Raja Grasindo Perseda, Jakarta.

Salvatore Dominick (2014). "Ekonomi Internasional, Jakarta Selatan: Salemba Empat.Saputra, Febrian Deni. 2015. Analisis impor Indonesia dari Cina", Jambi, *e-Jurnal Perdagangan, Industri dan Moneter*.

Sandee Henry (2012). "Why Dwell time matters", *The Trade Post*, 2 Juli 2012.

Saputra Febrian Deni. (2015). "Analisis impor Indonesia dari Cina", available online at: http://blogs.worldbank.org/trade/whydwell-time-matters.

Sariguna Posma and Johnson Kennedy. (2019). "Analisis Tingginya Biaya Logistik di Indonesia Ditinjau Dari Dwelling Time", DKI Jakarta, *Journal Economy Resources*.

Satria A. (2004). "Pengantar Sosiologi Masyarakat Pesisir. Jakarta: Pustaka Cisendo", *Perdagangan, Industri dan Moneter*, Vol. 3. No. 1.

Singgih Vita Agustarita and I Wayan Sudirman. (2015). Pengaruh Produksi, Jumlah Penduduk, PDB Dan Kurs Dollar Terhadap Impor Jagung Indonesia. E-Jurnal Ekonomi Pembangunan Universitas Udayana.

Tulus T. H. Tambunan (2011). *Perekonomian Indonesia: Kaian Teoritis dan Analisis Empiris*, Bogor: Ghalia Indonesia.

World Bank. http://www.data.worldbank.org.

Yuliarahmah (2013). "Permasalahan Logistik Nasional, Safety First", 24 November 2013, available online at: http://yuliapoltran.blogspot.com/2013/11/permasalahan-logistik nasional.html.