



The Influence of The Value of Oil and Gas Exports and Imports on The Country's Foreign Exchange from 2010-2017

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ABSTRACT

International trade requires a very important source of financing, namely foreign exchange reserves. Foreign exchange reserves are the net position of foreign assets of the government and foreign exchange banks, which must be maintained for international transaction purposes. This research aims to determine the effect of oil and gas exports, namely crude oil, oil and gas products on foreign exchange reserves in Indonesia. The type of data used in this research is secondary data obtained from the Central Statistics Agency website, data taken from BPS is the value of oil and gas exports and imports for 1996-2017 and the position of foreign exchange reserves for 2005-2018. The method used in this research is the Simple Linear Regression Method which is used to see the form of relationship between variables through an equation. From the research results above, it can be concluded that oil and gas exports and imports in 2010-2017 did not have a significant effect on the country's foreign exchange reserves. This shows the lack of contribution of exports and imports of crude oil, oil and gas products in influencing the country's foreign exchange reserves.

Keywords: Oil, Gas, Export, Import, Foreign Exchange

Field: Economic, Macroeconomic, International Trade and Finance

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INTRODUCTION

International trade requires a very important source of financing, namely foreign exchange reserves. Foreign exchange reserves are the net position of foreign assets of the government and foreign exchange banks, which must be maintained for international transaction purposes (Rachbini and Swidi, 2000: 113). Foreign exchange is needed to finance imports and pay foreign debt. Management and maintenance of foreign exchange reserves is based on the principle of obtaining optimal income. In Indonesia, regulations regarding institutions authorized to manage foreign exchange reserves are stipulated in the Law concerning Bank Indonesia No. 23 of 1999 as amended by Law No. 3 of 2004. Based on article 13 of this law, Bank Indonesia, in order to implement monetary policy, is given the authority to manage foreign exchange reserves. In managing foreign exchange reserves, Bank Indonesia can carry out various foreign exchange transactions and can receive loans (Gandhi, 2006: 7). The amount of foreign exchange reserves is influenced by exports and imports (Andrianto et al., 2023; Fadhli et al., 2022; Ngatno et al., 2022). The development of the world economy is largely determined by exports and imports carried out by countries in the world (Eddy et al., 2023; Hutabarat, 2024; Sinaga, 2024).

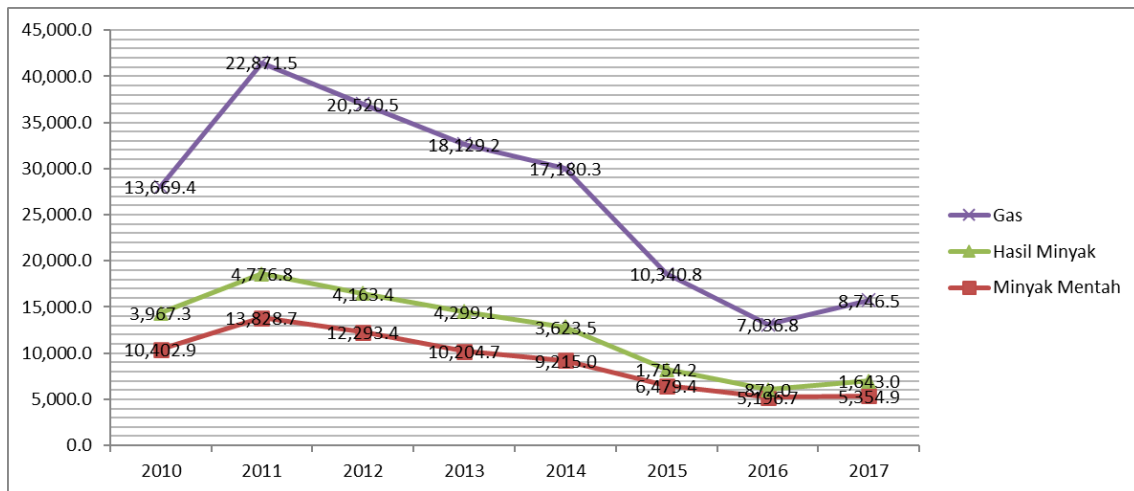


Figure 1. Development of Crude Oil Exports, Oil and Gas Products from 2010-2017

Source: Processed from customs documents of the Directorate General of Customs and Excise (PEB and PIB) obtained from the BPS website

Figure 1 can be seen that in 2010-2017 the value of Indonesian gas and oil exports in 2010 to 2011 increased then experienced fluctuations in the following year but decreased in 2015 to 2017 and the development of the value of Indonesian crude oil exports experienced fluctuations because the development was uncertain from year to year (Nyoto et al., 2023; Sari et al., 2021; Vina et al., 2021). From the graph above it can be stated that the value of exports of gas and oil products in 2010 reached US\$ 13,669.4 million and US\$ 3,967.3 million, then in the following year it experienced fluctuations but began to decline in 2015-2017 to US\$ 8,746.5 Million and US\$ 1,643.0 Million then the value of crude oil exports also experienced fluctuations in its development in 2010 amounting to US\$ 10,402.9, increasing in 2011 amounting to US\$ 13,828.7 Million, decreasing in 2012 amounting to US\$ 12,293.4 million then decreased continuously to US\$ 5,354.9 million in 2017 (Rifai et al., 2023; Saitri et al., 2023; Suhardjo, 2023).

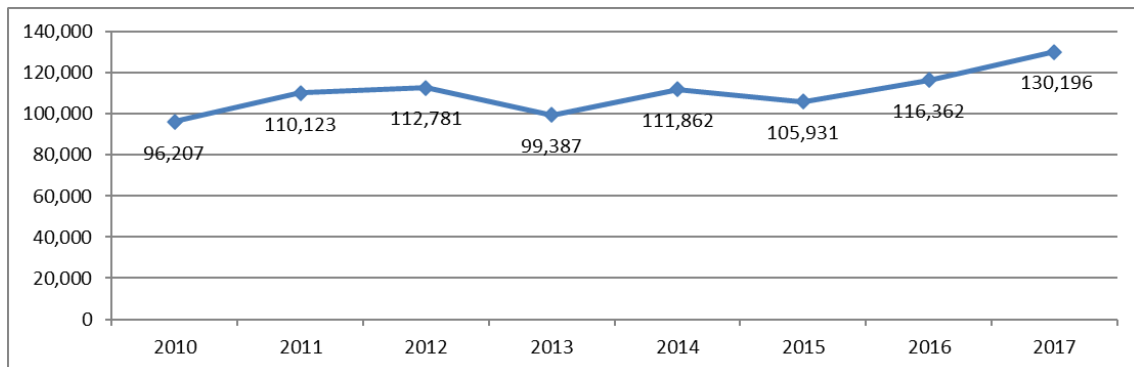


Figure 2. Development of the country's foreign exchange reserves from 2010-2017

Source: Central Statistics Agency (BPS)

Figure 2 can be seen that in 2010-2017 the development of the country's foreign exchange reserves experienced fluctuations in 2010 amounting to US\$ 96,207 million, then increasing in 2011 amounting to US\$ 110,123 million, then increasing again in 2012 amounting to US\$ 112,781 million, decreasing in 2013 (Anton et al., 2023; Renaldo, Suhardjo, et al., 2023; Suharti & Murwaningsari, 2024; Suyono et al., 2023). Amounting to US\$ 99,387 million, then increasing in 2014 amounting to US\$ 111,862 million, decreasing again in 2015 to US\$ 105,931 million and continuing to increase until 2017 amounting to US\$ 130,196 million (Maisur, 2023; Pramesti & Renaldo, 2023; W et al., 2023).

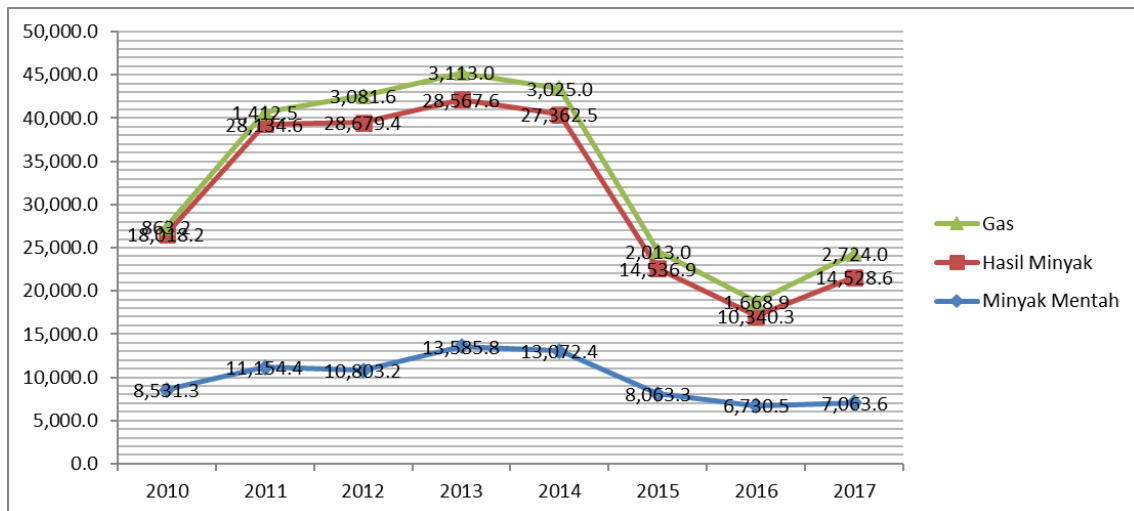


Figure 3. Development of Crude Oil Imports, Oil and Gas Products from 2010-2017

Source: Processed from customs documents of the Directorate General of Customs and Excise (PEB and PIB) obtained from the BPS website

Figure 3 can be seen that in 2010-2017 the value of Indonesian gas and oil imports from 2010 to 2011 increased then experienced fluctuations in the following year but decreased in 2015 to 2017 and the development of the value of Indonesian crude oil exports experienced fluctuations because the development was uncertain from year to year this is not much different from the export value. From the graph above it can be stated that the value of imports of gas and oil products in 2010 reached US\$ 863.2 million and US\$ 18,028.2 million, then in the following year it experienced fluctuations but began to decline in 2015-2016 to US\$ 1,668.9 million and US\$ 10,340.3 million and increased again in 2017, gas amounted to US\$ 2,724.0 million and oil output amounted to US\$ 14,528.6 million, then the value of crude oil exports also experienced fluctuations in development in 2010 amounting to US\$ 8,531.3, increased in 2011 amounting to US\$ 11,154.4 million, decreased in 2012 amounting to US\$ 10,805.2 million then increased again in 2013 amounted to US\$ 13,585.8 million and decreased again in 2014 to 13,072.4 million then decreased again in 2015 to 2016 to 6,730.5 and rose again in 2017 to 7,063.6 (Junaedi et al., 2023; Nyoto et al., 2024; Rostania et al., 2023; Suhardjo et al., 2023).

Research purposes

This research aims to determine the effect of oil and gas exports, namely crude oil, oil and gas products on foreign exchange reserves in Indonesia.

LITERATURE REVIEW

Foreign exchange reserves

Foreign exchange reserves, which are often referred to as international reserves and foreign currency liquidity (IRFCL) or Official reserve assets, are defined as all foreign assets controlled by the monetary authority and can be used at any time, to finance imbalances in the balance of payments or in the context of monetary stability by carrying out interventions in foreign exchange market and for other purposes (Renaldo, Fadrul, et al., 2022; Renaldo, Suhardjo, et al., 2022; Suyono, Firnando, et al., 2022). Based on this definition, the benefits of foreign exchange reserves owned by a country can be used to maintain exchange rate stability and can be used to finance deficits in the balance of payments (Gandhi, 2006:1). In its development, the Indonesian national economy is known by two terms of foreign exchange reserves, namely official foreign exchange reserves (H. P. Panjaitan et al., 2023; M. Panjaitan et al., 2023; Walettina & Anton, 2022). Exchange reserve and country foreign exchange reserve, each of which has a different scope (Renaldo, Andi, et al., 2023; Rusilawati et al., 2023; Sudarno et al., 2023). First, it is the state's foreign exchange reserves which are managed, administered and administered by the central bank, in accordance with the duties assigned by Law no. 13 of 1968 (Adrian et al., 2022; Andi et al., 2022; Nasution et al., 2022; Tohan et al., 2022). Second, it includes all foreign exchange held by bodies, individuals, institutions, especially national financial institutions which are monetarily part of national wealth (Halwani, 2005 in Juniantara, 2011:34).

Export

International trade activities provide stimulation for domestic demand which causes the growth of large factory industries, along with a stable political structure and flexible social institutions (Andi, Jufrianto, et al., 2023; Andi, Puteri, et al., 2023; Purba et al., 2023; Putra et al., 2023). Based on the description above, it can be seen that exports reflect international trade activities which can provide encouragement in the dynamics of international trade growth, so that developing countries are likely to achieve economic progress on a par with more developed countries (Todaro, 2002:49). Exports are other countries' purchases of goods made by domestic companies. The most important factor that determines exports is the country's ability to produce goods that can compete in foreign markets. (Sukirno, 2008: 205). Exports will directly affect national income. However, the opposite relationship does not always apply, namely an increase in national income does not necessarily increase exports because national income can increase as a result of increases in household spending, company investment, government spending and the replacement of imported goods with domestically made goods. (Sukirno, 2008:206). Net exports are the difference between total exports and total imports of a country. If the net export value is positive, it means the export value is greater than the import value and if the net export value is negative, it means the export value is smaller than the import value (Case and Fair, 2007: 387).

Import

Imports can be interpreted as purchasing goods and services from abroad into the country with a cooperation agreement between 2 or more countries. Imports can also be said to be trade by bringing goods from abroad into Indonesian territory by complying with applicable regulations (Hutabarat, 1996:403). Import is the process of legally transporting goods or commodities from one country to another, generally in the trade process (Hutahuruk, 2020, 2021, 2022). The import process is generally the act of bringing goods or commodities from other countries into the country (Renaldo, Hafni, et al., 2022; Renaldo, Jollyta, et al., 2022; Sudarno, Renaldo, Hutahuruk, Junaedi, et al., 2022). Large imports of goods generally require intervention from customs in the sending and receiving countries. Imports are an important part of international trade (Junaedi et al., 2024; Sudarno et al., 2024). Import activities are carried out to meet people's needs (Sudarno, Renaldo, Hutahuruk, Suhardjo, et al., 2022; Suhardjo et al., 2022; Suyono, Renaldo, et al., 2022). Imported products are goods that cannot be produced or that the country can produce, but cannot meet the needs of the people (Ratnasari, 2012).

Hypothesis

The hypothesis in this research is as follows:

$$H_0 = \beta = 0 \quad H_0 = \beta \geq 0 \quad H_0 = \beta \leq 0$$

$$H_1 = \beta \neq 0 \quad H_1 = \beta < 0 \quad H_1 = \beta > 0$$

Note:

$H_0 = \beta = 0$: It is suspected that the value of exports/imports does not have a significant effect on reservesforeign exchange in Indonesia

$H_1 = \beta \neq 0$: It is suspected that the value of exports/imports has a significant effect on foreign exchange reserves in Indonesia

$H_0 = \beta \geq 0$: It is suspected that the value of exports/imports does not have a negative and insignificant effect to foreign exchange reserves in Indonesia

$H_1 = \beta < 0$: It is suspected that the value of exports/imports has a negative and significant effect on foreign exchange reserves in Indonesia

$H_0 = \beta \leq 0$: It is suspected that the value of exports/imports does not have a positive and insignificant effect to foreign exchange reserves in Indonesia.

$H_1 = \beta > 0$: It is suspected that the value of exports/imports has a positive and significant effect on foreign exchange reserves in Indonesia.

METHODOLOGY

Data Types and Sources

The type of data used in this research is secondary data obtained from the Central Statistics Agency (BPS) website, data taken from BPS is the value of oil and gas exports and imports for 1996-2017 and the position of foreign exchange reserves for 2005-2018.

Data analysis method

The method used in this research is the Simple Linear Regression Method (Lind et al., 2018; Sekaran & Bougie, 2016) which is used to see the form of relationship between variables through an equation. In this research, this method is used to measure how much a variable influences other variable, namely the influence of exports on the country's foreign exchange reserves.

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i \quad (i = 1, 2, \dots, n)$$

Where:

Y_i is the value of the dependent variable at the i -th observation

β_0 and β_1 are model parameters

ε_i is the error component (the influence of other independent variables besides variable X)

X_i is the value of the independent variable X at the i th observation

N is the number of observation data (samples)

RESULTS AND DISCUSSION

Results

Table 1. Sample Data

Year	Crude oil		Oil Yield		Gas		National Foreign Exchange Reserves
	Export	Import	Export	Import	Export	Import	
2010	10.402,9	8.531,3	3.967,3	18.018,2	13.669,4	863,2	96.207
2011	13.828,7	11.154,4	4.776,8	28.134,6	22.871,5	1.412,5	110.123
2012	12.293,4	10.803,2	4.163,4	28.679,4	20.520,5	3.081,6	112.781
2013	10.204,7	13.585,8	4.299,1	28.567,6	18.129,2	3.113,0	99.387
2014	9.215,0	13.072,4	3.623,5	27.362,5	17.180,3	3.025,0	111.862
2015	6.479,4	8.063,3	1.754,2	14.536,9	10.340,8	2.013,0	105.931
2016	5.196,7	6.730,5	872,0	10.340,3	7.036,8	1.668,9	116.362
2017	5.354,9	7.063,6	1.643,0	14.528,6	8.746,5	2.724,0	130.196

Source: Central Statistics Agency

The influence of the value of crude oil exports on the country's foreign exchange reserves

Table 2. Test Results

Regression Statistics				
	Multiple R			0,465539935
	R Square			0,216727431
	Adjusted R Square			0,086182003
	Standard Error			1,007,797,484
	Observations			8
Coefficients				
	Standard Error		t Stat	P-value
Intercept	1,243,532,192.00	1,143,268,056.00	1,087,699,586.00	3,57946E-05
X Variable 1	(15,344,337.00)	1,190,891,019.00	(1,288,475,331.00)	0,245031675

$$df = 6(0.025 = 2.44691, 0.05 = 1.94318)$$

$$Th(t \text{ Stat}) = -1.288475331$$

$$R \text{ Square} = 0.216727431$$

$$Y = 124353.2192 - 1.5344337X$$

Based on the results above, it can be concluded that:

- It is suspected that the value of crude oil exports does not have a significant effect on foreign exchange reserves

- It is suspected that the value of crude oil exports has no negative and insignificant effect on foreign exchange reserves in Indonesia
- It is suspected that the value of crude oil exports has no positive and insignificant effect on foreign exchange reserves in Indonesia.

Based on the regression results above, the R2 value is $0.216727431 = 21.67\%$. It can be concluded that as much as 21.67% of the value of crude oil exports influences the country's foreign exchange reserves while the remaining 78.33% is influenced by other factors not included in the model.

The influence of the value of oil exports on the country's foreign exchange reserves

Table 3. Test Results

Regression Statistics				
	Multiple R			0,538886192
	R Square			0,290398328
	Adjusted R Square			0,172131383
	Standard Error			9592,330333
	Observations			8
	Coefficients	Standard Error	t Stat	P-value
Intercept	122415,114	8409,769535	14,5562983	6,59407E-06
X Variable 1	-3,843594512	2,452856823	-1,566986901	0,168161106

$$Df = 6(0.025 = 2.44691, 0.05 = 1.94318)$$

$$Th(t \text{ Stat}) = -1.566986901$$

$$R \text{ Square} = 0.290398328$$

$$Y = 122415.114 - 3.843594512X$$

Based on the results above, it can be concluded that:

- It is suspected that the value of oil exports does not have a significant effect on foreign exchange reserves
- It is suspected that the value of oil exports does not have a negative and insignificant effect on foreign exchange reserves in Indonesia
- It is suspected that the value of oil exports does not have a positive and insignificant effect on foreign exchange reserves in Indonesia.

Based on the regression results above, the R2 value is $0.290398328 = 29.03\%$. It can be concluded that 29.03% of the value of oil exports influences the country's foreign exchange reserves while the remaining 70.97% is influenced by other factors not included in the model.

The influence of the value of gas exports on the country's foreign exchange reserves

Table 4. Test Results

Regression Statistics				
	Multiple R			0,357101623
	R Square			0,127521569
	Adjusted R Square			-0,017891503
	Standard Error			10636,38774
	Observations			8
	Coefficients	Standard Error	t Stat	P-value
Intercept	120027,7987	10991,17024	10,92038391	3,49849E-05
X Variable 1	-0,652964339	0,697267405	-0,936461872	0,385179494

$$Df = 6(0.025 = 2.44691, 0.05 = 1.94318)$$

$$Th(t \text{ Stat}) = -0.936461872$$

R Square = 0.127521569

$$Y = 120027.7987 - 0.652964339X$$

Based on the results above, it can be concluded that:

- It is suspected that the value of gas exports does not have a significant effect on foreign exchange reserves
- It is suspected that the value of gas exports has no negative and insignificant effect on foreign exchange reserves in Indonesia
- It is suspected that the value of gas exports has no positive and insignificant effect on foreign exchange reserves in Indonesia.

Based on the regression results above, the R2 value is $0.127521569 = 12.75\%$. It can be concluded that 12.75% of the gas export value influences the country's foreign exchange reserves while the remaining 87.25% is influenced by other factors not included in the model.

The influence of the value of crude oil imports on the country's foreign exchange reserves

Table 5. Test Results

Regression Statistics				
Multiple R	0,41620839			
R Square	0,173229424			
Adjusted R Square	0,035434328			
Standard Error	10354,02758			
Observations	8			

	Coefficients	Standard Error	t Stat	P-value
Intercept	126672,6774	15005,72157	8,441625205	0,000150832
X Variable 1	-1,65221018	1,473571944	-1,121228038	0,305050033

$$Df = 6(0.025 = 2.44691, 0.05 = 1.94318)$$

$$Th(t \text{ Stat}) = -1.121228038$$

$$R \text{ Square} = 0.173229424$$

$$Y = 126672.6774 - 1.65221018X$$

Based on the results above, it can be concluded that:

- It is suspected that the value of crude oil imports does not have a significant effect on foreign exchange reserves
- It is suspected that the value of crude oil imports has no negative and insignificant effect on foreign exchange reserves in Indonesia
- It is suspected that the value of crude oil imports has no positive and insignificant effect on foreign exchange reserves in Indonesia.

Based on the regression results above, the R2 value is $0.173229424 = 17.32\%$. It can be concluded that as much as 17.32% of the value of crude oil imports influences the country's foreign exchange reserves while the remaining 82.68% is influenced by other factors not included in the model.

The influence of the value of imported oil products on the country's foreign exchange reserves

Table 6. Test Results

Regression Statistics	
Multiple R	0,314105973
R Square	0,098662562
Adjusted R Square	-0,051560344
Standard Error	10810,8668
Observations	8

	Coefficients	Standard Error	t Stat	P-value
Intercept	119524,1143	11940,89789	10,00964211	5,76024E-05
X Variable 1	-0,431006368	0,531833356	-0,810416201	0,448642826

Df = 6(0.025 = 2.44691, 0.05 = 1.94318)

Th(t Stat) = -0.810416201

R Square = 0.098662562

Y = 119524.1143 - 0.431006368X

Based on the results above, it can be concluded that:

- It is suspected that the value of imported oil products does not have a significant effect on foreign exchange reserves
- It is suspected that the value of imported oil products has no negative and insignificant effect on foreign exchange reserves in Indonesia
- It is suspected that the value of imported oil products has no positive and insignificant effect on foreign exchange reserves in Indonesia.

Based on the regression results above, the R2 value is 0.098662562 = 9.86%. It can be concluded that as much as 9.86% of the value of oil imports influences the country's foreign exchange reserves while the remaining 90.14% is influenced by other factors not included in the model.

The influence of the value of imported oil products on the country's foreign exchange reserves

Table 7. Test Results

Regression Statistics	
Multiple R	0,319843663
R Square	0,102299969
Adjusted R Square	-0,047316703
Standard Error	10789,03076
Observations	8

	Coefficients	Standard Error	t Stat	P-value
Intercept	101667,5355	11178,56168	9,094867335	9,92255E-05
X Variable 1	3,882929403	4,695823219	0,82689003	0,439937907

Df = 6(0.025 = 2.44691, 0.05 = 1.94318)

Th(t Stat) = 0.82689003

R Square = 0.102299969

Y = 101667.5355 + 3.882929403X

Based on the results above, it can be concluded that:

- It is suspected that the value of gas imports does not have a significant effect on foreign exchange reserves
- It is suspected that the value of gas imports has no negative and insignificant effect on foreign exchange reserves in Indonesia
- It is suspected that the value of gas imports has no positive and insignificant effect on foreign exchange reserves in Indonesia.

Based on the regression results above, the R2 value is 0.102299969 = 10.22%. It can be concluded that 10.22% of the value of gas imports influences the country's foreign exchange reserves while the remaining 89.78% is influenced by other factors not included in the model.

CONCLUSION

The development of export and import values in 2010-2017 experienced ups and downs or fluctuations with the average value of crude oil exports amounting to US\$ 9,122.0 million and the average value of crude oil imports amounting to US\$ 9,875.6 million then the average value of exports of oil products amounting to US \$ 3,137.4 million and the average value of oil imports was US\$ 21,271.0 million, then the average value of gas exports was US\$ 14,811.9 million and the average value of gas imports was US\$ 2,237.7 million and during the 2010-2017 period The country's average foreign exchange reserves are US\$110,356.2 million.

From the research results above, it can be concluded that oil and gas exports and imports in 2010-2017 did not have a significant effect on the country's foreign exchange reserves. This can be seen from the coefficient of determination as follows.

- The value of crude oil exports affects the country's foreign exchange reserves by 21.67%
- The value of crude oil imports affects the country's foreign exchange reserves by 17.32%
- The value of oil exports affects the country's foreign exchange reserves by 29.03%
- The value of imported oil products affects the country's foreign exchange reserves by 9.86%
- The value of gas exports affects the country's foreign exchange reserves by 12.75%
- The value of gas imports affects the country's foreign exchange reserves by 10.22%

This shows the lack of contribution of exports and imports of crude oil, oil and gas products in influencing the country's foreign exchange reserves.

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