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DOES LOCAL CURRENCY SETTLEMENT ENHANCE EXCHANGE RATE STABILITY? EVIDENCE FROM INDONESIA

Nabillah Hidayat[1], Ni Putu Wiwin Setyari[2]
Department of Economics Development, Faculty of Economics and Business, Udayana University
Email: nabillah.hidayat20@student.unud.ac.id

Abstract. Indonesia's dependence on the United States Dollar in international trade poses a significant threat to the stability of the Rupiah exchange rate. To reduce reliance on the U.S. Dollar, Bank Indonesia introduced the Local Currency Settlement (LCS) policy in collaboration with four partner countries: Malaysia, Thailand, Japan, and China. This study aims to analyze the impact of Local Currency Settlement implementation (D1), exports (X1), imports (X2), and inflation rate (X3) on the probability of Rupiah exchange rate stability. The research employs a logistic regression method and utilizes secondary data spanning the period from 2012 to 2023. The findings indicate that the implementation of Local Currency Settlement increases the likelihood of an unstable Rupiah exchange rate compared to the pre-implementation period. Exports contribute to a higher probability of Rupiah exchange rate stability. Conversely, imports and inflation rates increase the likelihood of exchange rate instability.
Keywords: *Local Currency Settlement, Exchange Rate, Logistic Regression, Dedolarization*

1. INTRODUCTION

In the era of globalization, economic dependence among nations has deepened. The scarcity of domestic resources has compelled nations to participate in the global market to meet their domestic demands (Wikantioso, 2023). Therefore, the opportunity to establish cooperation in the economic field is wide open. Consequently, cross-border trade has flourished, enabling countries to meet the needs of their population efficiently.

Over past few years, Indonesia has actively engaged in international economic cooperation with various countries to fulfill domestic needs that cannot be produced domestically (Muta'ali, 2020). The establishment of cooperation between countries has encouraged most nations around the world to adopt policies and practices that promote international trade (Dihpayana, 2018).

International trade agreements are primarily aimed at removing barriers to international trade. Cooperation in international trade is a crucial key to promoting a country's international trade growth. In practice, the term international trade refers to export and import activities (Supardi, 2019). The frequency of transaction during the export and import process between countries indicates the strength of their bilateral trade relations. Additionally, the growing volume of export and import transactions between countries fosters major trading partners in international trade.

In 2022, United States emerged as Indonesia's largest trading partner, followed by China, Japan, Singapore. In the Indonesia's export and import transactions, the United States Dollar (USD) is found to be the most predominantly used currency (Liana & Fitri, 2021). The USD serves as a widely accepted international currency frequently utilized in global trade transactions, particularly in export and import activities. According to data from Bank Indonesia, in 2020, the United States Dollar accounted for 93.8% of export transactions and 82% of import transactions in international trade. Additionally, Cao et al. (2023) assert that nearly 90% of global international trade transactions involve the United States Dollar as the primary means of payment.

The excessive reliance on the United States Dollar (USD) in various international transactions can create external vulnerabilities for domestic currencies. These vulnerabilities arise from factors beyond the control of monetary authorities in maintaining currency stability. In the context of Indonesia, Ananda & Idris (2024) argue that the country's economy and the exchange rate of the Rupiah are significantly influenced by U.S. monetary policy and fluctuations in the USD exchange rate. The Federal Reserve's (The Fed) decision to adjust its benchmark interest rate affects global interest rates, including in Indonesia. When the Fed raises interest rates, investors tend to shift their capital toward USD-denominated assets, as they are expected to yield higher returns. Consequently, this increases the demand for the USD, leading to a depreciation of the Rupiah.

A high dependency on the United States Dollar (USD) poses significant risks to the domestic economy. Sussangkarn (2017) explains that reliance on the USD exposes a country to the policies and economic challenges of the United States. Furthermore, Dovonou (2023) conducted a study on 51 developed and developing countries that predominantly use the USD as a medium of international payment. The findings indicate that the dominance of the USD increases these countries' exposure to and dependence on U.S. monetary policies. Consequently, excessive reliance on the USD makes national economies vulnerable to economic fluctuations and policy decisions in the United States. The high volatility of the USD directly contributes to the instability of the Rupiah's exchange rate.

Figure 1. US dollar exchange rate on Rupiah in 2018-2023

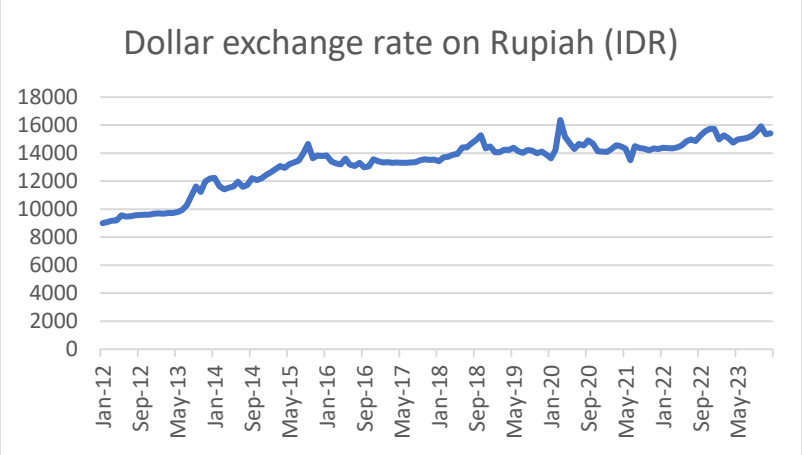


Figure 1 clearly demonstrates the high volatility of the US dollar-rupiah exchange rate. This volatility poses a significant risk to the rupiah, as excessive reliance on the US dollar can lead to depreciation of the domestic currency. These fluctuations are analyzed in the study by Murau et al. (2023), which highlights that the central role of the USD establishes U.S. monetary policy as the foundation of the international payment system. Consequently, monetary policy decisions made by the United States significantly influence the exchange rate movements of other currencies. Given these factors, Bank Indonesia, as the highest monetary authority, recognizes the need to reduce dependency on the USD as a medium of exchange in international trade transactions.

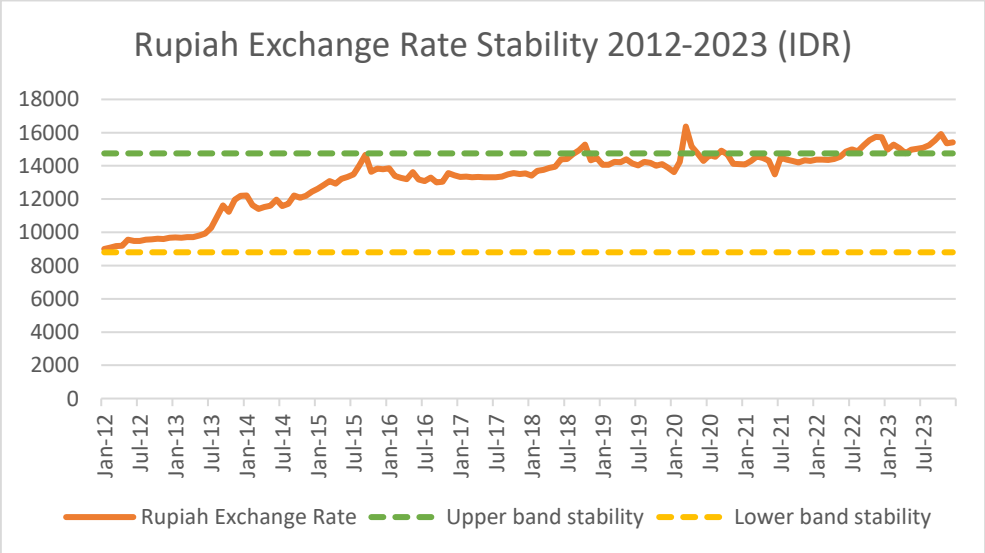
To address this issue, Indonesia has initiated a dedollarization strategy through the implementation of the Local Currency Settlement (LCS) policy. The LCS mechanism allows businesses in Indonesia and its trading partner countries to conduct bilateral transactions using their respective domestic currencies (Bank Indonesia, 2020). By enabling the use of local currencies for trade settlements, the LCS policy minimizes exchange rate fluctuation risks, thereby enhancing exchange rate stability and reducing economic and international trade vulnerabilities (Waranggani & Darmastuti, 2024).

2. MATERIAL AND METHODS

2.1 Research Design

The objects of this study are exports, imports, inflation, and the stability of the rupiah exchange rate between Indonesia and Malaysia, Thailand, Japan, or China, covering the period from January 2012 to December 2023. The dummy variable for Local Currency Settlement (LCS) is denoted by 1 after its implementation and 0 before implementation. Meanwhile, the stability of the rupiah exchange rate in this study is represented as a dummy variable, where 0 indicates a stable period and 1 indicates an unstable period. In this research, the independent variables consist of four variables: Local Currency Settlement (D1), Exports (X1), Imports (X2), and Inflation (X3). The dependent variable is the stability of the rupiah exchange rate (Z).

Figure 2. Rupiah Exchange Rate Stability from 2012-2023 (IDR)



Furthermore, Figure 2 explains the determination of stable and unstable periods is based on a stability range defined by the upper and lower exchange rate bands of the Rupiah. The upper limit is set according to the exchange rate assumption in the 2023 Draft State Budget (RAPBN), which stands at IDR 14,750. Meanwhile, the lower limit is determined based on the exchange rate assumption in the 2012 Draft State Budget, which was IDR 8,800. The selection of these upper and lower stability thresholds is inspired by the intervention band (*pita intervensi*) previously implemented by Bank Indonesia to prevent excessive exchange rate volatility. Essentially, if the Rupiah exchange rate falls within the defined range, it is assigned a value of 0, indicating stability. However, if the exchange rate moves outside this range, it is assigned a value of 1, indicating instability.

2.2 Sample size determination

This study uses a combination of cross-sectional data and time series data. The number of observations is measured by time units, specifically on a monthly basis, with four different countries. The observations span 144 months, or 12 years, starting from January 2012 to December 2023. Therefore, the total number of observations in this study amounts to 576 observations.

2.3 Logistic regression

Logistic regression is a type of linear regression model used to analyze the probabilistic relationship between one or more independent variables and a binary dependent variable. In this research, logistic regression is employed to examine the influence of Local Currency Settlement (LCS) implementation (D1), export value (X1), import value (X2), and inflation rate (X3) on the probability of rupiah exchange rate stability (Z). The results of the logistic regression analysis yielded the following model equation:

$$Z = -8.802 + 5.661D_1 - 0.188X_1 + 0.605X_1 + 0.695X_3 \quad (1)$$

2.4 Likelihood ratio test

In logistic regression, parameter testing to examine the significance of a coefficient together with its predictor variables is conducted using the Likelihood Ratio Test. The simultaneous significance test of regression coefficients. The formula to use likelihood ratio test is:

$$G = -2ln\left[\frac{\left(\frac{n_1}{n}\right)^{n_1}\left(\frac{n_0}{n}\right)^{n_0}}{\prod_{i=1}^{n}\hat{\pi}_i^{y_i}(1-\hat{\pi}_i)^{(1-y_i)}}\right] \quad (2)$$

2.5 Wald Test

The partial test commonly used in logistic regression is the Wald Test. The Wald Test estimates the partial effect of each predictor variable on the response variable. In general, the Wald Test compares the absolute value of the regression coefficient with its standard error. The formula for the Wald Test is as follows:

$$W = \frac{\hat{\beta}_j}{SE(\hat{\beta}_j)} \quad (3)$$

2.6 Goodness of Fit Test

In this study, to determine whether the model used is appropriate or not, a goodness-of-fit test will be conducted using the Hosmer and Lemeshow Test. The Hosmer-Lemeshow Test is a model evaluation technique that compares the predicted probabilities generated by the model with the actual observed values. The purpose of this test is to assess how well a model can predict actual outcomes. The Hosmer-Lemeshow Test indicates that a model is deemed suitable if the Hosmer-Lemeshow test statistic ($\hat{C}$) is less than or equal to the critical value of the chi-square distribution with a specific degree of freedom, or if the p-value is less than or equal to the significance level (0.05).

$$\hat{C} = \sum_{k=1}^{g} \left[\frac{(o_{1k} - \hat{e}_{1k})^2}{\hat{e}_{1k}} + \frac{(o_{0k} - \hat{e}_{0k})^2}{\hat{e}_{0k}} \right] \quad (4)$$

2.7 Confusion Matrix

The classification accuracy of a model measures its ability to classify data into the correct categories based on the response variable values. One of the most common methods used to evaluate the predictive accuracy of a model is through a 2x2 contingency table, commonly known as a confusion matrix. This table presents the correct and incorrect predictions for each category of the response variable. Based on this table, the model's prediction accuracy can be determined by dividing the number of correct predictions by the total number of predictions.

3. RESULTS AND DISCUSSION

3.1 Multicollinearity test

In this study, multicollinearity testing is conducted using the Variance Inflation Factor (VIF) method. The guideline for a regression model to be free from multicollinearity is that the VIF value should be less than 10. This test will be performed on four variables: exchange rate stability (Z), the implementation of Local Currency Settlement (D1), exports (X1), imports (X2), and inflation (X3).

Table 1. Multicollinearity test

Variable	VIF
Local Currency Settlement (D_1)	1,470
Exports (X_1)	4,978
Imports (X_2)	5,086
Inflation (X_3)	1,310

In Table 1. the VIF values for all tested variables indicate no multicollinearity, as evidenced by VIF values of less than 10. Therefore, the analysis proceeded to the next stage without eliminating any variables.

3.2 Logistic Regression

Based on the results of logistic regression testing, the logistic regression model equation is as follows:

$$Z = -8.802 + 5.661D_1 - 0.188X_1 + 0.605X_1 + 0.695X_3 \quad (5)$$

Simultaneous parameter testing was conducted to examine the overall logistic regression coefficients along with the predictor variables. This simultaneous test employed the likelihood ratio test (G^2) with a significance level of α = 0.05. The results of the simultaneous parameter test revealed a p-value of 0.000, which is less than the alpha value (0.05). Thus, H_0 is rejected, and H_1 is accepted. This indicates that the implementation of Local Currency Settlement (LCS), export values, import values, and inflation rates simultaneously have a significant effect on the stability of the rupiah exchange rate.

This finding aligns with the elasticity approach theory, also known as the Marshall-Lerner Condition. This approach suggests that the exchange rate between two currencies is influenced by the magnitude of trade in goods and services between the respective countries. In the context of LCS cooperation, the use of domestic currencies in bilateral trade promotes an increase in both exports and imports due to the ease of accessing domestic currencies compared to the U.S. dollar as the international payment instrument. Consequently, reducing the dominance of the dollar in international trade payments positively impacts the stability of the rupiah exchange rate.

The coefficient value of the Local Currency Settlement (LCS) variable is positive, indicating that the implementation of LCS increases the likelihood of Rupiah exchange rate instability. Referring to the odds ratio, represented as Exp(B), it can be concluded that the adoption of LCS raises the probability of Rupiah exchange rate instability compared to the period before its implementation, assuming all other factors remain constant.

This finding can be explained by several factors related to the dynamics of LCS implementation. According to a report by the African Export-Import Bank (2024), although local currency payment systems aim to reduce dependency on the U.S. dollar, their implementation can create short-term instability due to the limited liquidity of local currencies in international markets, leading to volatility and demand imbalances. In Indonesia's context, the limited use of the rupiah abroad compared to major currencies such as the dollar or euro can exacerbate conditions during periods of international trade fluctuations or external shocks.

Research by Carranza et al. (2003) also highlighted that adopting local currency payment systems can initially widen market imbalances, as not all market participants have equal capacity to utilize these currencies. This limitation can lead to greater exchange rate volatility, particularly in times of global economic uncertainty or disruptions. Furthermore, Mishkin (2019) emphasized that international financial markets are highly sensitive to changes in liquidity and risk perceptions. In the case of LCS implementation, newly introduced local currency payment systems in international money markets may trigger short-term instability due to the need for market adjustments.

A study by Hassan and Holmes (2015) found that implementing regional or bilateral payment systems in local currencies could lead to sharp exchange rate fluctuations when those currencies lack extensive international market coverage. Another study by Bunda and Zorzi (2010) demonstrated that policies encouraging the use of local currencies in

international trade could exacerbate exchange rate volatility if those currencies are not supported by sufficient trade volumes to stabilize demand.

Therefore, while LCS is designed to reduce dependency on the U.S. dollar, its initial implementation may result in exchange rate instability due to factors such as low liquidity, a lack of hedging instruments, and market reliance on other major currencies. The aforementioned reasons suggest that transitioning to local currency use in international transactions requires time and broader support to achieve long-term stability.

The regression coefficient for export values indicates a negative relationship with exchange rate stability. Additionally, the odds ratio for the export variable is 0.82. This implies that exports increase the likelihood of exchange rate stability by 0.82 times, but the effect is not statistically significant.

According to Manihuruk et al. (2023), exports have a strong influence on the stability of the Rupiah exchange rate. This relationship is explained through the link between export activities and the demand for domestic currency. When export activities increase, the demand for domestic currency rises, strengthening its value.

Another influencing factor is the nature of Indonesia's exports, which are predominantly based on natural resource commodities. The volatility of commodity prices in the global market leads to unstable export revenues. Ghosh et al. (2016) further argue that commodity-based exports tend to have a limited impact on exchange rate stability, as commodity prices are largely dependent on international market dynamics.

The regression coefficient of the import value variable indicates a positive relationship with exchange rate stability. Furthermore, the odds ratio for the import variable is 1.83. This suggests that an increase in import value raises the likelihood of Rupiah exchange rate instability by a factor of 1.83. However, the effect is not statistically significant.

This finding aligns with the research by Manihuruk et al. (2023), which explains that increased import activity leads to a higher demand for foreign currencies. This, in turn, causes a depreciation of the Rupiah. In this context, the depreciation of the Rupiah is reflected by an increase in its nominal value. Such an increase in nominal value significantly contributes to the potential instability of the Rupiah exchange rate.

This is consistent with the Balance of Payments concept and demand theory, which states that when imports increase, the demand for foreign currencies also rises because domestic buyers need to pay for imported goods in foreign currencies. The increased demand for foreign currencies reduces the supply of domestic currency in the foreign exchange market, which, in turn, puts pressure on the Rupiah's exchange rate, causing it to depreciate against foreign currencies.

The regression coefficient of the inflation rate variable indicates a positive relationship with exchange rate stability. Furthermore, the odds ratio for the inflation variable is 2.004. This suggests that each increase in the inflation rate significantly raises the likelihood of Rupiah exchange rate instability by a factor of 2.

When inflation rises, the prices of goods and services within a country become more expensive compared to other countries, reducing the competitiveness of exports and

increasing demand for imports. This heightens pressure on the balance of payments, resulting in a depreciation of the exchange rate (Fisher, 2020). Additionally, higher inflation often prompts tighter monetary policies, such as interest rate hikes, which can slow economic growth and create uncertainty in currency markets. According to Dornbusch (2001), exchange rate instability frequently arises when inflation expectations are poorly managed, as market participants anticipate further currency depreciation.

Other studies also support these findings. For instance, Ghosh et al. (2016) highlight that high inflation contributes to exchange rate fluctuations due to domestic policies' inability to effectively balance growth and price stability. Their study found that as inflation increases, economic uncertainty intensifies, leading to greater exchange rate volatility as investors and market participants shift toward more stable currencies. Moreover, Frankel and Rose (2013) emphasize that uncontrolled inflation is often a primary cause of currency crises in developing countries. High inflation expectations erode market confidence in the stability of national currencies, accelerating exchange rate depreciation and making it harder to control. Overall, these findings affirm that inflation plays a critical role in influencing exchange rate stability, particularly in developing economies like Indonesia.

3.3 Goodness of Fit Test

The model fit test in this study employed the Hosmer-Lemeshow test. A model is considered appropriate if the significance value is greater than $\alpha = 0.05$. In the Hosmer-Lemeshow test, a model is deemed a good fit if there is no difference between the observed results and the predicted probabilities. Table 4.8 indicates that the test results show a significance value of 0.312. This result demonstrates that the significance value $(0.312) > \alpha = 0.05$, meaning that the model used is appropriate and there is no difference between the observed results and the predicted probabilities. Subsequently, further testing was conducted to examine the predictive accuracy of the established model.

3.4 Accuracy Test

Table 2. Confussion Matrix

Obsevation		Prediction		
		Exchange Rate Stability		Prediction Accuracy
		Stable	Instable	
Exchange Rate Stability	Stable (D = 0)	472	7	98.5%
	Instable (D = 1)	42	54	56.3%
Overall Precentage				**91.5%**

Based on Table 2. above, it is observed that 472 observations accurately match the predicted values, with a prediction accuracy rate of 98.5%. Apart from this value, the results indicate that the predictions do not align with the observations. During periods of exchange rate instability, 54 observations match the predictions, achieving an accuracy rate of 56.3%. Beyond these values, the results indicate that the predictions do not correspond to the observed values.

4. CONCLUSION AND RECOMENDATION

The findings of this study indicate that the Local Currency Settlement (LCS) variable significantly influences the likelihood of exchange rate instability for the Indonesian Rupiah. The results suggest that bilateral payment variations require sufficient time to adapt to the foreign exchange market system. In its implementation, LCS may create short-term instability due to the limited liquidity of local currencies in international markets, leading to volatility and imbalances in demand.

The study also reveals that export values does not significantly create a likelihood of Rupiah exchange rate stability, but it has a negative relationship with the exchange rate. This finding states that an increase in exports ultimately strengthens the exchange rate by improving a country's balance of payments position. The increased demand for the Rupiah strengthens its position in the foreign exchange market, leading to an a

The findings further show that import value creates a likelihood of Rupiah exchange rate instability, although not significantly, and that import value has a positive relationship with the exchange rate. This is because imports using local currency are not yet significant enough to influence Rupiah exchange rate stability. This finding states that when imports increase, the demand for foreign currencies also rises because domestic buyers need to pay for imported goods in foreign currencies. The increased demand reduces the supply of domestic currency in the foreign exchange market, which in turn puts pressure on the Rupiah exchange rate against foreign currencies.

Finally, the study finds that the inflation rate contributes to the instability of the Rupiah's exchange rate. Inflation tends to trigger tighter monetary policy measures, such as interest rate hikes, which can slow economic growth and create uncertainty in currency markets. Exchange rate instability often occurs when inflation expectations are not well-managed, as market participants anticipate further depreciation of the currency.

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