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Monetary Policy, Credit Conditions, and Dollarization under Nonlinear Inflation Dynamics: Evidence from Laos using NARDL

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Abstract

The evidence on the transmission of monetary policy is still limited, particularly in terms of nonlinear effects, despite the high dollarization and structural weaknesses in the financial system of Lao PDR. This study fills this gap by examining whether policy rate changes have asymmetric impacts on inflation in this dollarized economy. We employ a Nonlinear Autoregressive Distributed Lag (NARDL) model to investigate the impact of policy rate fluctuations on inflation from 1992 to 2024. Credit conditions, aggregate demand, and dollarization are all considered. Three primary discoveries are identified. Initially, long-term inflation is influenced by structural factors namely, dollarization, aggregate demand, and credit conditions rather than interest rate channels. Secondly, policy rate increases have a modest positive effect (0.0308, $p < 0.10$), whereas rate reductions have no significant impact. Third, Wald tests verify the long-term asymmetry in monetary transmission. These findings suggest that price stability cannot be achieved solely through interest rate adjustments in highly dollarized economies such as Laos. An expanded framework that encompasses de-dollarization, credit regulation, exchange rate stabilization, and liquidity management is required.

Keywords: Monetary Policy; Inflation Dynamics; Interest Rate Channel; Credit Channel; Partial Dollarization

1. Introduction

Monetary policy is an important tool for maintaining macroeconomic stability. It works through many different channels, such as the interest rate channel, the credit channel, the exchange rate channel, and the expectations channel. All of these channels affect the ecomomy's financial costs, private sector spending, and price pressures in the economy (Mishkin, 1996, 2001). Research on the transmission mechanism of monetary policy shows that the policy works better when the financial markets are more developed, the financial institutions are structured better, and the central bank can send signals to the real economy (Bernanke & Blinder, 1992; Bernanke & Gertler, 1995). However, many contemporary studies indicate that the effects of policy shocks are often "non-linear" and "asymmetric." That is, increases and decreases in interest rates may produce different effects both in terms of direction and magnitude, making traditional linear models insufficient to fully explain such dynamics (Shin et al., 2014).

The uniqueness of the Lao PDR's macroeconomic structure presents a particular challenge for monetary policy transmission, as theoretical predictions often diverge from actual outcomes in highly dollarized settings. First, the country has had a high level of partial dollarization since the New Economic Mechanism (NEM) was put into place in 1986. The reforms helped make the economy more stable overall, but they also made the country very dependent on foreign currencies, especially the U.S. dollar and the Thai baht. The ratio of foreign currency deposits to broad money (FCD/M2) went up from about 0.36 in the early 1990s to almost 0.7 in 2023–2024 (Bank of the Lao PDR, 1993-2024), which is one of the highest levels in the region. This high degree of dollarization theoretically undermines the central bank's capacity to influence domestic liquidity through local-currency instruments, as economic agents can substitute away from the kip, thereby rendering the interest rate channel less effective. Consequently, the economy becomes increasingly sensitive to exchange rate fluctuations and external price shocks (Duma, 2011; Yeyati, 2006; Menon, 2008). This theoretical weakening of the interest rate channel is compounded by the actual inflationary dynamics. Inflation in the Lao PDR has exhibited instability and episodic fluctuations throughout its macroeconomic history. The Asian financial crisis of 1997–1999 resulted in a significant devaluation of the Lao kip and an inflation rate of 125 percent in 1999. Between 2021 and 2023, the nation experienced a subsequent surge in price pressures due to a depreciating currency, escalating public debt, and increased costs of energy imports. This resulted in inflation exceeding 31 percent in 2023 and remaining approximately 23 percent in 2024. The Consumer Price Index (CPI) increased from 4.6 points in 1992 to over 294 points in 2024 (Bank of the Lao PDR, 1993-2024), indicating both cost-push factors and alterations in pricing mechanisms. These episodes suggest that price formation in Laos is heavily influenced by structural and external factors, potentially overwhelming the signals sent by domestic policy rates.

In this environment, the Lao financial system is a further stumbling block for monetary transmission. A small bank-dominated economy with underdeveloped capital markets, Laos is dependent on the credit channel rather than the conventional interest rate channel. Such incomplete pass-through is well-documented in the literature, at both regional and country level studies (Bernanke & Gertler, 1995; Srithilat & Sun, 2017), where policy interest rate changes do not feed completely into market lending rates and instead credit aggregates as well as liquidity conditions adjust better to activity in the real sector. In Lao PDR, private-sector credit grew significantly from approximately 38 billion kip in the early 1990s to more than 185 trillion kip in recent years and policy interest rates fell from levels above 30 percent in the 1990s to within a range of between three and seven per cent after 2010 (Bank of the Lao PDR, 1993-2024). This divergence suggests that the role of interest rate instruments in inflation determination may have diminished over time, particularly in a dollarized and segmented financial system.

These characteristics of the Lao economy are consistent with a growing body of empirical international literature. Research on emerging and developing economies such as Algeria (Amel, 2023), Nigeria (Osabohien et al., 2020; Oyadeji, 2024), China (Li et al., 2021); Thailand (Disyatat & Vongsinsirikul, 2003), Vietnam (Anwar & Nguyen, 2018) and Cambodia (Saing, 2020) also finds a more pronounced role of credit/liquidity channels relative to interest rate channels in the monetary transmission mechanism, particularly for bank-based and dollarized financial systems. In addition, these papers expose sharp asymmetries in monetary policy effects, in the sense that tightening tends to be more powerful and persistent than easing.

A key question is to what degree the Lao policy interest rate can continue to affect inflation in an economy characterized by significant dollarization and where import prices are the primary determinants. Prior linear analyses, such as VAR, VECM, and ARDL, have failed to adequately account for nonlinear and asymmetric policy effects, highlighting the need for a more adaptable analytical framework.

This paper addresses this gap by employing the Nonlinear Autoregressive Distributed Lag (NARDL) model (Shin et al., 2014) to explore nonlinear inflation dynamics in Laos from 1992 to 2024. The model incorporates the positive and negative partial sums of policy rate changes, the interest rate spread, the degree of dollarization, and aggregate demand as explanatory variables

This study contributes to the existing literature in three principal ways: First, it represents the inaugural application of the NARDL methodology to analyze monetary policy transmission in the specific context of the Lao PDR, capturing potential asymmetric effects previously overlooked by linear models. Second, it provides a cohesive empirical framework by jointly examining the roles of monetary policy, credit conditions, and dollarization in driving inflation, offering a more holistic understanding of price dynamics in a partially dollarized economy. Third, the findings offer empirically grounded policy insights for the Bank of the Lao PDR. By clarifying the limited and asymmetric role of the policy rate, the results underscore the necessity for a broader policy package that includes liquidity management, credit regulation, and de-dollarization strategies to achieve long-term price stability.

Accordingly, this paper seeks to answer the primary research question of how effective the interest rate channel is in Laos' highly dollarized monetary system and whether its transmission exhibits asymmetric features.

This study aims to examine the effectiveness of the interest rate channel in Laos' highly dollarized monetary system and to assess whether its transmission exhibits asymmetric features.

2. Materials and Methods

2.1 The theoretical framework, data, and preliminary analysis

This study examines inflation dynamics in the Lao PDR, a small open economy characterized by partial dollarization and a bank-dominated financial system. In this setting, the effectiveness of monetary policy is often constrained, as the dual-currency system complicates the central bank's ability to manage domestic liquidity. Moreover, inflation may respond asymmetrically to policy instruments; that is, increases and decreases in the policy rate may have differential effects on prices. To capture these nonlinearities, this study examines three key determinants of inflation: the policy interest rate (as the main monetary signal), credit conditions, and the degree of dollarization.

Aggregate demand is proxied by the natural logarithm of real GDP (lnGDP) rather than the output gap. Although the output gap is theoretically preferable for measuring demand-pull inflation, its estimation in Lao PDR is difficult because of limited data availability, structural changes over time, and uncertainty surrounding potential output. Real GDP therefore provides a more observable and consistent indicator of aggregate demand conditions (Anwar & Nguyen, 2018; Srithilat et al., 2022). Credit conditions are measured by the interest rate spread (SPREAD), defined as the difference between lending and deposit rates. A wider spread reflects higher intermediation costs and greater credit market imperfections, which may restrict credit supply and raise financing costs in a bank-based system such as Laos (Bernanke & Gertler, 1995). The spread therefore serves as a theoretically grounded indicator of credit conditions (Bahruddin & Masih, 2018). The degree of dollarization (DOL) is measured by the ratio of foreign currency deposits to broad money (FCD/M2), reflecting the extent to which foreign currencies substitute for the domestic currency in the financial system.

The study uses annual data from 1992 to 2024, compiled mainly from the World Bank's World Development Indicators and publications of the Bank of the Lao PDR. After introducing lagged variables and decomposing policy rate changes into positive and negative partial sums, the effective estimation sample covers 1993–2024, yielding 32 observations. Value variables, including CPI and GDP, are transformed into natural logarithms to stabilize variance, while rate variables such as PR, SPREAD, and DOL are retained in level form to preserve their economic interpretation. Following Shin et al. (2014), the policy rate is decomposed into positive and negative partial sums, denoted as PR^{+} and PR^{-}. The variables used in the model are presented in Table 1.

To ensure model compatibility, unit root properties are examined using the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests. The results show that all variables are either I(0) or I(1), with none integrated of order two, satisfying the requirements of the ARDL/NARDL framework for subsequent long-run and short-run estimation.

2.2 Empirical Model

This study employs the NARDL model of Shin et al. (2014) to examine the asymmetric effects of policy rate increases and decreases on inflation in the Lao PDR.

2.2.1 Partial Sum Decomposition

To capture asymmetric, the policy rate is decomposed into positive and negative changes:

$$\Delta PR_t = PR_t - PR_{t-1}$$

$$PR_t^{+} = \sum_{j=1}^{t} \max(\Delta PR_j, 0) \quad PR_t^{-} = \sum_{j=1}^{t} \min(\Delta PR_j, 0)$$

PR^{+} and PR^{-} denote cumulative policy rate increases and decreases, respectively; differences in their coefficients indicate asymmetry.

2.2.2 Model Specification

The NARDL model comprises a long-run equation and a short-run error-correction representation.

(1) Long-run Equation

$$\ln CPI_t = \beta_0 + \beta_1^{+} PR_t^{+} + \beta_1^{-} PR_t^{-} + \beta_2 SPREAD_t + \beta_3 \ln GDP_t + \beta_4 DOL_t + u_t$$

(2) ECM Form of NARDL

$$\Delta \ln CPI_t = \alpha_0 + \sum_{i=1}^{p} \phi_i \Delta \ln CPI_{t-i} + \sum_{j=0}^{q_1} \gamma_j^{+} \Delta PR_{t-j}^{+} + \sum_{j=0}^{q_2} \gamma_j^{-} \Delta PR_{t-j}^{-} + \sum_{j=0}^{q_3} \delta_j \Delta SPREAD_{t-j} + \sum_{j=0}^{q_4} \eta_j \Delta \ln GDP_{t-j} + \sum_{j=0}^{q_5} \theta_j \Delta DOL_{t-j} + \lambda(ECT_{t-1}) + \varepsilon_t$$

where ECT_{t-1} denotes the deviation from long-run equilibrium, and a negative, significant λ confirms convergence. The short-run asymmetric effects are assessed through γ_j^{+} and γ_j^{-}.

2.2.3 Long-run Multipliers

Long-run multipliers are computed as:

$$\theta_1^{+} = -\frac{\lambda_2}{\lambda_1}, \theta_1^{-} = -\frac{\lambda_3}{\lambda_1}, \theta_2 = -\frac{\lambda_4}{\lambda_1}, \theta_3 = -\frac{\lambda_5}{\lambda_1}, \theta_4 = -\frac{\lambda_6}{\lambda_1}$$

where λ_1 is the coefficient of $\ln CPI_{t-1}$, and λ_2–λ_6 are the coefficients of the level variables from the estimated long-run form.

2.3 Long-run Cointegration Testing and Model Adequacy

The long-run relationship among the variables is examined using the Bounds Testing procedure of Pesaran et al. (2001), based on the following hypotheses:

- **H_0: No long-run cointegration**
- **H_1: Long-run cointegration exists**

The null hypothesis is rejected when the F-statistic exceeds the upper bound (I(1)), while values below the lower bound (I(0)) indicate no cointegration; intermediate values are considered inconclusive.

Model adequacy for the ARDL–NARDL specification is assessed using R^2, adjusted R^2, and information criteria (AIC, SC). Residual diagnostics for serial correlation, heteroskedasticity, normality, and parameter stability are also conducted to verify that the model satisfies key econometric assumptions and is appropriate for interpreting both short-run and long-run dynamics.

2.4 Asymmetry Testing and Diagnostic Checking

Asymmetric effects of policy rate changes are examined using the Wald Test, which evaluates the null hypothesis:

H_0: $\beta_1^{+} = \beta_1^{-}$

Rejection of H_0 indicates that increases and decreases in the policy rate exert statistically different effects on inflation, providing evidence of nonlinear monetary transmission.

A series of diagnostic tests are done on the NARDL model to make sure it is econometrically valid. The Breusch–Godfrey LM test checks for serial correlation, the Breusch Pagan Godfrey test checks for heteroskedasticity, the Ramsey RESET test checks for functional form misspecification, and the Jarque Bera statistic checks for normality of the residuals. CUSUM and CUSUMSQ plots are used to check the stability of parameters. All of these tests show that the estimated model meets important econometric assumptions and is good for interpreting short-run and long-run dynamics.

3. Results

3.1 Descriptive Statistics and Preliminary Relationships

Table 2 presents the descriptive statistics for all variables over 1993–2024. The means and medians of most variables are very close to each other, which shows that long-term trends are stable. For instance, lnCPI and lnGDP have mean values of 4.14 and 31.13, with corresponding medians of 4.54 and 31.51, suggesting smooth movements despite moderate macroeconomic fluctuations. In contrast, monetary policy–related variables are more volatile. The credit condition indicator, SPREAD, records a standard deviation of 5.23, reflecting substantial fluctuations in the lending deposit interest rate differential. By comparison, DOL_RATIO has a mean of 0.53 and the lowest volatility (Std. Dev. = 0.12), indicating that dollarization adjusts gradually and is relatively less sensitive to short-run shocks. The skewness results suggest only mild asymmetry for most variables. lnCPI and lnGDP are left-skewed, whereas SPREAD and DOL RATIO are right-skewed. In terms of kurtosis, PR pos shows a very high value (12.29), implying infrequent but large positive policy shocks, while PR neg remains closer to a normal distribution despite its volatility.

Overall, the dataset combines relatively stable variables, such as lnGDP and DOL RATIO, with more volatile series, including SPREAD, PR pos, and PR neg. This pattern reflects the dynamic nature of monetary policy transmission in Laos' dollarized economy and supports the application of the NARDL framework.

3.2 Unit Root Test Results

To verify stationarity prior to estimating the NARDL model, unit root tests were conducted using the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) procedures (Dickey & Fuller, 1981; Phillips &

Perron, 1988). As reported in Table 3, lnCPI, lnGDP, SPREAD, and the policy rate are non-stationary in levels but become stationary after first differencing, indicating I(1) processes. Although DOL_RATIO yields mixed results under the ADF and PP tests, it is treated as I(1). Overall, all variables are either I(0) or I(1), with none integrated of order two, confirming the suitability of the NARDL framework for the analysis.

3.3 Bounds Testing for Cointegration

To assess the existence of a long-run relationship among the variables, this study applies the Bounds Testing approach of Pesaran et al. (2001) under a restricted constant and no deterministic trend. As reported in Table 4, the F-statistic is 16.67, exceeding the upper bound critical values at all significance levels. The null hypothesis of no long-run cointegration is therefore rejected, indicating a long-run relationship among inflation, the policy interest rate, interest rate spread, GDP, and dollarization in Lao PDR. This result confirms the appropriateness of the NARDL framework for estimating both short-run and long-run dynamics.

3.4 Long-run and Short-run NARDL Estimates

This section reports the NARDL estimation results, distinguishing between the effects of policy rate increases and decreases while accommodating variables integrated of mixed orders, I(0) and I(1). The results include long-run coefficients from the cointegrating relationship and short-run dynamics from the associated Error Correction Model (ECM).

3.4.1 Long-run Estimates

Long-run coefficients derived from the EViews cointegrating relationship are reported in Table 5. The NARDL results indicate that several factors shape inflation in Laos in the long run. Policy rate increases exert a small positive effect on inflation (0.0308; $p = 0.0851$). Although this appears counterintuitive from a conventional monetary policy perspective, it may be explained by the features of a highly dollarized economy and two main transmission channels. First, through the exchange rate channel. In a partially dollarized economy, a policy rate hike may be perceived by economic agents as a signal of currency weakness, leading to depreciation of the Lao kip. Given that a substantial portion of consumption and production in Laos relies on imported goods, currency depreciation directly increases the domestic price of imports, thereby contributing to higher inflation. In this sense, the exchange rate effect may dominate the intended contractionary effect of the interest rate increase (Duma, 2011; Menon, 2008). Second, through the cost-push channel operating via credit markets. As indicated by the positive and highly significant coefficient on SPREAD (0.0212, $p<0.01$), a widening interest rate spread which often accompanies policy rate hikes in underdeveloped financial markets increases the cost of working capital for firms. In an environment where access to alternative financing is limited, firms may pass these higher costs onto consumers by raising prices, generating additional inflationary pressures (Bernanke & Gertler, 1995).

In contrast, the coefficient on PR_NEG is statistically insignificant and close to zero (–0.0021, $p>0.60$), indicating that policy rate reductions do not systematically reduce inflation in the long run. This asymmetry reinforces the view that the interest rate channel is weak and dominated by structural factors in a dollarized environment. All structural variables are statistically significant. SPREAD confirms that higher credit costs contribute to upward price pressures. LNGDP (LNGDP = 0.6461; $p<0.01$), validates the role of aggregate demand in driving inflation, consistent with economic theory. The large and highly significant coefficient on DOL_RATIO (1.6173; $p<0.01$).) indicates that a higher degree of dollarization makes the economy more sensitive to exchange rate movements and import price shocks, thereby amplifying inflation. The long-run summary shows that inflation in Laos depends on structural factors like dollarization level, aggregate demand, and credit costs, while the interest rate channel itself works with limitations. Further, these factors determine the overall inflation pattern in the country. When interest rates go up, inflation itself becomes worse, and reducing rates further shows no impact on controlling prices. This surely shows that monetary policy functions differently in an economy with high foreign currency usage. Moreover, the traditional mechanisms of monetary control become less effective in such dollarized systems.

3.4.2 Short-run ECM Estimates

Table 6 presents the short-run estimation results obtained from the error-correction representation of the NARDL model. The ECM results surely show that the model is very stable. Moreover, this indicates strong reliability in the findings. As per the results, the error-correction term is negative and very important (ECT = −0.2398; $p < 0.01$), which means that about 24% of differences from long-term balance get fixed each year. Also, this rate of change further shows that inflation in the Lao economy itself is relatively stable. Inflation actually responds strongly to demand factors and structural changes in the short run. These factors definitely have a major impact on price levels quickly. Aggregate demand shows a strong positive effect on GDP growth (ΔLNGDP = 0.9364; $p < 0.01$), which further confirms that demand-pull pressures dominate the economy itself. We are seeing that dollarization is only an important factor in the short term, which shows that exchange rate changes have big effects on the Lao financial system. As per the analysis, changes in lending-deposit rate spread show only weak short-term impact, while policy rate cuts have small negative effect on inflation. As per these findings, the interest rate channel works with limited effectiveness in the short run regarding conditions of high dollarization. The short-term data actually shows that inflation changes in Lao PDR are definitely controlled by basic structural issues like dollarization, total demand, and credit situations rather than normal interest rate changes. These interest rate tools actually work in uneven ways and are definitely not very effective.

3.5 Asymmetry Tests

To test whether the long-run effects of PR_POS and PR_NEG on consumer prices differ significantly, this study uses the Wald symmetry test based on the long-run cointegrating relationship. The hypotheses are as follows:

- **H_0: $\beta^+ = \beta^-$**
- **H_1: $\beta^+ \neq \beta^-$**

The Wald test shows that policy rate increases and reductions have different effects, with F-statistic 3.5958 and p-value 0.0732. This result itself is significant at 10% level but needs further analysis as it is not significant at 5% level. Also, this finding shows that monetary policy rate changes have different long-term effects, and this asymmetry itself provides further evidence of unequal impacts over time. We are seeing that when policy rates go up, the effect is only different in size compared to when policy rates come down at the 10% significance level. The details are shown in Table 7. This asymmetry further shows that the monetary policy transmission mechanism in Lao PDR is nonlinear by itself. Basically, when a country uses too much dollars instead of local currency, making policies stricter works better to control inflation, but making policies easier doesn't help the same way to boost the economy or reduce prices. Basically, we cannot test for asymmetry in the short run because the ECM model does not have all the same policy rate components needed to check if the effects are symmetric.

Basically, the results show that monetary policy works differently in different situations at 10% significance level, and this is the same reason why policymakers need to consider nonlinear effects when making monetary decisions, especially in Lao PDR where foreign currency usage is high.

3.6 Model Diagnostics and Stability Tests

To assess the validity and stability of the estimated NARDL model, a series of standard econometric diagnostic tests is conducted. These tests examine key model assumptions, including residual independence, homoskedasticity, normality, correct functional form specification, and parameter stability over time. The Breusch-Godfrey LM test shows no serial correlation in residuals ($p = 0.574$), and the Breusch-Pagan/White test confirms no heteroskedasticity ($p = 0.408$). This indicates the error term variance itself remains constant and does not further bias the coefficient estimates. Further, the Jarque-Bera test ($p = 0.634$) shows that the residuals follow normal distribution, which satisfies the main requirement of NARDL estimation itself. We are seeing that the Ramsey RESET test shows our model is working properly, with no problems from wrong setup or missing factors only ($p = 0.061$). The details are shown in Table 8.

The CUSUM and CUSUMSQ tests surely show that parameters remain stable as the test values stay within 5% confidence bands during the whole study period (Figure 1). Moreover, this confirms that the model works well throughout the sample time. Also, this finding further confirms that the model parameters and residual structure itself remain dynamically stable. Also, the diagnostic and stability tests actually show that the NARDL model meets all standard econometric requirements. The model is definitely well specified statistically. As per the analysis, the estimated results can be used for studying the economy and making policies regarding Lao PDR.

4. Discussion

The NARDL results show that inflation in Lao PDR is mainly driven by long-run structural factors under high dollarization conditions, rather than by normal monetary policy transmission through interest rates. This finding underscores the fundamental role of dollarization in shaping the monetary policy environment, a result that is consistent with theoretical predictions and empirical evidence from other dollarized economies. The weak and asymmetric effect of the policy interest rate on inflation aligns with the work of Duma (2011), Yeyati (2006), and Menon (2008), who demonstrate that in highly dollarized economies, the interest rate channel is significantly undermined. In such contexts, economic agents can substitute domestic currency with foreign currency, reducing the central bank's ability to influence liquidity and, consequently, inflation through domestic interest rate adjustments. Moreover, this limits how well domestic interest rate changes can work, as prices are heavily shaped by import dependence and foreign currency-denominated costs.

As per this study's long-term results, dollarization level, aggregate demand, and credit costs are the main factors that decide inflation in Laos, while policy rate changes have small effects and do not work as per traditional monetary theory. These findings suggest that the policy interest rate plays a limited role as a nominal anchor in a partially dollarized economy, consistent with the view that structural factors dominate the transmission mechanism.

In the short run, inflation itself responds significantly to economic activity (GDP) and dollarization levels, while interest rate changes and lending-deposit spreads have limited effects. This pattern is consistent with evidence from other developing economies with underdeveloped financial markets, such as Nigeria (Osabohien et al., 2020; Oyadeyi, 2024), where credit and liquidity channels are more operative than the conventional interest rate channel. In such bank-based systems, policy rate changes are often absorbed by the banking sector rather than transmitted to lending rates, a common feature of underdeveloped financial markets. As per the analysis, Laos shows inflation patterns similar to other developing countries regarding currency fluctuations and banking system limitations.

The Wald test results confirm the presence of long-run asymmetry in monetary policy transmission. This finding is consistent with the nonlinear framework proposed by Shin et al., (2014) and with recent empirical evidence from Laos (Srithilat and Sun, 2017; Park et al., 2023; and Keothephar et al., 2025). The observed asymmetry whereby policy rate increases exert a stronger effect on prices than equivalent rate reductions—can be attributed to asymmetric behavior by banks and borrowers. In a dollarized environment where domestic interest rates are not the primary determinant of financing costs, monetary tightening may be perceived as a signal of currency instability, triggering exchange rate pass-through effects, while easing fails to stimulate sufficient domestic demand to generate disinflationary pressures.

Overall, the findings underscore that monetary policy in Lao PDR operates in a complex and nonlinear manner, shaped by long-term structural factors rather than simple interest rate adjustments. This evidence carries important policy implications: relying solely on policy rate tools is insufficient to control inflation in a highly dollarized economy. Price stability in such contexts requires a broader policy framework that integrates liquidity management, credit regulation, and exchange rate stabilization alongside traditional monetary instruments. As the Bank of the Lao PDR navigates these challenges, a coordinated approach encompassing both monetary and structural policies will be essential for achieving sustained price stability.

5. Conclusion

This study examined the effectiveness of monetary policy transmission in the Lao PDR under conditions of high dollarization using a NARDL model with annual data from 1992 to 2024. The main findings can be summarized as follows.

First, long-run inflation dynamics in Laos are primarily influenced by structural factors—namely dollarization, aggregate demand, and credit conditions—rather than traditional interest rate mechanisms. The policy interest rate demonstrates a small and asymmetric influence on inflation: increases in the rate yield a modest positive effect, but decreases show no statistically significant impact. The Wald test validates the existence of long-term asymmetry in monetary policy transmission, aligning with nonlinear dynamics.

These results have significant theoretical implications. They contribute to the literature on monetary policy in dollarized economies by presenting empirical evidence that high dollarization profoundly alters the transmission mechanism, rendering the interest rate channel ineffective and even counterproductive. Shin et al. (2014)'s nonlinear framework is extended to the specific context of Laos by the observed asymmetry between policy rate increases and reductions. This demonstrates that monetary policy shocks have differential effects depending on their direction. In addition, the overwhelming influence of structural variables implies that conventional monetary models, which prioritize interest rate channels, may be inadequate for the examination of inflation dynamics in partially dollarized economies.

In a highly dollarized economy, the results emphasize that price stability cannot be achieved solely through interest rate adjustments from a policy perspective. It is necessary to establish a more comprehensive policy framework that encompasses long-term de-dollarization strategies, credit regulation, exchange rate stabilization, and liquidity management. This will necessitate close collaboration between the central bank and the government to ensure the successful implementation of these measures.

This research has some limitations. Utilizing annual data obscures short-term fluctuations that would be evident with more frequent data collection. The FCD/M2 ratio is the sole metric for assessing dollarization, however it may inadequately capture the complexities of currency replacement. The analysis exclusively examines nonlinearity in the interest rate variable, indicating that other variables may also exert asymmetric effects. Future research could address these limitations by employing higher-frequency data, incorporating additional measures of dollarization, and extending the nonlinear analysis to other policy variables such as exchange rates or credit aggregates. Moreover, incorporating expectations and institutional trust factors could provide deeper insights into monetary policy transmission under dollarized conditions.

6. Conflict of Interest

We certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

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Table 1. Description of Variables Used in the Model

Variable	Indicator	Data Form	Description	Source
Consumer Price Index	lnCPI	log	Dependent variable representing inflation	WDI
Policy interest rate	PR	level (%)	Main monetary policy instrument	BOL
Positive policy-rate changes	PR^{+}	partial sum	Cumulative increases in policy rate	Calculated based on PR
Negative policy-rate changes	PR^{-}	partial sum	Cumulative decreases in policy rate	Calculated based on PR
Lending–deposit interest rate spread	SPREAD	level (%)	Indicator of credit conditions	BOL
Gross Domestic Product	lnGDP	log	Proxy for aggregate demand	WDI
Degree of dollarization	DOL	Ratio	Foreign currency deposits to M2	BOL

Source: Author's compilation from World Bank and Bank of the Lao PDR data, 2025.

Table 2. Descriptive Statistics of Variables (1993–2024)

	LNCPI	PR_pos	PR_neg	SPREAD	LNGDP	DOL_RATIO
Mean	4.14	11.60	18.00	13.07	31.13	0.53
Median	4.54	11	29.5	12.30	31.51	0.50
Maximum	5.68	19.5	33	24	33.43	0.79
Minimum	1.58	0	0	7.27	27.58	0.35
Std. Dev	1.14	2.80	15.49	5.23	1.72	0.12
Skewness	-1.18	-1.33	-0.27	0.49	-0.74	0.51
Kurtosis	3.22	12.29	1.14	1.96	2.46	2.28
Jarque-Bera	7.58	124.67	4.99	2.73	3.41	2.10
Probability	0.02	8.45	0.08	0.25	0.18	0.34
Sum	132.66	371.5	576.25	418.53	996.43	17.27
SSD	40.45	243.86	7444.31	848.89	91.73	0.48
Obs	32	32	32	32	32	32

Source: author's compilation, 2025.

Table 3. Unit Root Test Results (ADF Test)

Variable	Test	Levels		First Difference		Status
		T-Stat	p-Value	T-Stat	p-Value	
LN_CPI	ADF	–2.6521	(0.0942)	–5.6481	(0.0001) ***	I(1)
	PP	-1.9684	(0.2985)	-6.8295	(0.0000) ***	I(1)
PR	ADF	-0.8961	(0.7764)	-9.6504	(0.0000) ***	I(1)
	PP	-0.9461	(0.7600)	-13.8848	(0.0000) ***	I(1)
SPREAD	ADF	-2.2497	(0.1937)	-7.7148	(0.0000) ***	I(1)
	PP	-2.1635	(0.2228)	-17.9107	(0.0001) ***	I(1)
LN_GDP	ADF	-2.8571	(0.0624)	-5.5386	(0.0001) ***	I(1)
	PP	-2.2901	(0.1810)	-8.7919	(0.0000) ***	I(1)
DOL_RATIO	ADF	-3.4976	(0.0151) **			I(0)
	PP	-1.7785	(0.3838)	-7.9075	(0.0000) ***	I(1)

Source: author's computation, 2025 . **Notes:** *, **, *** = significance at 10%, 5%, 1%.

Table 4. Bounds Test for Cointegration

Model specification	Equation Form	k	F-statistic	Critical Values: Pesaran et al. (2001) (0)/I(1)	Conclusion
NARDL(1,0,1,1,2,1)	Restricted Constant and No Trend (Case II)	5	16.67	10% : 2.407 / 3.517 5% : 2.910 / 4.193 1% I : 4.134/5.761	Evidence of Cointegration

Source: author's computation, 2025

Table 5. Long-run Estimates of the NARDL Model

Variable	**Coef.**	**P-Value**	**Interpretation**
PR_POS	0.0308	0.0851*	Policy rate increases exert a small positive effect on inflation, indicating limited effectiveness of the interest rate channel in a partially dollarized financial system.
PR_NEG(−1)	−0.0021	0.6089	Policy rate reductions do not exert a statistically significant long-run effect on inflation.
SPREAD(−1)	0.0212	0.0040***	A wider lending–deposit interest rate spread raises credit costs and contributes to upward price pressures.
LNGDP(−1)	0.6461	0.0000***	Higher aggregate demand significantly intensifies inflationary pressures, consistent with demand-pull inflation
DOL_RATIO(−1)	1.6173	0.0019***	A higher degree of dollarization amplifies inflation through exchange rate pass-through effects.
C	−17.5699	0.0000***	Constant term capturing the long-run equilibrium structure of the system.

Source: author's computation, 2025 . **Notes:** *, **, *** = significance at 10%, 5%, 1%.

Table 6. Short-run ECM Estimates of the NARDL Model

Variable	Coefficient	p-value	Interpretation
ECT(−1)	−0.2398	0.0000***	The system adjusts back to its long-run equilibrium in a statistically significant manner, correcting approximately 24% of disequilibrium per year.
ΔPR_NEG	−0.00206	0.0041**	Policy rate reductions slightly reduce inflation in the short run, although the magnitude of the effect remains limited.
ΔSPREAD	0.00200	0.0556	Changes in the interest rate spread exert only a limited short-run effect on inflation and are significant only at the 10% level.
ΔLNGDP	0.9364	0.0000***	Current aggregate demand strongly drives inflation, consistent with demand-pull inflation theory.
ΔLNGDP(−1)	−0.0846	0.0045**	A mild feedback effect emerges in the subsequent period, indicating cyclical adjustment dynamics.
ΔDOL_RATIO	0.1919	0.0314**	An increase in the degree of dollarization stimulates inflation even in the short run.

Source: author's computation, 2025 . **Notes:** *, **, *** = significance at 10%, 5%, 1%.

Table 7. Wald Test for Long-Run and Short-Run Asymmetry

Type	F-statistic	p-value	Decision	Interpretation

Long-run Asymmetry	3.5958	0.0732	Reject H_0 at 10%	long-run asymmetry: the effect of policy rate increases differs from that of policy rate reductions
Short-run Asymmetry	–	–	Not Applicable	Short-run Asymmetry: Not testable, as ΔPR_POS is excluded from the ECM.

Source: Author's computation, 2025. **Notes:** $p < 0.10$ indicates asymmetry. Short-run asymmetry is not tested because ΔPR_POS is excluded from the ECM.

Table 8. Model Diagnostics and Stability Tests

Test	Statistic / p-value	Decision	Interpretation
Breusch–Godfrey LM test	F = 0.573 (p = 0.574)	Fail to reject H_0	No serial correlation
Breusch–Pagan / White test	F = 1.105 (p = 0.408)	Fail to reject H_0	No heteroskedasticity
Jarque–Bera test	JB = 0.912 (p = 0.634)	Fail to reject H_0	Residuals normally distributed
Ramsey RESET test	F = 3.313 (p = 0.061)	Fail to reject H_0	Model well-specified (no omitted variables)
CUSUM & CUSUMSQ	Within 5% band	Fail to reject H_0	Parameters stable over time

Source: author's computation, 2025. **Notes**: $p > 0.05$ indicates no violation of the relevant econometric assumption.

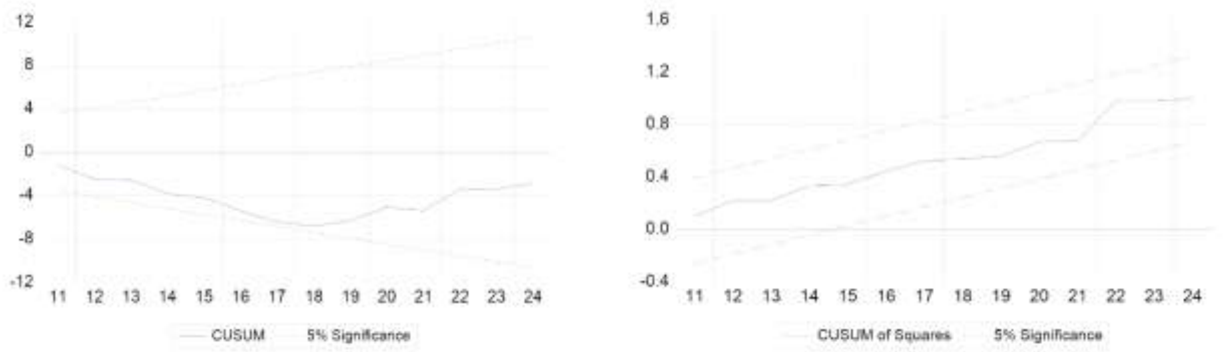

Figure 1 : CUSUM Tests results for the models.