



Economic Factors Affecting Gold Prices in Lao PDR

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Abstract

This research provides an empirical analysis of the macroeconomic determinants of domestic gold prices (GPL) in the Lao People's Democratic Republic (Lao P.D.R.) from April 2011 to April 2024. Using a high-frequency dataset of 157 monthly observations, the study examines the dynamic interactions between gold prices, exchange rate volatility (LAK/USD), and inflation dynamics (CPI). The theoretical framework is grounded in the Purchasing Power Parity (PPP) theory, utilizing advanced econometric procedures including the Augmented Dickey-Fuller (ADF) test, Johansen Cointegration, Vector Error Correction Model (VECM), and Granger Causality analysis.

The empirical results confirm the existence of a stable, long-run equilibrium relationship among the variables. A key finding is the overwhelming dominance of the exchange rate as the primary driver of domestic gold prices; a depreciation of the Lao Kip leads to a significant and immediate increase in gold value. Interestingly, the study finds that domestic inflation is statistically insignificant in the long run, suggesting a "crowding-out" effect where currency volatility outweighs local price pressures due to the nation's high dependency on imports and dollarization.

The VECM analysis reveals a "speed of adjustment" of approximately 8.8% per month, indicating a steady correction toward long-term equilibrium following market shocks. Furthermore, Granger Causality tests identify a unidirectional relationship where exchange rates and inflation "cause" gold price movements, confirming that gold in Laos acts as a reactive asset rather than an economic driver.

These findings suggest that for the Bank of the Lao PDR, stabilizing the exchange rate is the most effective prerequisite for managing gold market volatility. For investors, the results underscore that gold serves as a critical strategic hedge against currency risk (LAK depreciation) rather than a mere inflation hedge. This study fills a vital gap in understanding commodity price discovery within small, open, and developing economies.

Keywords: Gold prices, Inflation rate in Laos, Cointegration, Vector Error Correction Model, Granger causality

Article Info:

Submitted: January 30, 2026

Revised: February 05, 2026

Accepted: February 13, 2026

1. Introduction

Extending 1,000 years into the past, gold's use as currency and hard money impervious to government control is a powerful anchor for the financial system worldwide. Gold has often been referred to as a "safe haven" and also an asset that has a "zero beta". Its key selling point is its unique power to offer stability and strong shelter from the storms of global economics-especially during bouts of high inflation and sudden currency devaluations. Fiat currencies can be debased by their central banks through loose monetary policy and easy money creation, but gold is intrinsically valuable, so much harder to debase. As such, the gross consolidation method still serves as a critical component to national central bank reserve balance sheets and remains an important form of financial insurance for the retail investor seeking to preserve purchasing power in the event that standard fare financial instruments collapse under market stress or

systemic catastrophe (Baur & Lucey, 2010). From the point of view of modern portfolio theory gold is necessary in minimizing risk. With no proven connections (or low/negative correlation) to other major asset classes, it can serve as a potent diversifier and have a material beneficial impact on risk-adjusted returns in long-term institutional investment strategies (Baur & McDermott, 2010).

For emerging markets, deciphering what makes gold prices tick isn't an academic exercise as much as it is a matter of economic life and death. These are markets that get knocked off course by various outside shocks, whether they be shifts in the global commodity price cycle or swings in international trade patterns. Accordingly, bank and money theory must be able to interpret how the relationship between gold and macroeconomic events operates so that sustainable systems signals are adopted in

order to maintain stability of national banking (Sjaastad & Scacciavillani, 1996; Wang & Xu, 2020).

In the Lao People's Democratic Republic (Lao PDR), gold is an environmentally prominent, nuanced and culturally pluri-dimensional contributor to national economy. Besides ornaments and religious purposes, gold is a significant part of household saving. For most Laotians, gold is the only form of "financial" savings and wealth preservation they have. Gold dependence" has been particularly strong in Laos, another country with only very primitive domestic capital markets. Since there are very few investment vehicles available that the average person can save in like, say mutual funds or stocks, or complicated derivatives such as options and futures, physical gold is much simpler to buy and hold, for wealth folks (Kyophilavong, 2010; Bank of the Lao PDR, 2024).

Despite that, the Lao economy has faced unprecedented macro-economic difficulties for the past decade. The nation had a series of formidable problems: accelerating external debt, unrelenting disequilibrium in the fiscal sector, and persistent depreciation of the domestic currency the Kip. These issues were further augmented post COVID with a steep devaluation of the currency and inflationary leanings (Sirivongsa et al., 2024; Lao Statistics Bureau, 2024). It is in such a state of the economics that in 2019 the Governor of Bank of Lao PDR filed his worries regarding upon absolute need to stabilize Laos' Kip at least an extent it will be able to defend economy interior its boundaries against imported previously commodities prices. Since gold is traded internationally, and with the price of gold quoted in foreign exchange (dominated by US Dollar), the local price of gold in Laos can be considered as a proxy for kip strength. To the Lao, gold prices serve as a measure of "counter-insurance" or protection against currency debasement and drastic loss of purchasing ability with respect to foreign competitors like USD and THB (Sengphetphaivan et al., 2024; Pukthuanthong & Roll, 2011).

Although gold is culturally and economically highly significant in Lao PDR, there is a notable lack of robust empirical work on the structural forces driving its domestic price. There is much literature at the international level in connection with gold, world interest rates and world inflation but the specificities of a small open economy that is also developing such as Lao PDR has something to show. Its gold trade is tied to regional hubs, such as Thailand. Price references in Laos typically come from the prices in the Thai gold market and cross-border trade (Somsamone & Duangpasith, 2024; OEC, 2024). This absorption is indicative of a relatively high degree of tangential price signaling sensitivity; in the main, domestic gold prices have responded faster to exchange rate changes and regional market related events than they have to local inflationary indices. In the process, he creates a

"pass-through-of-price" effect (Pukthuanthong & Roll, 2011; Campa & Goldberg, 2006) where movement in the currency market is almost immediately reflected in the gold price and then onto national headlines about consumer confidence and investor optimism.

Bridge the gap The goal of this study is to narrow those gaps and complete the picture of Lao gold market, we construct a comprehensive research framework in which a trio of dynamic relationship between GPL, EXCHR and INFLR is examined. One of the main objectives of this market study is to perform a more sophisticated econometric analysis. The theoretical development of this study is based on the Purchasing Power Parity (PPP) theory (Cassell, 1918; Rogoff, 1996) which says that in order for the gold price in Laos to be equivalent to world prices (LAK/USD), its price will have to move with changes in the exchange rate. In this study, to pursue an in-depth analysis, we have proposed three specific objectives:

Cointegration Analysis in the Long-run: We apply the Johansen cointegration analysis (Johansen, 1988) to examine whether stable and long-run relationship between gold price, exchange rate of USD and country inflation is available or not. This is a significant point to consider when evaluating whether or not gold can act as a long-term hedge against runaway inflation and the decline of the Kip.

Short-term Dynamical Adjustments: the paper quantifies how fast the domestic gold market corrects itself toward long-run equilibrium under external macro shocks, based on VECM. This is a valuable indicator of the Vector Error Correction Model (VECM) (Engle & Granger, 1987), robustness of the Lao market.

Causal directionality: The study seeks to investigate the lead-lag relationship between these variables based on Granger causality analysis (Granger, 1969). Whether the exchange rate leads gold price or vice-versa is important from the viewpoint of macro-financial stability and policy implications.

Drawing on high frequency data for the period of April 2011- April 2024, this paper straddles an important phase in the economic trajectory of Lao P.D.R., encircling times of strong growth to recent structural challenges. The results of this study would serve to improve the ground for individual investors to build up their own diversified portfolios, supported by evidence of what was and was not ideal in an unpredictable world. At the same time, the Strategy provides important policy insights to Bank of Lao PDR (2024). Through learning how the transmission of demand can be achieved through commodity prices, savvy policy-makers can manage their money supply and thus inflation expectations better to finally deliver long run macroeconomic stability for the country.

2. Materials and Methods

2.1 Data Resources

The empirical method of the paper is inspired by availability of good quality data, and it tries to focus on joint relationships between gold price movements and

macroeconomic risks in Lao PDR. For ensuring the maximum reliability shielding in the academic integrity and transparency of all the raw data representing monitoring EOLUs is fully tracked from reliable institutional repositories:

GPL: Gold Prices (GPL)'s We obtained from the official BOL website. Prices are in Lao kip per Baht of gold weights to follow the market place and also to make easy for local people using this study.

Exchange Rates (EXCHR): Lao Kip/US Dollar (LAK/USD) according to the Bank of the Lao PDR. This is the external value of local currency and a determinant on import costs.

Rate of Inflation (INFLR): It is determined considering the rate of monthly change in percentage based on Consolidated Price Index (total) of Consumer Price Index (CPI) collected by Lao Statistics Bureau (LSB). That serves as an indication of how much domestic purchasing power is being lost.

2.2 Data Collection and Preparation

The paper however ensures robust empirical conclusions through an extensive high frequency data set that includes a total of 157 observations taking place on a monthly basis over a long sample period of more than thirteen years from April 2011 to April 2024. There are some reasons for this period: it includes several phases of the development of the Lao economy (rapid growth, currency changes) and also recent global economic changes.

To obtain data amenable to a rigorous econometric estimation, we Logarithmic Transformed: All variables were log transformed (ln), except inflation rate which already in percentage. It is a common technique to linearize data sets, stabilize the variance (homoscedasticity) and reduce the influence of extreme values. Interpretation of Elasticity: The estimated coefficients may be interpreted as elasticities by taking logs, which gives precise economic interpretations on how much gold prices are responsive to a 1 percent change in exchange rate or inflation.

2.3 Data Analysis and Econometric Framework

To overcome the problem of spurious regression, this paper adopted a four-step econometric methodology in which they are ordered as follows:

Stage 1: Unit Root Testing

It starts by Augmented Dickey-Fuller (ADF) root unit test in dividing the stationarity properties of every time-series variable. This is what tells you which kind of model to use, because it specifies the order of integration: I(d). Basically, the macroeconomic variables are I(1) following [77] and nevertheless, we first difference all of them.

Stage 2: Johansen Cointegration Test

Given the confirmation of I(1) status, then the study continues to Johansen Cointegration test to find a long-run stable equilibrium relationship. This is a multivariate method which looks at both Trace statistic and Maximum Eigenvalue statistics. It is related by an equation:

$$\ln GPL_t = \alpha + \beta_1 \ln EXCHR_t + \beta_2 \ln INFLR_t + \epsilon_t$$

Where are long-run elasticities of gold prices with respect to the macroeconomic variables.

Step 3 Vector Error Correction Model (VECM)

A VECM is applied to distinguish between long-run and short-run factors only after cointegration has been established:

$$\Delta Y_t = \pi Y_{t-1} + \sum_{i=1}^{p-1} r_i \Delta Y_{t-i} + \mu + \epsilon_t$$

It has an Error Correction Term (ECT), which indicates the "rate of adjustment," ie how quickly the domestic price of gold returns to its equilibrium level following a shock. The appropriate lag order (p) is selected based on Schwarz Information Criterion (SIC) and Akaike Information Criterion (AIC).

Stage 4: Diagnostic and Causality Testing

For the statistical efficiency of model, we conducted various diagnostic tests such as autocorrelation in residuals, heteroscedasticity and normality according to Jarque-Bera test. Third, the lead-lag relationships are tested using the Granger Causality test in order to investigate whether past changes in exchange rates and inflation can predict current gold returns.

3. Results

Following previous studies, we first examine the complexity of time-series data to tackle the potential problem of spurious regression. The Augmented Dickey-Fuller (ADF) unit root tests offer initial evidence on the stationarity of the series. The first round of testing "level" shows that all main variables (Gold Price GPL, the Exchange Rate EXCHR and the Inflation Rate INFLR) are non-stationary. it indicates that the average and variability of these series are not constant over time, a typical feature of macroeconomic data in developing economies such as Lao PDR.

But, after differencing the first time, the null of unit-root is dismissed for all the series. All variables are stationary and the conclusion is that all of them are I (1). This common integrating characteristic is an essential condition for additional analysis. It rationalizes deviations from the naive OLS approach and is the legal-mathematical reason why the Johansen Cointegration Framework Works.

With the variables being I (1), the analysis may move then towards Vector Error Correction Model (VECM). This kind of two-step strategy is crucial to account for the double edge relation between these variables, so that it is possible to estimate the stable long run equilibrium point (cointegration) and the short-term gyrations or how fast are temporary shocks erased by market's adjustment towards its longer path. This methodological consistency guarantees that the following results on the effect of changes in exchange rates as well as

inflation on the price of gold are statistically meaningful and robust.

After the stationarity of data was confirmed, the Johansen Cointegration Analysis is applied to investigate whether there is a long-run movement in common among variables. Thus, the results found with both the Trace and Maximum Eigenvalue tests are consistent in detecting one statistically significant cointegrating vector at 5% level. This empirical finding is important since it corroborates the existence of a stable, long-run equilibrium relationship between domestic gold prices and the macroeconomic variables chosen in Lao PDR. This finding suggests that the relationship between these variables are subject to transitory departures due to surprises in the market but follow a unified path of co-movements.

The economic interpretations of the normalized long-run equation are particularly noteworthy. The findings indicate that the exchange rate (LAK/USD) is massive significant in gold price determination. In particular, when the exchange rate (Lao Kip) would yield an increase of 1 unit (equivalent to a depreciation), the domestic gold price would rise by some 3,838.7 Kips. This positive association is further evidence that currency devaluation “passes through” foreign exchange into high value imported commodities, which points to the face that in essence the domestic gold market reflects currency stability of a country.

Interestingly, the evidence reveals that inflation is statistically insignificant in the long run. This is contrary to the classic economic theory that gold acts as a common hedge against inflation. In this context of the Lao PDR economy, a “crowding-out” phenomenon is evident as Lao PDR’s exchange rate impact is so overwhelming that it dominates even domestic prices. Consequently, Lao PDR gold prices are significantly more influenced by the exogenous value of the currency than domestic inflationary pressures for a long period of time. This difference is crucial in explaining the specificities of Lao's financial market structure compared to more diversified international markets.

Extending the long-run analysis, Vector Error Correction Model (VECM) results also provide deep insights into short-run dynamics and in particular how exactly the system transitions back to its equilibrium. A core component of this model is the ECT, which in the gold price equation is estimated as -0.0881 and is statistically significant at 1% level. The negative sign and the magnitude of this coefficient is crucial, they indicate that a stable error-correction mechanism is working indeed. In particular, we can interpret this value as a “speed of adjustment” factor of about 8.8%/month; i.e., if some shock in the gold market causes prices to go astray from their long-term trend, over the subsequent month almost 9% of such disequilibrium is extinguished. It implies a

reasonably smooth process of market adjustment up to its steady state.

With a 1-month horizon, the model indicates that domestic inflation has a negative effect on gold prices. Such an immediate response might be explained by short-run portfolio rebalancing or liquidity-constrained local investors in the case of sudden bursts of inflation pressure. Forthcoming, the long-run dominating exchange rate shocks manifest no immediate statistical significance in the short run. Quite the opposite! Such behaviors indicate a “price stickiness”, or an inefficiency in the domestic market, where local gold dealers and jewelers are not fast enough to update their rates upon daily currency moves and events; Local dealers do wait for a few days at least until a clearer trend has established itself in the LAK/USD rate before of such day-to-day changes.

On the other hand, when taking an exchange rate as a dependent variable in this VECM framework, you should be reminded to give account of the relevance of exchange rate for overall Lao adjustment process in long run and hence re-justified empirically by the significance of its respective ECM coefficient. On the other hand, inflation variable appears to be relatively exogenous in the model (this implies that at this model inflation doesn’t appear to essentially respond to gold prices adjustment process as portrayed by Error dynamic between gold and exchange rate). The difference is crucial in considering the sequence of macroeconomic shocks and duration for which these events stay operative on the Lao gold market.

Lastly, in order to complete the empirical part of our analysis, we used Granger Causality tests in a VAR framework to check for the precise direction and precedence relationships between variables. In the unidirectional causality, we find strong evidence to confirm that the changes in domestic gold prices are significantly ‘Granger-caused’ by both exchange rate and inflation rate. This is a significant result as it suggests that sector-specific macroeconomic shocks in Lao P.D.R. are important factors leading the domestic gold market. Simply put, movements in currency value and consumer prices anathematize the information feeds discussed just above by inhibiting what they do which is inform a society of changes needed in real price for gold and silver.

Crucially, there is no evidence of feedback loops: gold price does not Granger-cause exchange rate or inflation rates. This serves to highlight that, in the Lao economy, gold is a reactive asset—not an economic driver. Gold acts as a litmus test of the health and security of Lao's underlying economy, but remains sensitive to it; whereas changes in the gold market do not possess an institutional gravity with enough force to birth macroeconomic shifts in currency: or inflation. It is around this point that we have to start understanding that gold price volatility is a “symptom” of macro-economic instability NOT the “cause.”

After all, that hierarchy of effect delivers a crucial policy conclusion for the national economy. It highlights that we are not an island in stabilizing our gold market and is bound up with the overall macroeconomic management. More specifically, the results indicate that stable exchange rates are the key to stabilize gold prices. Until the Lao Kip gets a stable and predictable value to look up to then the physical Lao gold market continues to be vulnerable through external pressure as its currency channel is actually still also key for price discovery in this sector.

4. Discussion

This paper contributes an empirical examination of the macroeconomic factors influencing gold prices in Lao P.D.R. for the period 2011-2024. The study reveals a stable long-run relationship between gold prices, exchange rates, and inflation under the Johansen cointegration method and the Vector Error Correction Model (VECM). Most noticeable is the strong dominance of the exchange rate (LAK/USD) as the main long-run factor driving gold prices. A strong positive relationship indicates that a unit variation in the Lao Kip depreciation against the US Dollar results in a significant increase of about 3,838.7 Kip in the domestic gold price. This further reveals that the Lao gold market is significantly currency-driven, a direct consequence of the high dependency on imported gold and the highly dollarized structure of the Lao economy.

On the other hand, while domestic inflation has been theoretically linked to gold as a hedge in many global studies, its effect is practically negligible over the long run in the Lao context according to these findings. This implies that the “currency effect” dominates the “inflation effect,” suggesting that the exchange rate is a more critical determinant than the local Consumer Price Index (CPI) in governing gold price movements. Similar empirical patterns are observed in international and regional contexts, emphasizing that gold price fluctuations are strongly influenced by exchange rate movements, particularly the relative strength of the US Dollar.

Short-run dynamics analysis also confirms market behavior and suggests that the domestic gold market is self-correcting to a limited degree, with approximately 8.8% of deviation corrected each month. Although volatility may originate from inflation shocks, such impacts are typically short-lived and do not significantly alter long-term price discovery. Furthermore, the absence of immediate short-run significance in exchange rate shocks suggests price stickiness or lagged adjustment behavior, whereby domestic gold dealers gradually adjust prices only after confirming sustained exchange rate trends. This phenomenon likely reflects the local market structure and dealer behavior within the country.

The Granger causality results also confirm these rankings, demonstrating that gold prices are influenced by macroeconomic variables such as exchange rate and inflation, with causality running from these variables

toward gold price rather than vice versa. These findings reinforce previous empirical studies that highlight the importance of macroeconomic fundamentals in determining inflation dynamics and financial market stability in Lao PDR. Overall, these results contribute to the broader understanding of gold market dynamics in small open economies and indicate that external factors and exchange rate stability are more influential than domestic price levels.

The strong correlation between gold prices and exchange rate movements observed in this study is consistent with recent empirical evidence from Their findings demonstrate that in Lao PDR., exchange rate fluctuations are a major determinant of macroeconomic stability and government expenditure, reflecting a high degree of exposure to currency depreciation. Since gold is a globally traded asset priced in USD, its local price in Laos acts as a direct reflection of the exchange rate pass-through effect This confirms that for Lao investors, gold is not merely a luxury good but a necessary financial hedge against currency instability highlighted in local academic literature.

Therefore, in Lao PDR, gold is considered a strategic asset for currency risk management. When the national currency faces devaluation pressure, gold functions as a store of value and provides financial stability for households and institutions. The policy implication of these findings suggests that maintaining exchange rate stability should be prioritized by policymakers at the Bank of the Lao PDR. to stabilize the domestic gold market. Meanwhile, local investors and financial institutions should consider gold as a strategic hedging instrument against currency risk rather than solely an inflation hedge. Future research could extend this framework by incorporating global gold price benchmarks or high-frequency daily data to better capture rapid information transmission between international markets and Lao PDR.

5. Conclusion

This study provides robust empirical evidence on the macroeconomic determinants of domestic gold prices in Lao P.D.R. using monthly data spanning April 2011 to April 2024. By applying Johansen cointegration and Vector Error Correction Model (VECM) techniques, the study confirms the existence of a stable long-run relationship among gold prices, exchange rate, and inflation. The econometric modeling framework follows well-established time-series forecasting and structural relationship testing procedures.

The empirical findings reveal that exchange rate movements represent the dominant macroeconomic factor influencing gold price behavior in Lao P.D.R. This result supports international empirical evidence indicating that gold price dynamics in emerging economies are strongly influenced by currency valuation, particularly against the US dollar. Furthermore, the findings reflect key structural

characteristics of the Lao economy, including high dependence on imported goods and partial dollarization, which increase domestic sensitivity to external monetary fluctuations.

In contrast to conventional economic theory that frequently identifies gold as a hedge against inflation, this study finds that domestic inflation plays only a limited role in long-run gold price determination in Lao PDR. This outcome supports recent macroeconomic evidence suggesting that inflation in Laos is largely driven by exchange rate pass-through effects and imported price pressures rather than purely domestic monetary conditions.

The short-run dynamic analysis indicates that domestic gold prices respond gradually to macroeconomic shocks, reflecting structural market characteristics such as limited financial market depth and price adjustment rigidity. Similar behavioral patterns have been observed in several ASEAN gold markets with developing financial systems, including Thailand, where both domestic and global economic variables influence gold price movements. The Granger causality results further demonstrate a unidirectional causal relationship from macroeconomic variables exchange rate and inflation to gold prices. This finding confirms that gold functions primarily as a reactive asset reflecting macroeconomic instability rather than serving as a driver of broader economic fluctuations.

Overall, this research reinforces macroeconomic concerns regarding the vulnerability of the Lao economy to exchange rate volatility. Given that gold prices are more responsive to currency fluctuations than to domestic inflationary pressures, policymakers should prioritize foreign exchange market stability to reduce asset price volatility and strengthen financial confidence. Moreover, improving public financial literacy regarding gold as a store of value may provide households with a more reliable strategy for preserving wealth during periods of currency depreciation and inflation uncertainty, thereby supporting long-term economic resilience in Lao PDR.

Based on the empirical findings, this study proposes several policy recommendations:

1. For Policymakers: To stabilize the domestic gold market and protect consumer purchasing power, the Bank of the Lao PDR should prioritize exchange rate stabilization through strengthened foreign reserve management, enhanced monetary policy coordination, and improved exchange rate transparency. The strong cointegration between gold prices and foreign exchange movements highlights the central importance of currency stability in maintaining domestic asset market equilibrium.

2. For Investors and Financial Institutions: The findings suggest that gold should not be viewed solely as a hedge against consumer price inflation but rather as a strategic financial instrument for managing currency risk. Investment decision-making in the Lao financial market

should therefore closely monitor exchange rate trends and global economic developments when formulating portfolio strategies.

3. For Future Research: Although this study provides a comprehensive analysis based on monthly data, future research could incorporate global gold benchmark prices, such as the London Gold Fix, or utilize high-frequency daily data. Such approaches would allow for more precise analysis of international price transmission mechanisms and the speed of market adjustment between global and domestic gold markets.

In conclusion, this study makes a significant contribution to the literature on gold market dynamics in Lao PDR. The findings highlight that in small open economies with strong external economic dependence, such as Laos, currency stability plays a more critical role in gold price determination than traditional inflation-based explanations. These insights provide valuable implications for monetary policy management, investment risk assessment, and financial market development in emerging ASEAN economies.

6. Conflict of Interest

Conflict of Interest Statement The authors hereby declare that they have no conflict of interest be it financial, personal, professional or institutional that may inappropriately influence the outcome and analysis of this article. While the scholars have retained full free rein in all aspects of their investigation, all interpretations remain completely bound to the facts and to careful econometric analysis. The authors declare that they have no competing interests.

Financial Disclosure and They agree that no financial support has been received and the present study was not supported externally. There were no grants, subsidies, or commercial sponsorships received from public, private and non-governmental organizations. All costs related to the study, such as data collection, renting a statistical software or preparing the paper were entirely covered by the authors. This impartiality prevents outside interests from exercising any undue influence over the research findings.

Data Availability and the Requirements of Academic Integrity Consistent with the highest standards of academic integrity, in addition to meeting mandatory data availability requirements, the authors are willing to confirm that the monthly dataset used in this study a panel consisting of 157 months' observations was obtained solely from official publicly available and verifiable figures made available by the Bank of the Lao PDR. (BOL) and the Lao Statistics Bureau (LSB). The authors can verify the veracity of the data and retain the responsibility to provide transparency, thus are willing to share their raw data used for VECM and other tests upon reasonable request to verify for validation.

Ethics and Author Contribution Statement This paper is an original manuscript with a strict reference to the internationally recognized ethical standards for authors of academic authors. All participating authors have substantially contributed to the research, including conception of the study, data collection, application of econometric techniques and writing of the paper. All authors have also read and approved the final version to submission.

The authors hereby declare that this paper is original, has not been published elsewhere previously and it is not simultaneously being considered for any other journal or publication. The findings and conclusions in this paper are the authors' sole responsibility and do not necessarily reflect the official views of Research and Communication.

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Table 1: Johansen Cointegration Test Results

No. of CE(s)	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value	Prob.
0	55.308	29.797	41.283	21.132	0.000
1	14.025	15.495	14.021	14.265	0.054

Table 2: Long-Run Cointegrating Equation

$$GPL_t = 3838.717EXCHR_t + 30114.95INFLR_t + \epsilon_t$$

Variable	Coefficient	Std. Error	t-Statistic	Significance
EXCHR	3838.717	348.415	11.018	*** (0.01)
INFLR	30114.95	137532	0.219	ns