

Analysis of the Factors Affecting Trade Balance in Indonesia

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Abstract---which means that Indonesia's export value has decreased and imports have tended to increase. While the Indonesian domestic currency (IDR) has depreciated against several other currencies including the American currency (USD). In theory, it would be explained if the currency of a domestic currency depreciates then exports should increase because the commodity of the country is competitive compared to other countries in the international market, whereas the government will limit imported commodities because imported goods will be increasingly expensive. This arises from the occurrence of research gaps. export value, import value, exchange rate and GDP on the trade balance, especially in Indonesia in the short and long term. The results of the study explained that in the long term for 35 years (1980 - 2015), referring to all independent variables (export value, import value, exchange rate and GDP) significantly affected the trade balance of 55.08 percent, while the remainder was explained by other variations that were not included in this research model. However, in the short term, the results of the co-integration test and error-error method show that all independent variables do not occur in the short-run equilibrium relationship with the dependent variable. All independent variables are inversely proportional to trade balance.

Keywords---Gross Domestic Product (GDP), Export, Import, Exchange Rate, Trade Balance.

INTRODUCTION

International trade which is part of an open economy related to exports and imports is an important matter and influences the improvement of welfare and development in a country. The government should try to increase exports by seeking opportunities for foreign market expansion aimed at increasing the country's income (foreign exchange) and suppressing imports from other countries which are state expenditures, so that the trade balance surplus is expected to occur. However, the industry in Indonesia uses more raw materials that are still imported from abroad (imports).

There are several factors that influence the trade balance including the exchange rate of economic growth, export and import. These factors will be used as study material in trade balance research in Indonesia.

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Table 1: Exchange Rate, Export, Import And GDP Growth

Tahun	Idr/Usd	Export (Thousand Usd)	Import (Thousand Usd)	Gdp Growth
2012	8,996.00	151,775,046	178,666,955	6.030050653
2013	9,069.00	148,500,805	176,255,994	5.557263689
2014	9,793.00	146,540,725	168,310,225	5.006668426
2015	12,171.00	131,940,836	135,075,913	4.8763223
2016	12,388.00	131,553,644	129,151,797	5.033279592
2017	13,788.00	153,280,799	150,068,580	5.067680274
2018	14,414.00	79,571,444	85,531,073	

Source : bi.go.id (Indonesia's central bank)

It can be seen in table 1.1 where in 2013 to 2016 there was a decline in export and import during the IDR to USD depreciation exchange rate. This was in accordance with international trade theory that if there was a domestic currency depreciation, then a decline in exports would occur. but imports will increase because goods from other countries are seen as cheaper. However, this does not happen in 2015 to 2016 when IDR depreciation occurs against the USD whereas exports and imports decline, it should be based on the above theory, when the domestic currency depreciates against foreign currencies then exports will increase. This happened a research gap that is not appropriate between the theory and facts that actually happened. This is reinforced by the graph below, namely the growth of Indonesia's export import from 1975 to 2016:

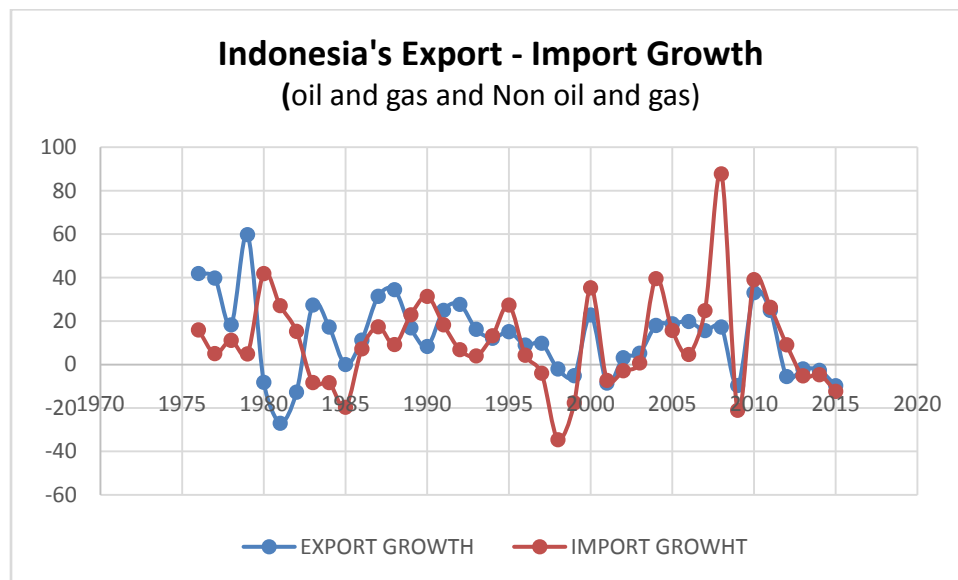


Figure 1.2: Indonesia's Export Import Growth

Source : Central bureau statistics (Biro Pusat Statistik-BPS)

Can be seen in graph 1.2 above shows the growth of Indonesia's import export in the long term from 1975 to 2015. From 1975 to 1979 the Indonesian state experienced a trade balance surplus, from 1980 to 1983 Indonesia experienced a trade balance deficit in which export dropped temporarily import rises dramatically. In 2008 there was a very high import surge while exports experienced a very low decline so that Indonesia experienced a very large trade balance deficit even though at that time the IDR depreciated against the USD. The same thing happened in 2014 to 2015, which increased very high so that Indonesia experienced a very large trade balance deficit, but exports experienced a decline, this occurred when the IDR experienced a depreciation towards the USD.

The Indonesian government's efforts to increase foreign exchange earnings from exports continue to be sought and improved in the context of financing development in the country. For this reason, Bank Indonesia needs to maintain the stability of the rupiah, because one of the components that affects the value of export imports (trade balance) is exchange rate stability (exchange rate). Indonesia adheres to the free floating exchange rate system stipulated in Law Number 23 of 1999 concerning Bank Indonesia and Law Number 24 of 1999 concerning Foreign Exchange Traffic and the Exchange Rate System. Below is a graph that shows the long-term trend for the rupiah (IDR) against the US dollar (USD) :

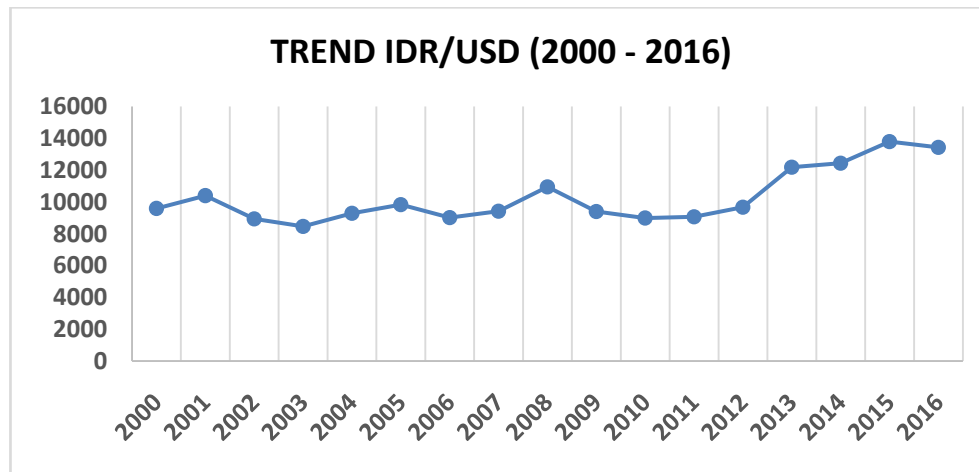


Figure 1.1: *Trend IDR to USD 2000 until 2019 Years*

Based on the explanation above, the author intends to analyze how much influence the exchange rate, export value, import value and economic growth on Indonesia's trade balance.

II. LITERATURE REVIEW

II.I. Theory of International Trade (Export - Import).

The relationship between one country and another country arises due to the fact that among these countries need each other, especially the need for goods consumed or goods produced, this is the background of international trade as described in several theories of international trade, said by Adam Smith states about absolute advantage, this theory explains that a country will specialize and export a type of goods where the country has absolute advantage over the commodity and otherwise the country will import goods if the country does not have absolute superiority (absolute disadvantage). Even this theory encourages free trade (free trade), namely that each country will do specialization based on absolute superiority above that of each country.

Other international trade theories, namely those proposed by David Ricardo about the law of comparative advantage, explain that international trade can occur due to differences in the function of factors of production, namely labor factors. The difference in this function leads to the occurrence of efficiency differences (cost cooperative advantage), meaning that a country will specialize in production and export the product relatively more efficiently than other countries. In addition, the issue of efficiency differences also involves labor productivity (production comparative advantage), meaning that a country will specialize in production and export products relatively more productively than other countries.

II.II. Trade Balance.

The trade balance which is part of the current account represents the difference between the export value and the import value or the difference between export revenue and import expenditure. If export revenues are greater than import expenditure, the country experiences a trade balance surplus, whereas the country experiences a trade balance deficit.

II.III. Exchange Rate

The exchange rate itself can be interpreted as the price of a country's currency (domestic currency) which is converted in the form of another country's currency (foreign currency). The exchange rate is one of the factors or

components that have an important role in influencing the open economy given the strong influence on the current account balance. In addition, the exchange rate of a country's currency to other countries shows indicators of national economic competitiveness in international markets and is a comparison between the level of commodity prices in the international market relative to commodity prices in the country.

So that the exchange rate can also be used as a tool to measure the economic condition of a country. The growth of a stable currency value indicates that the country has a relatively good or stable economic condition (Salvator, 1997: 10).

II.IV. Effect of Exchange Rate on Trade Balance

Exchange Rate has a strong influence on trade balance. When domestic currency experiences depreciation towards foreign currencies, exports must increase and imports must decrease as compensation from rising import prices. Conditions under the situation of real exchange rate depreciation can increase net exports. The change in the trade balance above can be formulated with this brought equation :

$$\Delta NX = \Delta X - \epsilon(\Delta IM) - IM(\Delta\epsilon) \dots\dots\dots 2.1$$

II.V. Gross Domestic Product (GDP)

Gross Domestic Growth is a measure of the aggregate output of income from a country. So that Gross Domestic Product (GDP) is the total value of all products produced by the production sectors by utilizing existing production factors in the region for a period of time, without regard to the origin of the actors of production (BPS, 2014).

The relationship of GDP to the trade balance is where GDP is closely related to the influence of the ups and downs of the value of exports and imports. If domestic GDP increases, this will lead to an increase in Indonesia's imports of capital goods and raw materials. This situation will facilitate production activities in Indonesia which will ultimately increase Indonesia's exports abroad.

II.VI. Previous Research (Emperical Study)

Research conducted by Petrović, Pavle, 2010 "Exchange Rate and Trade Balance: J-curve Effect" says that exchange rate depreciation in Serbia improves the trade balance in the long run, while giving an increase in J-Curve effects in the short term.

Yusoff, Dr. Mohammed B .; C2007, has examined the relationship of trade balance with the real long-term exchange rate that occurred in Malaysia by using co-integration techniques, namely a procedure stated by Johansen (1991) and Johansen and Juselius (1990). That the trade balance is influenced by several factors such as; changes in exchange rates, monetary and fiscal policies, income growth both in domestic and foreign countries, supply shock and competitiveness. The results of this study show that the real exchange rate, foreign income turns out to significantly explain variations in the trade balance. The trade balance can increase around 8 percent in the long run in response to 10 percent real depreciation. In addition, a 10 percent increase in Malaysia's income will affect around 9.7 to increase the trade balance, thus suggesting that the expansion of import yields can increase which can be exported and domestic income (Saudi, 2018).

Kooll, Bahmani-Os and Kantimpong, 2001, examined the relationship of trade balance with real exchange soybeans. The two authors used the object of research on trade relations between Thailand and several countries which were trading partners, namely Germany, Japan, Singapore, Britain and America. The results showed that changes in the Bath Thai exchange rate only had a significant effect on trade relations with the United Kingdom and the United States. This shows a decline in the Bath exchange rate against the US Dollar and the British Pound Steering, as a result of the increase in the rate of exports and a decline in the rate of imports. So that there is a surplus in the trade balance of Thailand towards the two countries.

II.VIIHypothesis

The hypothesis is a temporary answer to the problem to be examined whose truth must be tested empirically. From the description, statement and empirical study above, in this study the hypothesis is:

- 1) There was a positive influence on the real exchange rate on Indonesia's trade balance over a period of 35 years from 1980.d. 2015.

- 2) There was a positive influence on the export value of Indonesia's trade balance over a period of 35 years from 1980.d. 2015.
- 3) There was a negative influence of GDP on Indonesia's trade balance over a period of 35 years from 1980.d. 2015.
- 4) There was a negative influence on the import value of Indonesia's trade balance during the 35 years from 1980 d. 2015.

III. METHOD RESEARCH

In this study, the scope of the study is the effect of exchange rates, export values, import values and gross domestic product which are the factors that influence the trade balance. The research location is Indonesia. While the data used in this study is to use secondary data (time series) on an annual basis taken from several sources (Indonesia Bank, World Bank, International Financial Statistics) in the form of annual data (time series) from 1980 to 2015, for 35 year. Data processing is done by using statistical software EVIEWS.

The research model uses multiple regression with OLS (Ordinary Least Square) method, a method to produce an estimate of multiple regression equations using sample data. So that this method is used to analyze how the relationship that occurs between the independent variable (exchange rate, export, Import and GDP) to the dependent variable (trade balance) in the long term and how much influence independent variables on the dependent variable either partially or simultaneously. The research model is as follows :

$$\ln(\text{Trade_Balance}) = \beta_0 + \beta_1 \ln(\text{GDP}) + \beta_2 \ln(\text{Exc_rate}) + \beta_3 \ln(\text{Export}) + \beta_4 \ln(\text{Import}) + u_t$$

Information :

β_1 - β_4 : Regression coefficient (slope parameters), this coefficient also determines direction as a predictor / contribution that can show value increase (+) or decrease (-)

β_0 : Constants (intercept)

U_t : White-noise process (disturbances or error term)

\ln : Natural logarithms

The method used to see the short-term relationship between the independent variable (exchange rate, export, Import and GDP) to the dependent variable (trade balance) is to use co-integration methods and error correction method (ECM). ECM is used to analyze multivariate time series data that is not stationary but co-integration occurs between the variables used in the research model. This method will also be used to see how much influence independent variables have on the dependent variables in this study.

IV. FINDINGS

Analysis of Long-term Relations (35 Years) Research Model. The estimation results from the above research model are as follows:

$$\text{LOG}(\text{TRADE_BALANCE}^2) = 421.491612524 - 163.538004207 * \text{LOG}(\text{GDP}) + 2.39271897863 * \text{LOG}(\text{EXCHANGE_RATE}) + 95.8162789952 * \text{LOG}(\text{EXPORT}) - 60.1496203137 * \text{LOG}(\text{IMPORT}) \quad 4.1$$

The estimation results in equation 4.1 above show that there is a positive relationship between the exchange rate, and export to the trade balance, meaning that if the domestic exchange rate depreciates, there will also be an increase in the trade balance of 95.8162789952 as well as exports, if the export increases then the trade balance will also experience an increase of 95.8162789952. But not so with GDP and import, there is an inverse (negative) relationship, meaning that if the GDP declines, there will be a trade balance increase of 163.538004207 and vice versa if there is an increase in GDP there will be a decrease in trade balance of 163.538004207. Whereas Import is if import has decreased, there will be an increase in trade balance of 60.1496203137 and vice versa if there is an increase in imports, there will be a decrease in trade balance of 60.1496203137.

The four independent variables (GDP, Exchange Rate, Export and Import) each have a significant influence on the trade balance (dependent variable). This can be seen from the results of t-statistics and probability (Prob.) as follows (Hussain et al., 2019):

Table 4.1: Results of Estimated Research Models

Variable	t-Statistic	Prob.
Log(Gdp)	-3.068322	0.0044
Log(Exchange_Rate)	5.967051	0
Log(Export)	3.810587	0.0006
Log(Import)	-2.721096	0.0106
F-statistic	9.504517	
Prob(F-statistic)	0.000039	
R-squared	0.550842	
Adjusted R-squared	0.492886	

From the estimation results in table 4.1 above that the simultaneous test (F-statistic) in the regression model results obtained at 9.504517 with Prob. equal to 0.000039 smaller than 5%, this shows that together (simultaneously) the four independent variables (GDP, Exchange Rate, Export and Import) have a significant influence on the trade balance (dependent variable). This result is a description of the long-term relationship between the four independent variables (GDP, Exchange Rate, Export and Import) to the dependent variable (trade balance).

IV.I. Classic Assumption Test

The classic Assumption Test is an analysis carried out to assess whether in a linear Ordinary Least Square (OLS) regression model there are classical assumption problems.

1. Resetting Model Normalization Test Results.

The normality test is carried out in the study using the *Jarque-Berra* test with results of 3.058715 (below 4) and the probability value of 0.216675 is greater than 5 percent. This suggests that the above research model used is normally distributed.

2. LM correlation test results

The auto-correlation test is done using Breusch-Godfrey (BG). Based on the BG test the following results were obtained:

The results of the Auto-correlation test are obtained Obs * R-squared of 2.202870 and Probability Chi-Square of 0.3324 is greater than 5 percent, this can be concluded that there is no autocorrelation from the research model.

3. Results of the Heteroscedasticity Test.

From the results of heteroskedascity tests conducted using *Breusch-Pegan Godfrey* (BPG) obtained the following results:

The results of heteroscedasticity test obtained Obs * R-squared amounted to 10.83243 and Probability Chi-Square of 0.0848 greater than 5 percent, this can be concluded that there was no heteroscedasticity from the research model.

4. Multicollinearity test results

From the results it can be seen that the VIF value is less than 10, so it can be concluded that in the regression model there is no multicollinearity and the regression model is feasible to use.

5. Model Interpretation Test

This test can be seen from the results of adjusted R-squared which is equal to 0.550842, meaning that in the long term trade balance variations (dependent variables) can be explained by variations in exchange rate, GDP, export and import (independent variables) by 55.08 percent, while the remainder is explained by variations others not included in this model research.

The *Akaike info criterion* (AIC) test results are 3.36152012 and the Durbin-Watson test results are 1.63034856. The Ramsey Reset Test results, namely F-Statistic of 1.744194 and Probability F of 0.1982 is greater than 5 percent, this shows that the linear model is feasible to use in research (goodness fit research model).

IV.II. Analysis of the Short-Term Relationship of the Research Model

1. Stationary Test

Stationary tests are performed using the root unit (unit root test) with Augmented-Dickey-Fuller (ADF) with the following results:

Table 4.2: Stationary Test Results

Variable	Stationary Level					
	Level		First Difference		Second Difference	
	ADF	Prob.	ADF	Prob.	ADF	Prob.
Trade Balance	-	0.203	-1.895118	0.3302	-	0.0000
Exchange Rate	2.218088	7	-6.878913	0.0000	9.966156	---
GDP	0.450606	1	-4.474351	0.0011	---	---
Export	-	0.904	-4.879541	0.0004	---	---
Import	0.362450	9	-4.769003	0.0005	----	---
	0.157007	9				
	-	0.907				
	0.347098	4				

2. Co-integration Test (Engle-Granger Test)

The results of the co-integration tests that have been carried out are as follows:

Table 4.3: Results of a co-integration test

Variable	t-Statistic	Prob.
C	1.01182	0.3197
D(GDP)	-1.112433	0.2748
D(ECHANGE_RATE)	-0.613695	0.544
D(EXPORT)	0.393785	0.6965
D(IMPORT)	-0.10324	0.9185

From the results of the integration co-test, the results show that all independent variables (exchange rate, GDP, export and import) do not affect the trade balance (dependent variable) in the short term. This can be seen in the t-statistic and Prob. In table 4.4 all independent variables are not significant.

The above is also supported by an F-statistic of 0.454335 Prob. (F-statistic) of 0.768455 is greater than 5 percent, meaning that the independent variable together does not significantly influence the trade balance in the short term.

3. Error Correction Method (ECM)

The ECM test is used to see whether there has been a short-run equilibrium relationship between the exchange rate, GDP, export and import to the balance. The estimation results are obtained as follows:

$$D(\text{TRADE_BALANCE}^2) = 251103423.994 - 5377358695.53 * D(\text{GDP}) - 337589527.797 * D(\text{ECHANGE_RATE}) + 558352183.439 * D(\text{EXPORT}) - 11565602.3128 * D(\text{IMPORT}) - 108821361.176 * \text{ECT}(-1) \quad 4.2$$

Table 4.3: Results of Error Correction Estimates.

Variable	t-Statistic	Prob.
C	1.448099	0.1583
D(GDP)	-1.728817	0.0945
D(ECHANGE_RATE)	-0.758496	0.4543
D(EXPORT)	1.105807	0.2779
D(IMPORT)	-0.029984	0.9763
ECT(-1)	-1.942973	0.0618

Table 4.6 above explains that all independent variables from the research model are insignificant and can be seen from probability (Prob.), All independent variables are greater than 5 percent. This means that the results of test co-integration and error correction methods (ECM) show that all independent variables do not occur in short-run equilibrium relationships with respect to the dependent variable. All independent variables in equation 4.2 above are inversely proportional to trade balance. The coefficient of ECT (error correction) is 1.942973, this indicates a

difference or correction between the trade balance and the balance value of 1.94 percent which will be adjusted within one year.

V. DISCUSSION AND CONCLUSION

The existence of a research gap in this study is not appropriate between the theory of international trade with facts and conditions that occur in Indonesia. This is indicated by the relationship between the exchange rate against the trade balance, where in the past few years Indonesian domestic currency (IDR) has depreciated against the American dollar (USD), vice versa Indonesia's export commodity has decreased, while imports have increased, Indonesia has a trade balance deficit. From the results of the research conducted, it is explained that in the long run the factors that affect the trade balance, namely exchange rate, export, import and GDP both partially, each variable and simultaneously influence the Indonesian trade balance. The exchange rate relationship with the trade balance is positive or directly proportional, meaning that if the IDR experiences depreciation against the USD, the trade balance will increase. The relationship between GDP and trade balance is negative or inversely proportional, meaning that if Indonesia's GDP increases, the trade balance will decline due to increased imports. Export relations with the trade balance are positive or directly proportional, meaning that if the export value of an Indonesian commodity experiences an increase, the balance will increase as well. The import relationship with the trade balance is negative or inversely proportional, meaning that if the import value increases, the trade balance will also decline.

However, in the short term, the opposite is true, the factors that affect the trade balance do not affect either partially or simultaneously. This is shown from the results of co-integration and error correction method (ECM) that have been done to show that all independent variables do not occur short-run equilibrium relationship to the dependent variable. The increase in imports from foreign commodities to Indonesia is due to the fact that most industrial raw materials in Indonesia are still imported from other countries.

In addition to these macroeconomic variables that affect trade balance in Indonesia, there are other factors that also affect the net exports themselves, among others in the form of market sentiment towards socio-political developments, psychological factors of market participants in calculating information.

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