

Factors Associated with Foreign Exchange Reserves in Indonesia, 2006–2016

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Abstract—The purpose of this study is to determine and explain the stability of the value of foreign exchange reserves affected by macroeconomic variables, such as net exports, foreign investment, and foreign debt. The research method used is explanatory research with a quantitative approach. The data used in this study are quarterly time series data. Data analysis was carried out by descriptive analysis and multiple linear regression analysis assisted by the GRETl program. The results showed that oil and gas net exports, non-oil and gas net exports, foreign investment, and foreign debt simultaneously had a significant effect on the volatility of Indonesia's foreign exchange reserves during the 2006–2016 period. Foreign debt partially has a significant effect on foreign exchange reserves, while the variables of oil and gas net exports, non-oil and gas net exports and foreign investment have no significant effect on Indonesia's foreign exchange reserves for the 2006–2016 period.

Keywords—*Indonesian foreign exchange reserves; oil and gas net-exports; non-oil and gas net-exports; foreign investment; foreign debt*

I. INTRODUCTION

The topic of this research is important because as emphasized by Rachbini and Suwidi it considers that foreign exchange reserves have an important position and foreign exchange reserves play a role as a source of financing for international trade, state development and foreign loans [1]. On the other hand, foreign exchange reserves have an important role in solving the constraints of limited foreign exchange and financing the budget deficit [2]. Foreign exchange reserves are one of the monetary indicators that show the strength of a country's economy [3]. The value of foreign exchange reserves must be maintained so that trade or international transactions can run stably [4]. The rise and fall of the value of foreign exchange reserves in a country is influenced by several factors [5]. According to Febriyanti, et al and Tambunan, the stability of the value of foreign exchange reserves is influenced by several macroeconomic variables, such as net exports, foreign investment and foreign debt [6,7]. Foreign exchange reserves are also influenced by foreign debt, foreign investment and portfolio investment. The theory is also in line with the research conducted by Yang and Li, that the variable of gross domestic product, the balance of exports and imports, foreign direct investment, foreign debt and exchange rates has a positive influence on foreign exchange reserves in China [8].

Based on the theory and previous research, the factors that influence foreign exchange reserves are limited to the variables of net exports, foreign investment and foreign debt. Net exports variabel consist into two variables which are oil and gas net-exports, non-oil net exports. These macroeconomic variables are the variables chosen to analyse the factors that affect Indonesia's foreign exchange reserves for the period 2006-2016. Net exports are part of the current account that shows a measure of a country's economic success [3]. Meanwhile, foreign investment is another factor affecting foreign exchange reserves [9]. Foreign investment as a component of the capital account also has an effect on the balance of payments stability and foreign exchange reserves. Foreign debt can complement the lack of domestic resources to accelerate foreign exchange growth and savings [7].

Based on the background stated earlier, the research problems formulated are as follows:

- Are oil and gas net-exports, non-oil net exports, foreign model plantations and the amount of foreign debt simultaneously having a significant effect on the country's foreign exchange reserves?
- Does oil and gas net-exports partially have a significant effect on Indonesia's foreign exchange reserves?
- Does non-oil net exports partially have a significant effect on Indonesia's foreign exchange reserves?
- Does foreign investment partially have a significant effect on Indonesia's foreign exchange reserves?
- Does the amount of foreign debt partially have a significant effect on Indonesia's foreign exchange reserves?
- What variables have the most dominant influence on Indonesia's foreign exchange reserves?

The purpose of this study is to find out and explain the effects of simultaneous oil and gas net-exports, non-oil net exports, foreign investment and the amount of foreign debt, on Indonesia's foreign exchange reserves, and to know and explain the partial influence of net-exports of oil and gas, non-oil and gas exports, foreign investment, the amount of foreign debt to Indonesia's foreign exchange reserves, and to know and explain

what variables have the most dominant influence on Indonesia's foreign exchange reserves.

II. METHODS

This research uses descriptive quantitative analytical method with explanatory research approach, which is about an event regarding causal relations [10]. In this study the locations of the research were Bank Indonesia and the Central Statistics Agency. The data used in this study is quarterly time series data from the first quarter of the period 2006 - fourth quarter of 2016. Data analysis was carried out by descriptive analysis and multiple linear regression analysis [8] assisted by the GRETL program.

III. RESULTS

This study has five variables which will be presented in the data, namely the variables of foreign exchange reserves as the dependent variable; oil and gas net-exports, non-oil and gas net-exports, foreign investment and foreign debt as independent variables, which will be described as follows:

A. Indonesian Foreign Exchange Reserves

Foreign exchange reserves are stocks of foreign currency owned by a country and stored by a central bank that can be used for international transactions or payments and to intervene in the foreign exchange market [11].

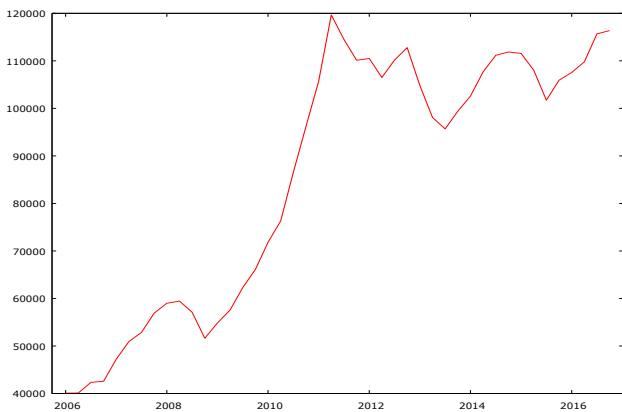


Fig. 1. Graph of Indonesia's foreign exchange reserves for 2006-2016.

B. Net Export of Indonesia's Oil and Gas Sector

Net exports are the value of goods and services exported to other countries minus the value of goods and services imported from other countries [2]. Net oil and gas exports are the difference between the export value and the import value of goods in the oil and gas sector which are summarized in the current account.

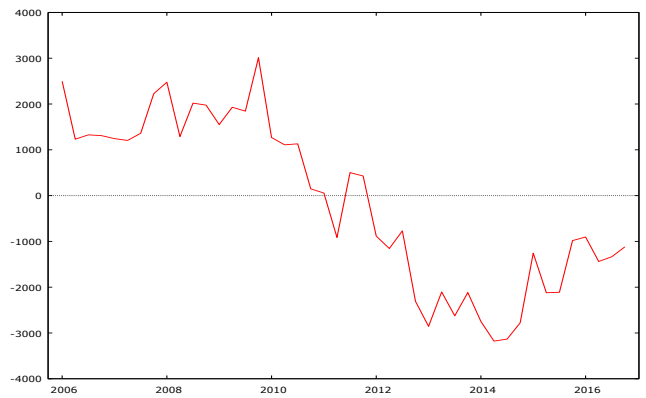


Fig. 2. Graph of Indonesia's net oil and gas export value for 2006-2016.

C. Net Exports of Indonesia's Non-Oil and Gas Sector

Net non-oil and gas exports are the difference between the export value and the import value of goods in the oil and gas sector which are summarized in the current account [10].

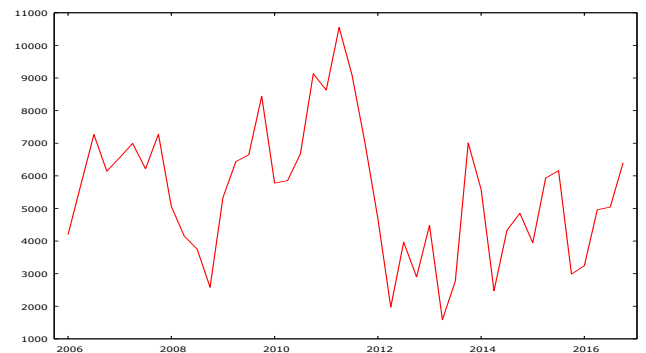


Fig. 3. Graph of Indonesia's net non-oil and gas export value for 2006-2016.

D. Foreign Investment in Indonesia

Foreign investment is a long-term investment carried out directly by foreign investors in a business field of domestic citizens [11]. Foreign investment also played a role in stabilizing the balance of payments and the position of foreign exchange reserves

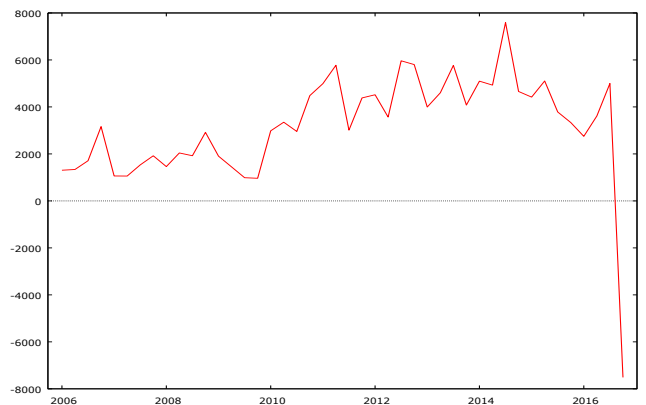


Fig. 4. Graph of value of Indonesian foreign investment for 2006-2016.

E. Indonesian Foreign Debt

Indonesia's foreign debt is the position of the actual liability of the Indonesian population to a non-resident at a time, not including contingents, which requires repayment of interest and or principal interest in the future [4].

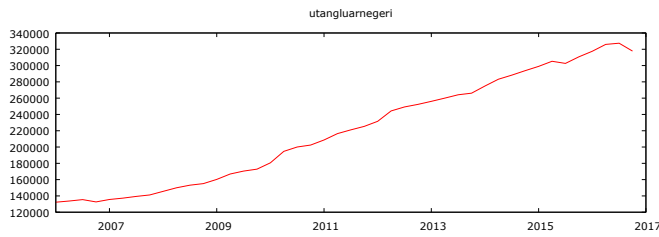


Fig. 5. Graph of Indonesia's external debt for the period 2006-2016.

The analysis used in this study is multiple linear regression analysis. Multiple linear regression analysis is the study of the dependence of the dependent variable with one or more independent variables [8]. Multiple linear regression analysis helps to determine the direction of the relationship between independent and dependent variables, whether each dependent variable has a positive or negative effect [12]. The independent variables in the multiple linear regression test in this study are net oil and gas exports (X_1), non-oil and gas net exports (X_2), foreign investment (X_3), and foreign debt (X_4). The dependent variable is foreign exchange reserves (Y).

The equation for the multiple linear regression model is generated as follow:

$$Y = 29159,9 - 0,714295X_1 + 0,817895X_2 + 0,119437X_3 + 0,266003X_4 + e$$

Whereas to answer the hypothesis that has been formulated using analysis of the results of the F test and t test:

TABLE I. F TEST RESULTS

R-squared	0.975002	Adjusted R-squared	0.972371
F(4, 38)	2.631048	P-value(F)	0.049206
Rho	0.403335	Durbin-Watson	1.162761

- Are net oil and gas exports, non-oil net exports, foreign model plantations and the amount of foreign debt simultaneously having a significant effect on the country's foreign exchange reserves?

The results of this study indicate that simultaneously there are significant influences between net oil and gas exports, non-oil net exports, foreign investment and foreign debt to Indonesia's foreign exchange reserves. A country's foreign exchange reserves are influenced by net exports (current account) and capital account. Foreign exchange reserves are also influenced by foreign debt, foreign investment and portfolio investment [7,10]. Therefore, export, import, foreign investment and foreign debt activities determine the proportion

of the amount of foreign exchange reserves and their composition.

The results of this study are also supported by research from Yang and Li, which states that the balance of export imports, foreign direct investment, and the balance of foreign debt are important factors that influence foreign exchange reserves [13].

TABLE II. T TEST RESULTS

Variables	t-ratio	p-value
Const	0.9392	0.3535
Xnetto oil and gas (X_1)	-0.7397	0.4640
Xnetto non oil (X_2)	2.023	0.0502
Foreign Investment(X_3)	0.3798	0.7062
Foreign Debt (X_4)	2.468	0.0182

- Does the net oil and gas export partially have a significant effect on Indonesia's foreign exchange reserves?

The partial test results show that oil and gas net exports partially have no significant effect on foreign exchange reserves. The inability of the oil and gas trade balance in registering surpluses makes the opportunity to save foreign exchange declines. Oil and gas exploration that has not been optimal in Indonesia has made revenue from the export side not optimal, so that the value of oil and gas exports cannot outperform the high domestic dependence on oil and gas imports. This makes oil and gas import financing must be taken from foreign exchange reserves [4]. The value of net oil and gas exports dominated by imports will drain foreign exchange reserves. Non-oil and gas net exports partially have no significant effect on foreign exchange reserves.

- Does non-oil net exports partially have a significant effect on Indonesia's foreign exchange reserves?

Non-oil and gas net exports partially have no significant effect on foreign exchange reserves. The results show an insignificant relationship due to the decline in non-oil and gas exports over the past few years which has caused the value of non-oil and gas net exports to decline and the percentage of them against foreign exchange reserves has been smaller. In addition, the decline in the value of non-oil and gas exports is also caused by the lack of optimal implementation of various government policies related to non-oil and gas export activities, such as limited trade facilities, length of procedures for exports, not yet optimal SME development, and limited information about new markets.

- Does foreign investment partially have a significant effect on Indonesia's foreign exchange reserves?

The results of this study indicate that foreign investment has no significant effect on Indonesia's foreign exchange reserves. This is because the value of revenues from foreign investment is still not optimal because Indonesia's competitiveness is not optimal in attracting foreign investment. This condition is caused by the low quality of human

resources, poor bureaucracy, poor infrastructure, large amounts of taxes, limited funding and complicated licensing which are obstacles for foreign investors to enter Indonesia [5,14].

- Does the amount of foreign debt partially have a significant effect on Indonesia's foreign exchange reserves?

The results of this study indicate that the amount of foreign debt has a positive and significant influence on foreign exchange reserves. The increase in foreign debt caused an increase in the capital account because the recording of the value of foreign debt was defective in the capital account. The increase in the capital account led to a rise in the balance of payments, which increased the value of foreign exchange reserves.

- What variables have dominant influence on Indonesia's foreign exchange reserves?

The results of data analysis from this study indicate that foreign debt has a dominant influence on Indonesia's foreign exchange reserves. The amount of foreign debt is mainly due to the current account deficit. The value of foreign debt entering Indonesia is the highest value compared to other variables. It could be shown on the graph. Therefore, foreign exchange reserves in Indonesia are dominated by foreign debt. Foreign debt is needed to cover the budget deficit [10].

IV. DISCUSSION AND CONCLUSION

A. Discussion

From the results of the research that has been carried out on the analysis of factors that affect Indonesia's foreign exchange reserves which have been running well in accordance with the theory contained in the literature review on monetary policy, international trade, the new international trade, export and import paradigm, trade balance, investment foreign exchange, foreign debt, foreign exchange reserves if this theory is linked to analysing factors that have affected Indonesia's foreign exchange reserves and from previous researchers who have conducted research on factors that affect foreign exchange reserves stating that the balance of export-import, investment foreign direct investment and the balance of foreign debt are important factors that influence foreign exchange reserves. Then it shows that foreign debt has a dominant influence on Indonesia's foreign exchange reserves.

B. Conclusion

This study concludes that oil and gas net-exports, non-oil net-exports, foreign investment and foreign debt simultaneously have a significant effect on the volatility of Indonesia's foreign exchange reserves in the 2006-2016 period. Foreign debts partially have a significant effect on foreign exchange reserves, while the variables of net exports, net non-oil exports, and foreign investment have no significant effect on Indonesia's foreign exchange reserves for the period 2006-2016. And based on the ranking of significant values and regression coefficients of foreign debt variables is the dominant variable that affects Indonesia's foreign exchange reserves from 2006 to 2016.

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