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Currency Risk and Debt Maturity: Their Effects on the Resilience of Indonesia's Foreign Exchange Reserves

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ABSTRACT

Research Originality: This study uncovers the unexpected negative impact of long-term external debt on Indonesia's foreign exchange reserves, challenging conventional beliefs about debt stability.

Research Objectives: This study provides important—and occasionally surprising—new insights into the dynamics of Indonesia's external debt and its impact on the country's foreign exchange reserves.

Research Methods: Using recent time series data from 2013–2024 and the tried-and-true OLS regression method, this study provides a thorough and timely analysis of the relationship between Indonesia's foreign exchange reserves and the structure of its external debt.

Empirical Results: The empirical results indicate that long-term debt has a negative impact on foreign exchange reserves, whereas Rupiah and foreign currency-denominated debts have positive effects. Notably, short-term debt shows no significant impact. These findings offer practical guidance for Indonesia's external debt management, supporting better debt prioritization and enhanced financial resilience.

Implications: These novel insights offer valuable guidance for optimizing debt management to strengthen Indonesia's financial resilience and economic stability.

Keywords:

external debt; exchange rate risk; macroeconomic stability; debt structure

How to Cite:

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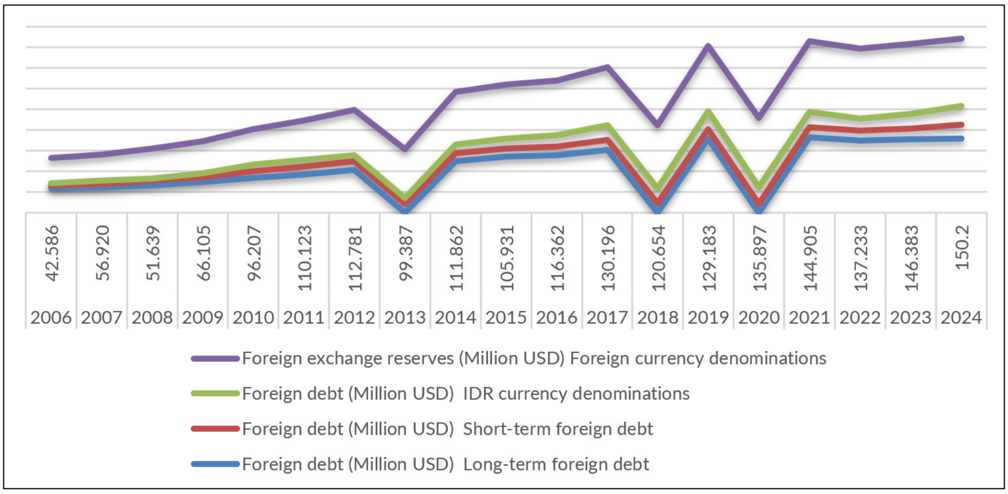
INTRODUCTION

Foreign exchange reserves are one of the leading indicators of a country's macroeconomic stability. Their primary functions are maintaining external liquidity, supporting exchange rates, and meeting international payment obligations. In this context, managing foreign exchange reserves is greatly influenced by various economic factors, including the structure of external debt. Foreign debt, as part of capital flows, is a significant source of financing. However, it also carries risks that can strain foreign exchange reserves, particularly when principal and interest payments are due.

Foreign debt or foreign loans can impact foreign exchange reserves, as foreign debt is an inbound fund from outside countries that helps cover a country's balance sheet deficit. In contrast to Mahmood (2005), the relationship between foreign debt and the balance of payments is negative, where the higher the foreign debt, the lower the balance of payments will be, or create a current account deficit caused by external debt. It is intended to facilitate debt accumulation, the level of financing needed to meet import payments. The development of Indonesia's external debt, or foreign loans, from 2006 to 2016. It can be observed that Indonesia's external debt has exhibited an increasing trend annually, with significant or slight increases from the previous year (see Figure 1). The highest increase in Indonesia's external debt occurred in 2008, with a growth rate of 13.50 percent due to the global financial crisis (Trading Economics, 2025).

Figure 1. The Development of Indonesia's External Debt or Foreign Loans



Although previous literature has helped improve our understanding of the relationship between external debt and foreign exchange reserves in aggregate (Nailil et al., 2021; Ridho, 2015; Yuliani et al., 2024). Most existing literature ignores differences in debt characteristics, such as the term (short-term or long-term), currency denomination, and type of lender. The composition of external debt plays an important role in determining the pressure level on a country's foreign exchange reserves. Studies by Gergely et al. (2012) demonstrate that debt management policies can yield suboptimal solutions on a consolidated basis if adequate reserves are not factored into the decision-making process for issuing foreign currency debt.

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In addition, increased foreign currency debt issuance and EU/IMF loans are the primary factors driving the growth of foreign exchange reserves. According to Tille (2003), the exchange rate plays a crucial role in the movement of foreign loan positions; fluctuating exchange rate movements significantly impact a country's foreign loan position. Widharma et al. (2013) stated that if the rupiah exchange rate appreciates against the US dollar, it will be followed by a decrease in debt or loans denominated in rupiahs. Conversely, the depreciation of the rupiah exchange rate will cause the amount of foreign debt to increase, as Indonesia pays its foreign debt in foreign currency. Studies by Jannah and Shidiqi (2017) also showed that exchange rates can have a negative impact on foreign debt and its fluctuations.

Although the overall influence of external debt on developing countries, such as Indonesia, is widely recognized, and studies like Dawood et al. (2020) have emphasized the vulnerability of foreign exchange reserves to exchange rate volatility and debt repayment pressures, substantial research gaps remain. More recent empirical work by Koh (2020) finds that the rapid buildup of debt, both public and private, increases the likelihood of a financial crisis, as does a larger share of short-term external debt, higher debt repayment coverage, and lower reserve coverage. Countries facing extreme crises generally deploy an unworkable combination of fiscal, monetary, and financial sector policies, and often suffer from structural and institutional deficiencies. Meanwhile, Mouandat (2022) underlined that it is better to issue more local currency debt and less foreign currency debt, as long as domestic interest rates are lower than international debt risk premiums. Similarly, Elkhalfi et al. (2024) demonstrated an increase in external debt stocks that initially supported growth; however, excessive debt accumulation led to a decline in returns and a negative impact on growth. These results underscore the importance of prudent debt management, particularly in the context of globalization, where developing countries are increasingly vulnerable to external shocks.

Despite extensive studies on external debt, existing research often overlooks the detailed impact of debt structure on foreign exchange reserves, typically focusing on aggregate debt measures. This study addresses this gap by providing a novel and comprehensive analysis of Indonesia's external debt disaggregated by both maturity (short-term vs. long-term) and currency denomination (Rupiah vs. foreign currency). Unlike prior work, it reveals how these specific dimensions distinctly affect the country's foreign exchange reserves, offering granular insights that have not been thoroughly explored in the Indonesian context. This contribution advances the academic debate on external debt management and delivers critical guidance for emerging economies navigating volatile global financial conditions.

METHODS

This research employs a quantitative methodology centered on Indonesia, utilizing time series data spanning from 2013 to 2024. The dependent variable is foreign exchange reserves, and the independent variables consist of short-term debt, long-term debt, foreign currency-denominated debt, and local currency-denominated debt. These variables are chosen because Indonesia's ongoing dependence on foreign borrowing to address budget deficits and its vulnerability to currency risk, particularly from exchange rate volatility, necessitate their consideration. Information regarding the external debt structure and currency denomination is sourced from Bank Indonesia, while data on foreign exchange reserves is obtained from BPS (Statistics Indonesia).

The study employs the Ordinary Least Squares (OLS) multiple regression method to analyze the association between debt structure and reserves. To guarantee model reliability, standard classical assumption tests are performed, encompassing assessments for autocorrelation, multicollinearity, normality, and heteroscedasticity. This methodology facilitates a precise evaluation of the impact of external debt composition on Indonesia's foreign exchange reserves over time. The variable relationship model is analyzed based on regression equations. The mathematical equation in this research is as follows:

$$R_t = \beta_0 + \beta_1 UJP_t + \beta_2 UJL_t + \beta_3 DMF_t + \beta_4\ DMD_t + \epsilon_t R_{-t}$$

Where:

RtR_t: Foreign exchange reserves.

UJPtUJP_t: Short-term debt.

UJLtUJL_t: Long-term debt.

DMFtDMF_t: Foreign currency-denominated debt.

DMDtDMD_t: Domestic currency-denominated debt.

RESULTS AND DISCUSSION

The empirical results summarized in Table 1 offer valuable insights into how various debt components impact the stability of foreign exchange reserves. The model demonstrates strong explanatory power, with an R-squared value of 0.9655, indicating that approximately 96.5% of the variation in Indonesia's foreign exchange reserves is explained by the selected independent variables. The overall model is highly statistically significant, as indicated by an F-statistic of 97.94, confirming that at least one predictor has a meaningful effect on foreign exchange reserves.

Long-term external debt has a negative impact on foreign exchange reserves. This counterintuitive result suggests that increases in long-term debt, holding other factors constant, are associated with a reduction in reserves. This challenges the conventional view that long-term debt is inherently more stable or less burdensome. Short-term debt has no statistically significant effect on foreign exchange reserves. This finding is noteworthy as it questions the common assumption that short-term debt exerts a more immediate and volatile pressure on reserves.

Debt denominated in Rupiah exhibits a positive effect on foreign exchange reserves. This finding suggests that an increase in Rupiah-denominated external debt is associated with higher foreign exchange reserves, possibly reflecting capital inflows or a reduced need to draw down reserves for debt servicing. Foreign currency-denominated debt also shows

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a positive and statistically significant relationship with foreign exchange reserves. Despite potential exchange rate risks, foreign currency debt inflows may contribute positively to reserve accumulation. Overall, these findings highlight the complex and nuanced relationship between the composition of external debt and foreign exchange reserves in Indonesia. They provide important implications for policymakers aiming to optimize external debt management and safeguard reserves.

Table 1. The Result of Least Squares

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.16757	8.118359	1.498773	0.1561
JKPJG	-2.091018	0.774814	-2.698735	0.0173
JKPDK	-0.231689	0.626615	-0.369747	0.7171
DENIDR	2.447717	0.876599	2.792289	0.0144
DENMTASG	2.119548	0.727256	2.914447	0.0113
R-squared	0.965498	Mean dependent var		108.6607
Adjusted R-squared	0.955641	S.D. dependent var		32.90707
S.E. of regression	6.930766	Akaike info criterion		6.930752
Sum squared resid	672.4973	Schwarz criterion		7.179289
Log-likelihood	-60.84214	Hannan-Quinn criteria		6.972814
F-statistic	97.94445	Durbin-Watson stat		1.137954
Prob(F-statistic)	0.000000			

Our discovery that short-term debt exerts no statistically significant influence on foreign exchange reserves is crucial and necessitates further examination. Traditionally, it has the potential to trigger a financial crisis. The indirect effects suggest that short-term foreign debt during banking crises, combined with exchange rate misalignments corrected by currency crises, increases the likelihood of a sovereign default. Countries with substantial debt exposure are vulnerable to economic and financial disruptions that may precipitate sovereign defaults. Supporting this, Babecký et al. (2014) found that sovereign defaults raise the probability of subsequent currency crises, though the reverse relationship does not hold.

Reverse causality may also arise when the domestic banking sector holds significant government debt on its balance sheets (Gennaioli et al., 2014; Sosa-Padilla, 2018; Thaler, 2021). Initially, growing foreign debt stocks can stimulate economic expansion; however, excessive debt accumulation eventually leads to diminishing returns and negatively impacts growth. These findings underscore the importance of prudent debt management, particularly in the context of globalization, where developing countries remain highly susceptible to external shocks. This dynamic is especially relevant in studies examining the influence of external debt on the economic growth of emerging nations.

However, our results reveal a more complex reality for Indonesia over the 2013–2024 period, where short-term debt appears to have limited relevance for foreign exchange reserves.

Indonesia's authorities, including Bank Indonesia and the Ministry of Finance, have likely implemented robust policies and oversight mechanisms to manage short-term debt effectively. These may include stricter regulations on short-term lending, enhanced monitoring of private sector short-term debt, or a policy emphasis on government short-term borrowing rather than private sector alternatives. Recent data (DJPPR, 2025) indicate that Indonesia's external debt stock is predominantly composed of long-term maturities, which likely diminishes the influence of the relatively small short-term debt component on reserves.

Contrary to the view that short-term debt inherently reduces moral hazard, evidence suggests that under financial frictions and fair debt pricing, short-term debt can actually encourage risk-taking. In a theoretical model where firms are financed through equity and short-term loans but face refinancing constraints, operational and rollover losses can elevate default risk. In such scenarios, shareholders may increase asset risk to improve interim debt repricing and avoid inefficient liquidation. Notably, these risk-taking incentives tend to dissipate when debt maturities are sufficiently extended.

If short-term debt is channeled into highly productive sectors that generate quick returns and foreign exchange earnings, repayments may not substantially deplete reserves. This condition aligns with policy recommendations advocating for strategic and prudent short-term debt usage. Potential negative impacts from short-term debt repayments may be neutralized by other foreign exchange inflows, such as foreign direct investment and export revenues, or through sophisticated hedging practices employed by borrowers. These factors can collectively render the net effect of short-term debt on aggregate reserves statistically insignificant over the period studied.

Overall, these findings challenge the conventional wisdom that all short-term debt is inherently unstable and detrimental to foreign exchange reserves in developing countries. They emphasize the critical role of effective debt management and sound economic fundamentals in enabling a country to sustain and service its debt without significantly depleting its reserves. The most notable finding is the negative impact of long-term debt on foreign exchange reserves. This outcome contradicts the commonly accepted notion that long-term debt, due to its prolonged maturity structure, provides enhanced stability and reduces immediate strain on foreign exchange reserves. This consequence for Indonesia demands meticulous contemplation:

Long-term debt ultimately matures, necessitating the repayment of principal and interest. The enormous growth in long-term debt, as evident in Indonesia's rising debt levels (Asnawi et al., 2023; CEIC Data, 2024), suggests that the significant quantity of scheduled repayments, even when distributed over time, may consistently deplete foreign exchange reserves. This is especially applicable when the projects funded by this debt fail to produce adequate foreign exchange returns or when the debt is denominated in foreign currency (Widharma et al., 2013).

The allocation and productivity of long-term debt suggest that some of Indonesia's long-term external debt may not be consistently directed towards sectors that directly generate foreign exchange or substantially enhance export capabilities. If long-term debt funds domestic consumption, import-heavy initiatives, or yield suboptimal returns, it may

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result in a heightened need for foreign currencies for servicing, without a corresponding rise in foreign exchange earnings. Recent studies have highlighted that external debt can bridge investment-saving gaps for growth, but its advantages depend on its allocation to productive sectors to prevent a 'debt trap' (e.g., Van Bon, 2015; Marimuthu et al., 2021).

Although the model distinguishes between currency denominations, the total long-term debt amount is likely to include a substantial component denominated in foreign currency. A depreciating Rupiah over time would elevate the Rupiah equivalent of foreign currency debt, thereby amplifying the stress on Bank Indonesia to stabilize the currency, which could indirectly result in reserve depletion despite the debt being long-term. Tille (2003) emphasizes that fluctuations in exchange rates can have a profound impact on a nation's foreign debt status.

It is essential to evaluate whether this trend signifies a departure from earlier periods in which long-term debt may have exhibited a more favorable correlation with reserves. The period from 2013 to 2024 may indicate emerging issues or strategies in debt management. This discovery necessitates a reassessment of Indonesia's long-term debt policy, emphasizing the effective use and a meticulous examination of its eventual impact on foreign exchange liquidity.

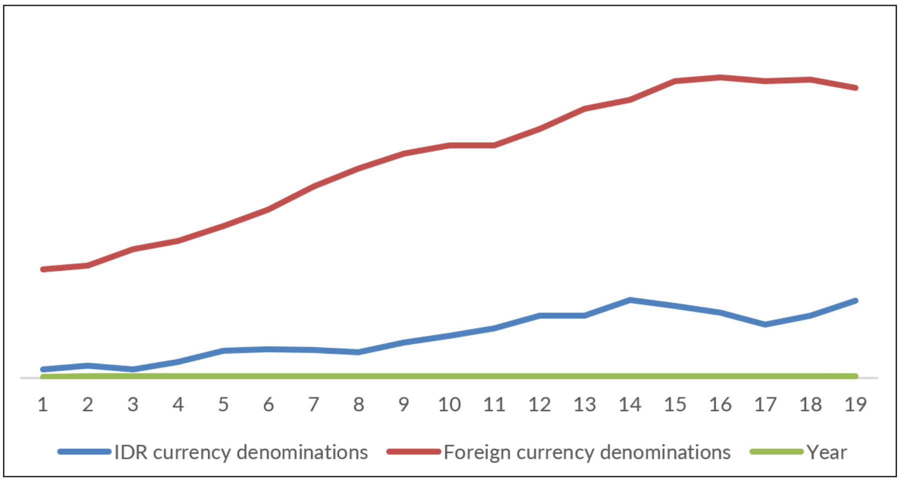
The findings indicate a positive effect of both Rupiah-denominated debt and foreign currency-denominated debt on foreign exchange reserves. This result suggests that regardless of whether the debt is denominated in local or foreign currency, its denomination aspect generally enhances reserves. The Rupiah denomination (IDR) in Indonesia's external debt showed a mixed trend from 2013 to 2024. In 2013, the amount of debt denominated in Rupiah was still relatively small, accounting for around 2.26% of total external debt. 14.35% in 2017 and 16.27% in 2018. After that, the proportion of rupiah-denominated debt is expected to stabilize until 2023, with a slight decline in 2024.

Indonesia's external debt is primarily denominated in foreign currencies, with the US dollar being the most common. However, debt is also in other currencies, such as the Japanese yen and the euro. The Indonesian Rupiah (IDR) denomination and foreign currencies are closely tied to the country's foreign exchange reserves. A stronger IDR, or an increase in the IDR's value, typically results in higher foreign exchange reserves. This is because reserves are held in foreign currencies, and the exchange rate affects their value in IDR. Conversely, a weaker IDR could deplete reserves if the value of the foreign currency held declines. A stronger IDR means that each unit of foreign currency is worth fewer IDR, potentially reducing the value of the reserves (see Figure 2).

The positive coefficient for foreign currency-denominated debt (DENMTASG). When the government or private entities borrow foreign currency from international markets, these monies immediately enhance the nation's foreign exchange reserves or are converted to Rupiah, subsequently entering the local economy and indirectly bolstering the reserve base. It is a direct result of external borrowing serving as a source of foreign cash. Recent research on the currency composition of reserves and trade and financial connections has shown that these factors influence the attractiveness of primary reserve currencies (ECB, 2021), thereby affirming that such inflows constitute a direct element of reserves.

The beneficial effect of Rupiah-denominated external debt is a significant observation. This generally pertains to foreign investors acquiring Rupiah-denominated government bonds or other domestic securities. When foreign entities purchase Rupiah-denominated bonds, they must initially convert their foreign currency into Rupiah, resulting in an influx of foreign exchange into Indonesia's financial system and ultimately augmenting the country's foreign exchange reserves. The possibility for local currency debt to serve as a stable source of foreign exchange, thereby mitigating direct foreign currency risk for the issuer (Widharma et al., 2013). currency rate risk on the government's balance sheet.

Figure 2. Development of Foreign Debt and Foreign Exchange Reserves 2006-2024



The combined benefits of Rupiah and foreign currency loans show the importance of having a well-managed and appealing loan market in both segments to help build foreign exchange reserves. However, foreign currency debt must be handled carefully, as it comes with long-term repayment costs and exchange rate risks. Overall, these findings indicate that the structure of external debt is more significant than its total amount. The negative impact of long-term debt, the limited effect of short-term debt, and the positive role of both types of currency reveal a complex relationship. This challenges common assumptions and provides a solid foundation for more targeted and effective debt management policies.

Putri et al. (2017) found that external debt did not significantly affect Indonesia's foreign exchange reserves from 1988 to 2017 because the borrowed funds were not used productively and failed to generate high returns. Rahim et al. (2019) confirmed this result, while Ardianti and Swara (2018) showed that net exports had a more substantial impact on reserves. This suggests that external factors, such as trade performance, contribute more to reserve growth than external borrowing.

The effect of external debt on economic growth also depends on its maturity. Chen et al. (2019) and Biqiong et al. (2020) found that short-term debt can support growth, whereas long-term debt may increase the fiscal burden if not invested in productive sectors such as infrastructure or technology. Therefore, developing countries must manage their debt structure carefully to prevent it from becoming a source of economic weakness.

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Kose et al. (2020) emphasized the need to maintain a balance between foreign exchange reserves and short-term debt. Similarly, Moreno Brieva et al. (2019) warned that short-term debt is volatile and prone to sudden capital outflows, which can lead to currency or banking crises. Therefore, both short-term and long-term foreign debt policies should follow principles of prudence, efficiency, and long-term economic stability.

Putri et al. (2017) found that foreign debt had a positive but insignificant effect on Indonesia's foreign exchange reserves between 1988 and 2017. In theory, productively used debt can increase reserves, but in practice, Indonesia's debt has not been managed efficiently enough to yield strong returns. Rahim et al. (2019) reported similar findings, while Ardianti and Swara (2018) showed that net exports have a significant positive impact on reserves. This means export performance contributes more to reserve growth than foreign borrowing. Overall, these studies highlight the interconnected roles of external debt, trade, and reserves in shaping economic stability. Strong export performance supports reserve accumulation, which in turn promotes faster economic growth (Azar & Aboukhodor, 2017).

The consumption of the Indonesian government has a direct and considerable positive effect on the change in the country's domestic foreign exchange reserves. The increased consumption will also significantly increase the country's foreign exchange reserves. The expanding domestic community consumption of goods and services generated in the local real market will promote the acceleration of increased output per capita and annually. This innovation by academics demonstrates that macroeconomic variables, such as consumption expenditure, have a positive impact on the increase of foreign currency reserves in Indonesia. This condition will enhance productivity, including bidding on export products overseas, thereby driving Indonesia's net export performance. Surely, it supports foreign exchange reserves (Rangkuti & Hidayat, 2021).

CONCLUSION

Our analysis of Indonesia's external debt from 2013 to 2024 reveals several key insights. Long-term debt shows a negative effect on foreign exchange reserves, challenging the assumption that longer maturities automatically bring stability. This finding calls for a reassessment of borrowing practices and how debt is used to support productive activities. In contrast, both Rupiah- and foreign currency-denominated debts contribute positively to reserves, showing the importance of capital inflows in any form. The insignificant effect of short-term debt suggests that current management practices are largely effective.

These results provide practical guidance for policymakers. First, ensure that long-term debt is used productively and avoid excessive borrowing. Second, maintain a balanced mix of Rupiah and foreign currency debt to manage risk and attract capital. Third, keep strong oversight of short-term debt and apply hedging when necessary. Finally, enhance debt monitoring and risk management systems to strengthen financial resilience.

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