

ANALYSIS OF THE INFLUENCE OF EXPORTS, FOREIGN DEBT, AND REMITTANCES FROM INDONESIAN WORKERS ON FOREIGN EXCHANGE RESERVES IN INDONESIA 2010-2023

Pipin Dwi Safitri ¹
Putri Ayu ^{2*}

^{1,2} Faculty of Economics and Business, Andalas University, Payakumbuh, Indonesia

*Corresponding Author: putriayu@eb.unand.ac.id

Received: May14, 2025 Accepted: June 11, 2025 Published: June 30, 2025

Abstract: This study investigates the impact of exports, foreign debt, and remittances from Indonesian migrant workers on Indonesia's foreign exchange reserves. Utilizing the Error Correction Model (ECM), the analysis is based on quarterly time series data from 2010 to 2023, obtained from Statistik Ekonomi dan Keuangan Bank Indonesia (SEKI BI), the International Monetary Fund (IMF), and Badan Pusat Statistik (BPS). The results reveal that, in the long term, exports and foreign debt have a positive and significant effect on foreign exchange reserves, whereas TKI remittances are not statistically significant. In the short term, only foreign debt exhibits a significant but negative effect, while changes in exports and TKI remittances do not significantly influence the reserves. These findings highlight the importance of export performance and cautious foreign debt management in sustaining Indonesia's external economic resilience.

Keywords: Foreign Exchange Reserves, Exports, Foreign Debt, TKI Remittances, Indonesia

Abstrak : Penelitian ini bertujuan untuk menganalisis pengaruh ekspor, utang luar negeri, dan remitansi TKI terhadap devisa negara Indonesia. Metode yang digunakan adalah error Correction Model. Jenis data yang digunakan adalah sekunder yang bersifat time series dengan periode kuartal dari tahun 2010 hingga 2023 yang diperoleh dari Statistik Ekonomi dan Keuangan Bank Indonesia (SEKI BI), International Monetary Fund (IMF), dan Badan Pusat Statistik (BPS). Hasil menunjukkan bahwa dalam jangka panjang, secara parsial ekspor dan utang luar negeri positif dan signifikan terhadap cadangan devisa Indonesia, sedangkan remitansi TKI tidak signifikan. Dalam jangka pendek hanya Utang luar negeri yang signifikan tetapi negatif, sisanya perubahan utang luar negeri dan remitansi TKI tidak signifikan mempengaruhi terhadap cadangan devisa .

Kata Kunci : Cadangan Devisa, Ekspor, Utang Luar Negeri, Remitansi TKI, Indonesia

INTRODUCTION

International trade is an important aspect of the global economy of all nations, including Indonesia (Budiono in Antoni et al., 2019). Indonesia's economic development is presently becoming more interconnected with the economies of other nations (Sayoga & Tan, 2017). This condition occurs due to international trade relations and an open market economic system (Dwinoviyanto, 2023). International trade activities require sources of financing as well as reserve capital for these international activities. The main source of financing is known as foreign exchange reserves (Tafara et al., 2022).

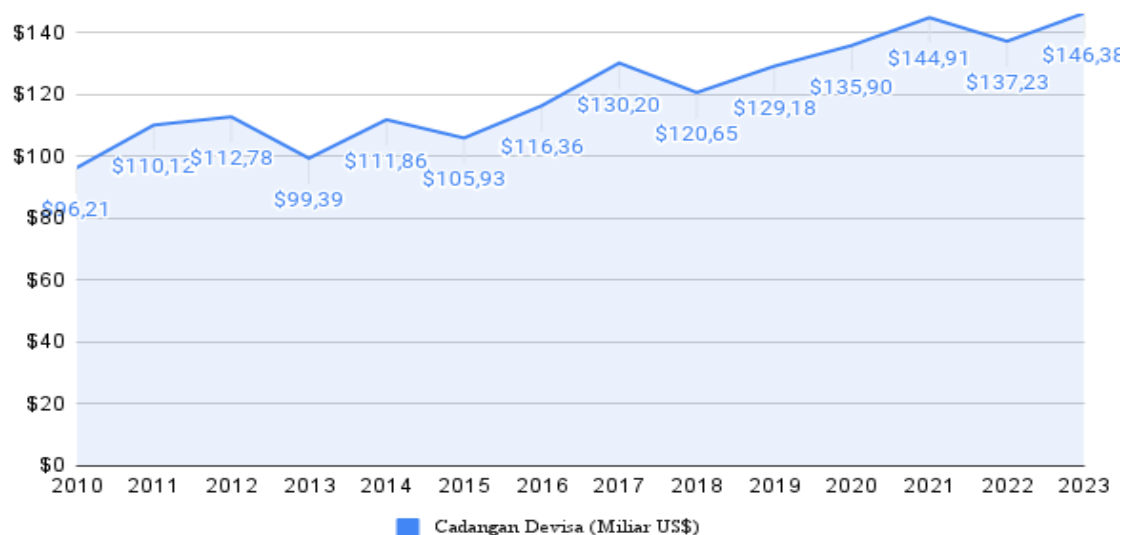


Figure 1. *Value of Indonesia's Foreign Exchange Reserves 2010-2023*
Source: SEKI Bank Indonesia (2023), processed

Indonesia's foreign exchange reserves have varied from 2010 to 2023, as seen in the above image. The lowest foreign exchange reserves, valued at US\$96.21 billion, were recorded in 2010, while the greatest, valued at US\$146.38 billion, were recorded in 2023. If foreign exchange reserves are unable to meet these conditions, then the country is in a vulnerable condition and may experience economic difficulties (Kuswantoro, 2017). Indonesia's foreign exchange reserves in 2023 were able to finance import activities for 6.7 months (Bank Indonesia, 2024). However, the International Monetary Fund's data from 2023 indicates that Indonesia's foreign exchange reserves are still below Singapore and Thailand.

The foreign exchange reserve position of a nation is influenced by a number of things. Exports are one of the variables influencing foreign exchange reserves. One of the primary sources of Indonesia's foreign exchange reserves is exports. According to Mankiw (2017), exports are activities that sell goods and services produced domestically to foreign countries. According to Paul Samuelson and Nordhaus William in Alvaro (2022), exports are goods and services that are domestically produced and then purchased by foreigners. Through export activities, Indonesia will earn income in the form of foreign exchange known as foreign exchange (Sayoga & Tan, 2017).

Based on Figure 2, in 2014 there was a decrease in export value from 182 million US\$ to 175 million US\$, but Indonesia's foreign exchange reserves increased from 2013 by 99.386 billion US\$ to 111.861 billion US\$ in 2014. The same thing happened in 2015, exports fell

from 149 million US\$ to 144 million US\$, while foreign exchange reserves rose from 105.931 billion US\$ to 116.362 billion US\$. In 2018 and 2022 there was an increase in export value, but foreign exchange reserves decreased. The increase in exports should have been a payment surplus that increased foreign exchange reserves. The reverse occurred in 2019, 2020, and 2023, with a rise in foreign exchange reserves following a decline in exports, where a balance of payments deficit and a decline in foreign exchange reserves should have resulted from the decline in exports. Additionally, this condition differs from Salvatore's (2013), Dwinoviyanto (2023), Antoni et al. (2019), Maesaroh & Kundhani (2024), and Cliff Diky Rijoly et al. (2023) which stated assertion that a rise in exports will result in a rise in foreign exchange reserves.

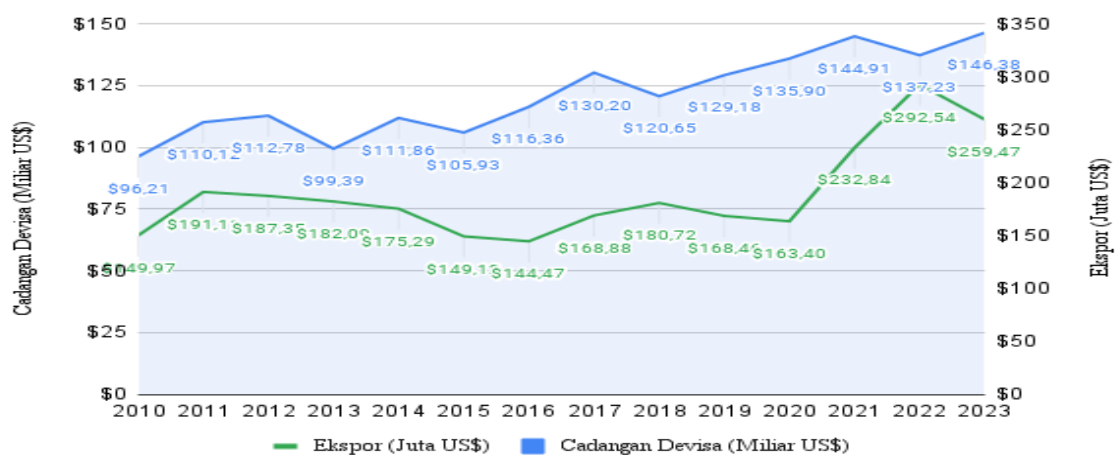


Figure 2. Trend of Indonesia's Export Value and Foreign Exchange Reserves Value 2010-2023

Figure 1. Value of Indonesia's Foreign Exchange Reserves 2010-2023

Based on Figure 3, Indonesia's foreign debt has continued to increase every year since 2010-2021, in 2022 it decreased and in 2023 it increased again. The increase in Indonesia's foreign debt is not always followed by an increase in foreign exchange reserves. In 2013, 2015, 2018 there was a decrease in foreign exchange reserves when foreign debt increased. This condition is different from the results presented by Todaro & Smith (2012), (Dwinoviyanto, 2023), Antoni et al., (2019), Amalia & Titik, (2021) that foreign debt has a positive and significant influence on foreign exchange reserves both in the long and short term.

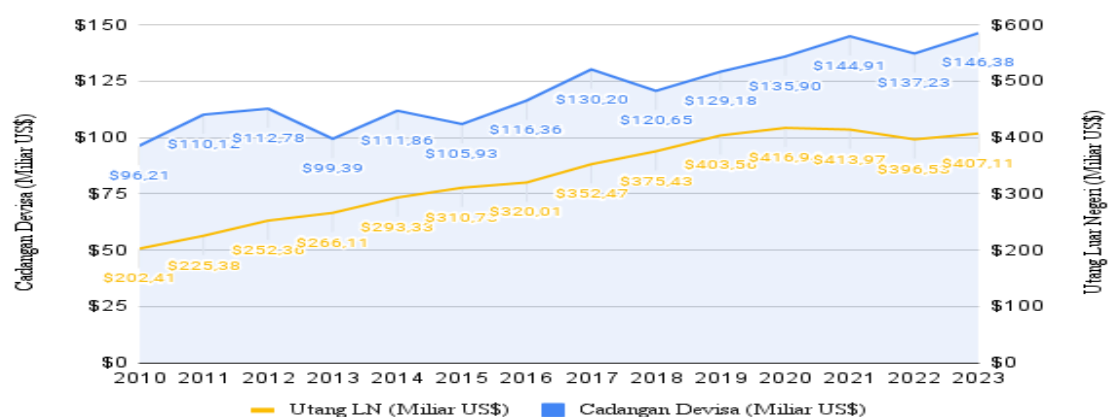


Figure 3. Data on Foreign Debt and Foreign Exchange Reserves in Indonesia 2010-2023

Source: SEKI Bank Indonesia (2023), processed

Overseas employment and remittances are solutions to reduce unemployment, reduce poverty at the household level, and boost the nation's foreign exchange reserves (Kevles, 1987). Wahyudi & Suropto (2023) explains that receiving remittances can increase economic stability through increasing foreign exchange reserves. However, according to Diana & Zulfa (2020), the increase in migrant workers has no significant on the increase in the nation's foreign exchange reserves. Figure 4 shows that remittances and the nation's foreign exchange reserves are not necessarily positively correlated, like in 2013, 2015, 2018, and 2022, the increase in remittances was followed by a decrease in foreign exchange reserves. Then, in 2016, 2017, 2020, and 202. This condition is different from the statements of Wahyudi & Suropto (2023) and Johnson (2010).

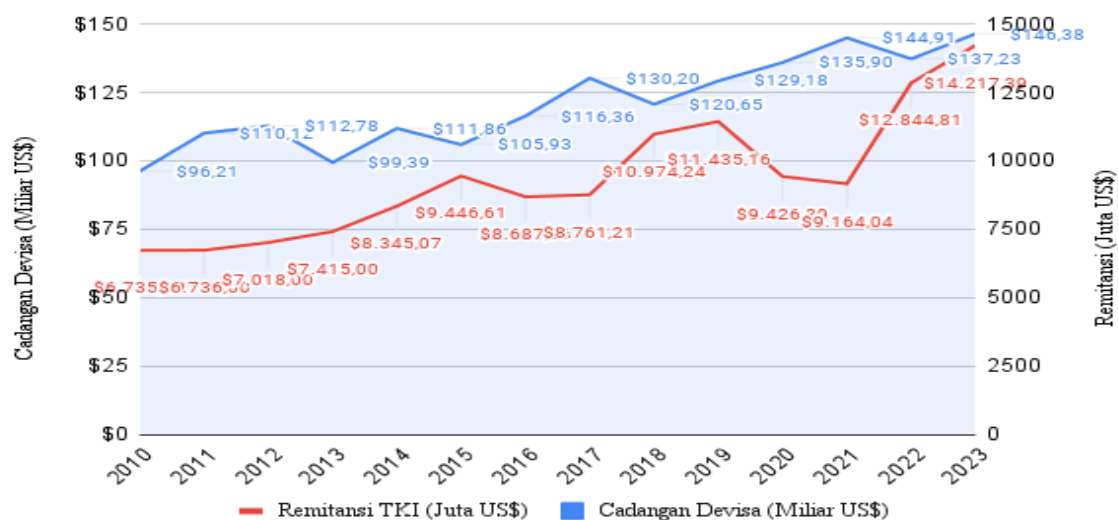


Figure 4. Trend of The Migrant Workers Remittance and Foreign Exchange Reserves in Indonesia 2010-2023

Source: SEKI Bank Indonesia (2023), processed

The researcher is intrigued by the phenomenon's explanation and feels compelled to investigate "Analysis of the Influence of Exports, Foreign Debt, and Remittances of Indonesian Migrant Workers on Foreign Exchange Reserves in Indonesia in 2010-2023". This research is important for policymakers in maintaining economic stability by strengthening foreign exchange reserves. Moreover, there are discrepancies between theoretical expectations and empirical findings. While theory suggests that foreign debt and remittances should have a positive impact on reserves, several studies show inconsistent or even opposite results, particularly in the short term. This highlights the need for further investigation within the Indonesian context.

LITERATURE REVIEW

The Table 1 show the literature review from other Author. Based on the literature summary table below, there are differences in findings between researchers regarding the influence of exports, foreign debt, and remittances on foreign exchange reserves. Some studies show a positive and significant influence, while others find a negative or even insignificant relationship. These differences reflect variations in context, observation period,

analysis methods, and economic characteristics of each country or study region, so it is important to conduct a critical analysis of these findings.

Table 1. Summary of Previous Research

No	Author	Variables	Method	Results
1	Dwinoviyanto, (2023)	a) Foreign exchange reserves b) Export c) Exchange rate d) Investment e) Foreign debt of the economic sector	ECM	1. Long-term a) Exports, investment and foreign debt (+ and sig) b) The exchange rate (- and sig) 2. Short-term a) Exports (+ and sig) b) The exchange rate (- and no sig) c) Foreign investment and debt (+ and sig)
2	Wahyudi & Suropto, (2023)	a) Foreign exchange reserves b) Inflation c) GDP d) Export e) Import f) Remittance	<i>Fully Modified Ordinary Least Square</i> (FMOLS) Panels	1. All variables have long-term effects a) GDP and exports (+ and no sig) b) Imports (- and no sig) c) Remittances (+ and no sig)
3	Tafara et al., (2022)	a) Foreign exchange reserves b) Export value c) Rupiah exchange rate per US Dollar d) Foreign debt	Multiple Linear Regression	1. Simultaneous Test a) All X (+ and sig) 2. Simultaneous Test a) Export (no sig) The Rupiah exchange rate per US Dollar (- and sig) b) Foreign debt (+ and sig)
4	Amalia & Titik, (2021)	a) Foreign exchange reserves b) Import c) Rupiah exchange rate d) Foreign debt	ECM	1. Long-term a) Imports, Rupiah Exchange Rate (Rate), and Foreign Debt (+ and sig) 2. Short-term a) Imports and Rupiah Exchange Rate (Rate) (no sig) b) Foreign debt (+

No	Author	Variables	Method	Results and sig)
5	Alda Heriyatma et al., (2022)	a) Foreign exchange reserves b) GDP c) Export d) Import e) Exchange rate f) Foreign debt	Multiple Regression	1. Simultaneous Test a) All independent variables (sig) 2. Partial Test a) GDP (+ and sig) b) Exports (+ and sig) c) Imports (- and sig) d) The exchange rate (- and sig) e) Inflation (no sig) f) Foreign debt(- and sig)
6	Merry Indriany et al., (2021)	a) Foreign exchange reserves b) Export c) Rupiah/US Dollar exchange rate d) FDI e) Inflation	ARCH/GARCH, with GARCH model	a) Exports, foreign direct investment and foreign debt (+ and sig) b) Imports(- and sig) c) The exchange rate (- and sig) d) Inflation (- and sig)
7	Diana & Zulfa, (2020)	a) Foreign exchange reserves b) Indonesian workers	Simple Regression	1. The number of Indonesian workers (no sig)
8	Indriyani et al., (2020)	a) Foreign exchange reserves b) Foreign debt c) Exchange rate d) Inflation e) Export	<i>Autoregressive Distributed Lag approach</i>	1. Simultaneous Test a) Independent variables (sig) 2. Partial Test a) Foreign debt (+ and sig) b) The exchange rate (- and sig) c) Inflation (no sig) d) Exports (+ and sig)
9	Antoni et al., (2019)	a) Foreign exchange reserves b) Export c) Rupiah exchange rate d) Foreign debt e) Foreign investment	ECM	1. Long-term a) Exports (+ and sig) b) Foreign debt (+ and sig) c) The rupiah exchange rate (+ and sig) d) Foreign investment (+ and sig) 2. Short-term

No	Author	Variables	Method	Results
				a) Exports (+ and sig) b) Foreign debt (+ and sig) c)]The rupiah exchange rate (- and sig) d) Foreign investment (- and sig)
10	Sayoga & Tan, (2017)	a) Foreign exchange reserves b) Foreign debt c) Export d) Exchange rate	ECM	1. Long-term a) Foreign debt, export value and the rupiah exchange rate (+ and sig) 2. Short-term a) Foreign debt (+ and sig) b) Exports(+ and sig) c) The rupiah exchange rate against the US dollar (- and sig)

RESEARCH METHODOLOGY

This uses types of secondary data that are periodic or time series with period quarters from 2010 to 2023. Secondary data is data that has been processed and obtained from a trusted source and used as information addition for the relevant institution. Research data obtained from Statistik Ekonomi dan Keuangan Bank Indonesia, International Monetary Fund (IMF), and Badan Pusat Statistik (BPS). The operational variable is as follows.

Table 2. Operational Independent Variables

Variabel	Operational Definition	Unit	Symbol
Foreign Exchange reserves	Foreign currency deposits by the central bank	Million US Dollars (\$)	Y
Export	The activity of selling goods and services abroad	Million US Dollars (\$)	X ₁
Foreign Debt	Loans from foreign institutions or goverments	Million US Dollars (\$)	X ₂
TKI Remittances	Part of the income sent by migrant workers to family members in the country of orgin.	Million US Dollars (\$)	X ₃

The analysis test as following :

1. Unit root Test
2. ECM Model

In *the Error Correction Model* (ECM) data must be stationary at a degree of integration of 1 or I₁ or known as *the first difference* (Hamilton, 1994). This model can be used if it

has met all the assumptions of using ECM with evidence of short-term and long-term relationships through cointegration tests using *the Johansen Test* or *Engle-Granger Test*. The ECM method test is *a two-step regression*, namely regression is carried out in two stages for long-term estimation and short-term ECM estimation (Basuki, 2017). Thus, the following is the long-term ECM equation:

$$Y_t = \alpha_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \dots + \beta_n X_{nt} + e_t$$

In the meanwhile, the short-term Error Correction Model (ECM) equation is as follows:

$$\Delta Y_t = \alpha_0 + \gamma_1 \Delta X_{1t} + \gamma_2 \Delta X_{2t} + \dots + \gamma_n \Delta X_{nt} + ECT_t + e_t$$

Where:

Y	= Dependent variable (bound)
α_0	= Constant (intercept)
$\beta_1, \dots, \beta_n$	= Coefficient of independent variables in the long run
$X_1, \dots, X_n$	= Independent (free) variable
e_t	= Error term
Δ	= Changes
ECT	= Error Correction Term or residual in the long-term equation

RESULT AND DISCUSSION

Results

1. Stationary Test (Unit Root Test)

The following are the maximum of the lag test results:

Table 3. Maximum Lag Test Results

Lag	AIC	SBIC	Prob.
0	79,1483	79,2983	
1	70,3412*	71,0917*	0,000
2	70,571	71,9219	0.218
3	70,8971	72,8484	0.521
4	71.0105	73,5621	0.053

Source: Secondary data processed using statistical applications

This study's stationary test was conducted using the Augmented Dickey-Fuller test, which is seen from the probability values summarized in the following table:

Table 4. Stationary Test Results with Augmented Dickey-Fuller

Variabel	Level Level			First Difference Level		
	T Stat.	Critical Value	Caption	T Stat.	Critical Value	Caption
		10%			10%	
CADEV L1.	2,229	2,598	TS	5,208	2,599	S
EXP L1.	1,351	2,598	TS	4,645	2,599	S
ULN L1.	2,675	2,598	TS	4,854	2,599	S
REMITKI L1	0,309	2,598	TS	4,730	2,599	S

Note: TS = Non-stationary; S = Stationary.

Source: Secondary data processed using statistical applications

Based on the table above, the results of the stationary test show that foreign exchange reserves, exports, foreign debt, and TKI remittances are not stationary at the level. Meanwhile, the *first difference* shows that all variables are in stationary conditions at the *first difference level*. Thus, the next stage is to conduct a cointegration test.

2. Cointegration Test

The cointegration test yielded the following findings:

Table 5. Results of Cointegration Test with Johansen Test

Max rank	Eigenvalue	Trace statistics	Certical value
0	-	49,3117	47.21
1	0.35466	25,6613*	29.68
2	0.27922	7,9805	15.41
3	0.10241	2,1463	3.76

Source: Secondary data processed using statistical applications

The cointegration relationship can be seen where the *trace statistic value* must be > *critical value* at a certain rank. So, there is a cointegration relationship in this research because the *trace statistic value* at rank 0 is 49.3117 > *critical value* of 47.21. There is a long-term link in the data used, as indicated by the asterisk (*) at maximum rank 1. It is recognized that this research model has a long-term association based on the cointegration outcomes.

3. Assumption Test Classic

All assumption tests classic fulfilled.

4. Long Term ECM Estimates

Extended-Duration Error Correction To observe how independent variables affect dependent variables over an extended period of time, model testing is utilized. The outcomes of the long-term ECM estimates are as follows:

Table 6. Long -Term ECM Estimation Results

Dependent Variabel : CADEV (Foreign Exchange Reserves in million US\$)					
Variabel	Information	Coeff.	Std. E r r o r	t tsat	Prob. T
EXP	Export	1,240	0.300	4.13	0,000
ULN	Foreign Debt	0.201	0.021	9.38	0,000
REMITTIE	TKI Remittances	-4,978	3,045	-1.63	0.108
S					
cons	Constant (intercept)	44484.04	4994.98	8.91	0,000
Engle-Granger regression test					
D. egresid	Coefficient	Std. Error	t stat	Prob. t	
egresit L1	-0.313	0.092	-3.40	0.001	

Source: Secondary data processed using statistical applications

The initial equation for long-run ECM estimation is as follows:

$$Y_t = \beta_{0t} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \varepsilon$$

$$CADEV_t = \beta_{0t} + \beta_1 EXP_t + \beta_2 ULN_t + \beta_3 REMITKI_t + \varepsilon$$

So, the long-term ECM equation this research is as follows:

$$CADEV_t = 44484,04 + 1,240EXP_t + 0,201ULN_t - 4,978REMITKI_t + \varepsilon$$

5. Long Term ECM Estimates Short

After the data is confirmed to be in stationary condition in differentiation at the first level and the data has a long-term relationship. Then the data is considered feasible to conduct a short-term ECM test. The following are the outcomes of the short-term ECM test:

Table 7. Short -Term ECM Estimation Results

Dependent Variabel : CADEV (Foreign Exchange Reserves in million US\$					
Variabel	Information	Coeff.	Std. E r r o r	t tsat	Prob. T
EXP D1.	Export Changes	0.429	0.309	1.39	0.172
EXP LD.	Foreign Changes _{t-1}	-0.109	0.311	-0.35	0.728
ULN D1.	Changes in Foreign Debt	0.488	0.078	6.29	0,000
ULN LD.	Changes in Foreign Debt _{t-1}	-0.174	0.099	-1.77	0.083
REMITTI ES D1.	Changes in TKI Remittances	-5,254	3,550	-1.48	0.246
REMITKI LD.	Changes in TKI Remittances _{t-1}	-0.256	3,746	-0.04	0.967
CADEV LD.	Change in Foreign Exchange Cad. _{t-1}	0.417	0.133	3.14	0.003
_cons	Constant (intercept)	-359,176	735,392	-0.49	0.628
_egresid L1	Error Correction Term	-0.255	0.082	-3.13	0.003

Source: Secondary data processed using statistical applications

The initial equation for short-term ECM is as follows:

$$\Delta Y_t = \alpha_0 + \gamma_1 \Delta X_{1t} + \gamma_2 \Delta X_{2t} + \gamma_3 \Delta X_{3t} + \gamma_1 \Delta X_{1t-1} + \gamma_2 \Delta X_{2t-1} + \gamma_3 \Delta X_{3t-1} + \gamma_4 \Delta Y_{t-1} + \gamma_5 ECT_t + \varepsilon_t$$

$$\Delta CADEV_t = \alpha_0 + \gamma_1 \Delta EXP_t + \gamma_2 \Delta ULN_t + \gamma_3 \Delta REMITKI_t + \gamma_1 \Delta EXP_{t-1} + \gamma_2 \Delta ULN_{t-1} + \gamma_3 \Delta REMITKI_{t-1} + \gamma_4 \Delta CADEV_{t-1} + \gamma_5 ECT_t + \varepsilon_t$$

Based on the estimation results above, the short-term ECM equation by including changes in the independent variables (*First Difference /D1*) and changes in the independent variables in the previous quarter (*Lagged Difference /LD*) is as follows:

$$\begin{aligned} \Delta CADEV_t = & -359,176 + 0,429 \Delta EXP_t + 0,488 \Delta ULN_t \\ & - 5,254 \Delta REMITKI_t - 0,109 \Delta EXP_{t-1} - 0,174 \Delta ULN_{t-1} \\ & - 0,256 \Delta REMITKI_{t-1} + 0,417 \Delta CADEV_{t-1} - 0,255 ECT_{t-1} + \varepsilon_t \end{aligned}$$

6. Hypothesis Test Results Study

To see whether the ECM estimation results reject or accept H0 can be seen by comparing the calculated t value (t stat) and t table as in the following curve.

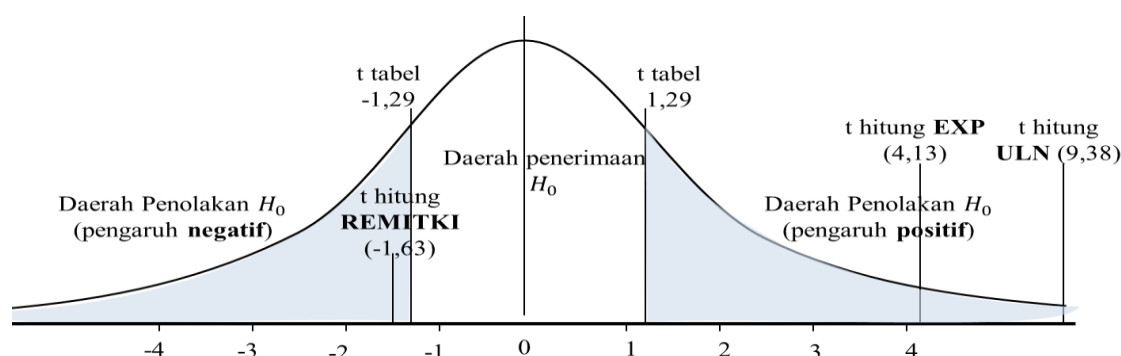


Figure 5. T-Test Curve of Long-Term ECM Estimation Results

Source: Processed based on ECM estimation results

The H_0 acceptance area and the H_0 rejection area are the two regions that are seen in the above image. The findings indicate that, to a certain extent, exports and foreign debt have a long-term, favorable, and noteworthy impact on foreign exchange reserves. Therefore, assuming all other factors stay the same, a one million dollar rise in exports will result in a 1.24 million dollar increase in foreign exchange reserves over time. Additionally, assuming all other factors stay the same, foreign exchange reserves will rise by 0.20 million US dollars, or 201 thousand US dollars, over time if foreign debt increases by \$1 million US dollars. But, the TKI remittances are negative and do not significantly affect foreign exchange reserves in the long term. The *L1 regress value* refers to the *Error Correction Term* (ECT) value in the previous quarter. This value shows how much the foreign exchange reserve variable deviates from the long-term equilibrium predicted in the previous quarter. The ECT value are 0.313 and negative, meaning that in the previous quarter, foreign exchange reserves were below their long-term equilibrium value. A negative value also indicates that there were corrections or improvements made to return the foreign exchange reserve variable to long-term equilibrium.

If we show the short-time, the Export changes (*First Difference* or D1) positive and do not significantly, The change in exports in the previous quarter (*Lagged Difference* or LD) was negative and did not significantly, Changes in foreign debt (*First Difference* or D1) was positively and significantly, Changes in foreign debt in the next quarter (*Lagged Difference* or LD) negatively and significantly, changes in TKI remittances (*First Difference* or D1) negative and do not significantly, Changes in TKI remittances in the previous quarter (*Lagged Difference* or LD) are negative and do not significantly, change in foreign exchange reserves in the previous quarter (*Lagged Difference* or DL) was positive and significantly affects the change in foreign exchange reserves in the short term. So, that the increase in the change in foreign exchange reserves in the previous quarter will drive an increase in the change in Indonesia's foreign exchange reserves by 417 thousand US\$ in the short term assuming other variables remain constant. Short-term Error Correction Term (ECT) which indicates a short-term equilibrium fluctuation that will be corrected towards long-term equilibrium. The first adjustment or correction process of 25.5% occurs in the first quarter and the remaining 74.5% occurs in the following quarter.

Discussion

The results from Antoni et al. (2019) shows the same results as this study, namely that in the long term exports have a positive and significant influence on foreign exchange reserves in Indonesia. The results of this study are also strengthened by a scatter *plot* between foreign exchange reserves and exports in Indonesia with the following description.

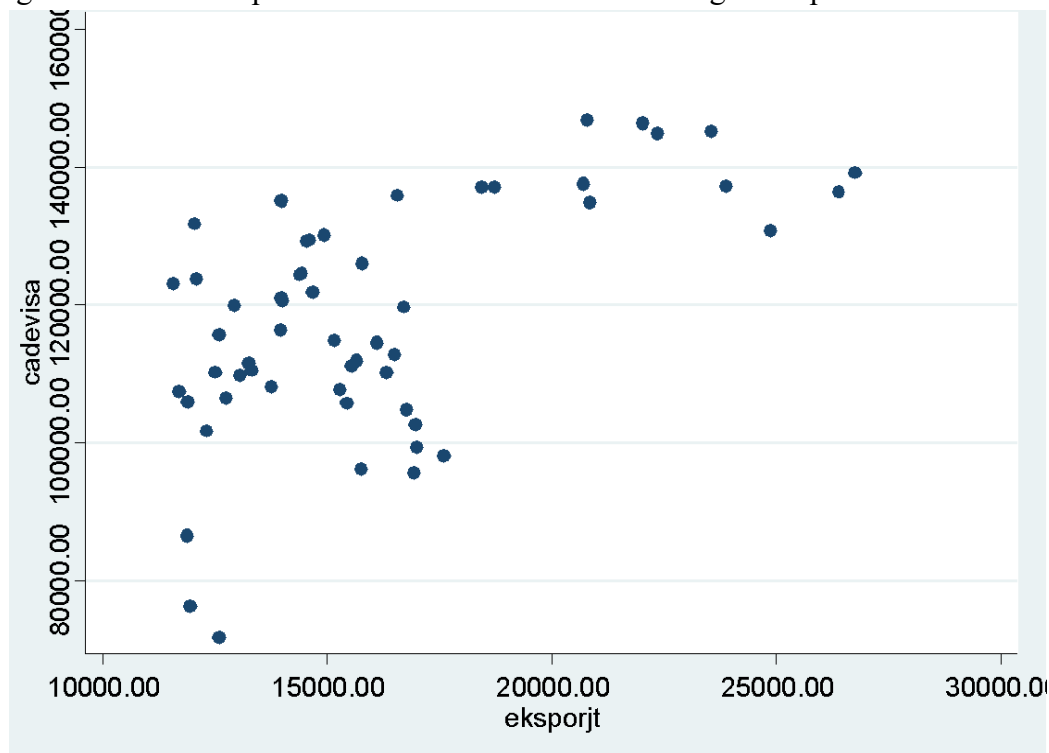


Figure 6. Scatter Plot between Exports and Indonesia's Foreign Exchange Reserves 2010-2023
Source: Secondary Data Processed Using Statistical Applications

But, in the short term show that changes in exports are positive and do not significantly affect changes in foreign exchange reserves in Indonesia. So that the increase or decrease in changes in exports does not affect changes in foreign exchange reserves in the short term. This can occur due to short-term fluctuations such as seasonal factors, changes in global demand, and inconsistent changes in trade policies, same with Sanusi et al. (2019).

Then, changes in exports in the previous quarter have insignificant effect on changes in dependent variable in the short term. Its because the adjustment process does not always occur immediately, so changes in exports in the previous quarter require a longer time to significantly affect changes in dependent variable. In addition, the presence of other factors such as exchange rate fluctuations, changes in trade policies and political turmoil can cause the relationship between exports and foreign exchange reserves same with Suropto et al., (2023).

In the long run, foreign debt has a positive and significant impact on Indonesia's foreign exchange reserves, according to Dwinoviyanto's (2023) research findings. In order to boost foreign exchange reserves, foreign loans can boost production capacity in industries with a comparative advantage (Dwinoviyanto, 2023). the result of short time is supported by Amalia & Titik (2021) that changes in foreign debt (D1) have a positive and significant impact.

According to research on the impact of remittances in developing nations by Orozco & Ellis (2014), remittances have a negligible and detrimental impact on foreign exchange reserves. Additionally, this study shows that the impact of remittances is multifaceted. The influence of remittances on foreign exchange reserves is negligible if they are not utilized for profitable investments. Short-term ECM estimation results, on the other hand, indicate that variations in TKI remittances (D1) and those from the prior quarter have a negligible and adverse impact on fluctuations in foreign exchange reserves. This implies that changes in foreign exchange reserves will not be impacted by changes in TKI remittances, either in terms of growth or reduction, or by changes in TKI remittances during the preceding quarter.

CONCLUSION

Conclusion

Based on the analysis that has been carried out, there are several conclusions that can be drawn from this study, namely:

1. In the Long Term, the Exports, Foreign debt has a positive and significant, but TKI remittances have a negative and insignificant impact on Indonesia's foreign exchange reserves in the long term.
2. In the Short Term, the Export changes (*First Difference* or D1) positive and do not significantly, The change in exports in the previous quarter (*Lagged Difference* or LD) was negative and did not significantly, Changes in foreign debt (*First Difference* or D1) was positively and significantly, Changes in foreign debt in the next quarter (*Lagged Difference* or LD) negatively and significantly, changes in TKI remittances (*First Difference* or D1) negative and do not significantly, Changes in TKI remittances in the previous quarter (*Lagged Difference* or LD) are negative and do not significantly, change in foreign exchange reserves in the previous quarter (*Lagged Difference* or DL) was positive and significantly affects the change in foreign exchange reserves in the short term.
3. In addition to presenting empirical results, this study also provides new contributions to the literature, namely by simultaneously analyzing the effects of exports, foreign debt, and TKI remittances on Indonesia's foreign exchange reserves in one comprehensive econometric model. Most previous studies tend to discuss these variables separately, so that the relationship and comparison of the relative influence between variables have not been fully described. These findings indicate that exports and foreign debt have a significant influence in the long term, while TKI remittances have not shown a significant contribution. Thus, this study provides a new perspective for the formulation of more integrated policies in maintaining the stability of foreign exchange reserves by optimizing the role of the trade sector and foreign debt management.

Suggestion

Based on the conclusions above, here are some suggestions that can be made based on the results of this study, namely:

1. In the Long Term

The government needs to encourage diversification of export products, pay attention to the use of debt for productive investment activities and can increase long-term economic capacity. And needs to optimize remittances by encouraging the use of remittances for productive investments domestically, such as opening MSMEs.

2. In the Short Term

The government can focus on maintaining the stability of export volume by maintaining the quality and continuity of supply, manage liquidity and make debt payments on time, and provide incentives to migrant workers who exchange remittances in the form of rupiah currency.

REFERENCES

- Agustina, & Reny. (2014). Pengaruh Ekspor, Impor, Nilai Tukar Rupiah, dan Tingkat Inflasi terhadap Cadangan Devisa Indonesia. *Jurnal Wira Ekonomi Mikroskil*, 4, 61–70.
- Al-Assaf, G., & Al-Malki, A. M. (2014). Modelling the Macroeconomic Determinants of Workers' Remittances: The Case of Jordan. *International Journal of Economics and Financial Issues*, 4(3), 514–526.
- Alda Heriyatma, Elok Fitriani Rafikasari, & Moh Farih Fahmi. (2022). The Effect of Gross Domestic Product, Exports, Imports, Exchange Rates, Inflation and External Debt on Indonesia's Foreign Exchange Reserves in 2017-2020 (Study From an Islamic Perspective). *Qawānīn Journal of Economic Syaria Law*, 6(2), 177–198. <https://doi.org/10.30762/qaw.v6i2.156>
- Alvaro, R. (2022). Pengaruh Nilai Kurs, Inflasi, Dan Pdb Terhadap Ekspor Tembaga Di Indonesia. *Jurnal Budget : Isu Dan Masalah Keuangan Negara*, 4(1), 64–81. <https://doi.org/10.22212/jbudget.v4i1.32>
- Amalia, S., & Titik, C. S. (2021). Pengaruh Impor, Nilai Tukar Rupiah, dan Utang Luar Negeri Terhadap Cadangan Devisa Indonesia. *Buletin Ekonomika Pembangunan*, 2(1), 1–36. <https://doi.org/10.21107/bep.v2i1.13847>
- Antoni, Akmal, & Muslim, I. (2019). Long-Term Relationships of Macroeconomic Variables on Indonesian Foreign Exchange Reserves. *Menara Ekonomi*, V(2), 1–9.
- Badan Pusat Statistik. (2023). *Badan Pusat Statistik*. Badan Pusat Statistik. 5 April 2023
- Bank Indonesia. (2023). *Statistik Ekonomi dan Keuangan Indonesia*. Bank Indonesia Institute. [https://www.bi.go.id/id/statistik/ekonomi keuangan/seki/Default.aspx#headingFour](https://www.bi.go.id/id/statistik/ekonomi%20keuangan/seki/Default.aspx#headingFour)
- Basuki, A. T. (2017). *Ekonometrika Dan Aplikasi Dalam Ekonomi*. Katalog Dalam Terbitan.
- Basuki, A. T., & Prawoto, N. (2014). *Pengantar Teori Ekonomi*. Penerbit Mitra Pustaka Nurani (MATAN).
- Departemen Komunikasi Bank Indonesia. (2024). *Cadangan Devisa Desember 2023 Meningkat*. Bank Indonesia. <https://www.bi.go.id/id/publikasi/ruang-media/news-release/>
- Diana, E., & Zulfa, A. (2020). The Influence of The Amount of Migran Workers to The Growth of Foreign Exchange Reserve in Indonesia. *Journal of Malikussaleh Public Economics*, 2(1), 9. <https://doi.org/10.29103/jmpe.v2i1.1739>
- Dwinoviyanto, F. A. (2023). Analisis Pengaruh Ekspor, Tingkat Kurs, Investasi Dan Utang Luar Negeri Sektor Ekonomi Terhadap Cadangan Devisa Di Indonesia Tahun Periode 2016:Q1-2022:Q4. *Jurnal Berkala Ilmiah Efisiensi*, 23(8), 25–36.
- Engle, R. F., & Granger, C. W. J. (2012). *Co-Integration and Error Correction : Representation , Estimation ,*. 55(2), 251–276.
- Giuliano, P., & Ruiz-Arranz, M. (2009). Remittances, Financial Development, and Growth. *Journal of Development Economics*, 90(1), 144–152. <https://doi.org/10.1016/j.jdeveco.2008.10.005>
- Gujarati, D. N. (2004). *Basic Econometrics* (Fourth Edi). The McGraw Hill.
- Hamilton, J. D. (1994). Time Series Analysis. In *Princeton University Press*. <https://doi.org/10.1016/j.ejor.2024.01.032>
- Indriyani, K., Marwa, T., Adnan, N., & Muizzuddin, M. (2020). The Determinants of Foreign

- Exchange Reserves: Evidence from Indonesia. *The Journal of Asian Finance, Economics and Business*, 7(11), 629–636. <https://doi.org/10.13106/jafeb.2020.vol7.no11.629>
- International Monetary Fund. (2023). *International Monetary Fund*. International Monetary Fund. <https://www.imf.org/>
- Johnson, K. (2010). *Many Happy Returns: Remittances and Their Impact* (Issues 1–13).
- Julismin. (2013). Dampak dan Perubahan Iklim di Indonesia. *Jurnal Geografis*, 5(1), 40–46.
- Kevles, D. J. (1987). In the Corridors of Power. *Nature*, 326(6116), 894–895. <https://doi.org/10.1038/326894a0>
- Maesyaroh, W. U., & Kundhani, E. Y. (2024). Analisis Faktor-faktor yang Mempengaruhi Cadangan Devisa. *Jurnal Ilmu Ekonomi (JIE)*, 8(01), 92–109. <https://doi.org/https://doi.org/10.22219/jie.v8i01.29769>
- Mankiw, N. G. (2017). *Macroeconomics* (9th ed.). Worth Publishers.
- Orozco, M., & Ellis, C. G. (2014). *Impact of Remittances in Developing Countries*. 89–118. https://doi.org/10.1007/978-94-017-9023-9_5
- Salvatore, D. (2013). International Economics. In J. Hollenbeck (Ed.), *John Wiley & Sons, Inc* (11th Editi). Wiley. <https://doi.org/10.4324/9781315662367-15>
- Sanusi, K. A., Meyer, D. F., & Hassan, A. S. (2019). An Investigation of the Determinants of Foreign Exchange Reserves in Southern African Countries. *Journal of International Studies*, 12(2), 201–212. <https://doi.org/10.14254/2071-8330.2019/12-2/12>
- Sayoga, P., & Tan, S. (2017). Analisis cadangan devisa Indonesia dan faktor-faktor yang mempengaruhinya. *Jurnal Paradigma Ekonomika*, 12(1), 25–30. <https://doi.org/10.22437/paradigma.v12i1.3931>
- Sumiyati, Arisandi, B. D. A., & Wilujeng, P. R. (2022). Metode Arch/Garch Untuk Memprediksi Hubungan Economic Uncertainty (Covid 19) Dan Volatilitas Saham. *Jurnal Bisnis Dan Akuntansi*, 24(1), 117–130. <http://jurnaltsm.id/index.php/JBA>
- Suripto, Novayadi, N., Sukarniati, L., & Kurniawan, M. L. A. (2023). Analysis of Factors Affecting Foreign Exchange Reserves in Indonesia (2017-2021). *International Journal of Applied Business and International Management*, 0(3), 72–92. <https://doi.org/doi.org/10.32535/ijabim.v8i132462>
- Suripto, Setyawan, R. R., Istanti, & Mustofa, H. (2021). *An Analysis of Factors Affecting Indonesia's Foreign Exchange Reserve*. 12(2), 223–235.
- Syukuriyah, D. L., & Indrawati, L. R. (2022). Analisis Faktor-Faktor Yang Mempengaruhi Cadangan Devisa Di Indonesia (Periode Tahun 1991-2020). *Jurnal Kajian Ekonomi Dan Kebijakan Publik*, 7(1), 81–91. <http://repository.unair.ac.id/47209/>
- Tafara, L., Kumaat, R. J., & Maramis, M. T. B. (2022). Analisis Faktor - Faktor Yang Mempengaruhi Cadangan Devisa Indonesia Periode 2011-2020. *Jurnal Berkala Ilmiah Efisiensi*, 22(6), 73–84.
- Todaro, M. P., & Smith, S. C. (2012). *Pembangunan Ekonomi di Dunia Ketiga* (11th ed.). Addison-Wesley.
- Uli, L. B. (2016). Analisis Cadangan Devisa Indonesia. *Jurnal Perspektif Pembiayaan Dan Pembangunan Daerah*, 4(1), 15–24. <https://doi.org/10.22437/ppd.v4i1.3529>
- Untoro, J. (2010). *Buku Pintar Pelajaran*. PT Wahyumedia.
- Wahyudi, H., & Suripto, W. A. (2023). Long-Term Impact of Macroeconomic Variables on Foreign Exchange Reserves in the Organization of Islamic Corporation. *Jurnal Ekonomi Dan Bisnis Islam (Journal of Islamic Economics and Business)*, 9(1), 149–171. <https://doi.org/10.20473/jebis.v9i1.40217>
- Wang, P. (2009). Balance of Payments and International Investment Positions. In *The Economics of Foreign Exchange and Global Finance*. https://doi.org/10.1007/978-3-642-00100-0_4
- Wei, W. W. S. (2006). Time Series Analysis: Univariate and Multivariate Methods. In *New introduction to Multiple Time Series Analysis* (2nd Editio). Addison Wesley.
- World Bank. (2023). *How do you define remittances?* The World Bank. <https://datahelpdesk.worldbank.org/knowledgebase/articles/>