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Analysis of Effects of Macroeconomic Policies on the Economic Recovery of Laos PDR after the Covid-19 Pandemic

Análisis de los efectos de las políticas macroeconómicas en la recuperación económica de la República Democrática Popular Lao tras la pandemia de Covid-19

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Abstract

This study investigates the effects of monetary and international economic factors on the economic growth and stability of Laos by using quarterly time series data from Q1 2017 to Q3 2023. An auto auto-regressive distribution lag (ARDL) model was applied to the model estimation. This study also revealed the problem and transmission mechanism of Laos' economic recovery. Based on empirical results, a negative relationship between CPI and GDP can be affirmed. Furthermore, it can be confirmed that money supply, bank interest rates, and exchange rates have a positive impact on CPI and GDP. However, the relationship between goods export value and GDP is negative. Moreover, it can be concluded that all independent variables have more varied effects on GDP than on CPI. Thus, the government can adapt the empirical results as tools and guidelines for effective and efficient monetary and international economic policy implementation to enhance economic recovery and accelerate sustainable economic development and growth. Currently, the critical economic problem of Laos that needs to solve be solved is rapidly increasing inflation. Therefore, the high inflation rate must be reduced to avoid the long-term risk of hyperinflation.

***Keywords*:** Laos PDR, Monetary Policy, Trade, GDP, Inflation Rate And Exchange Rate.

Resumen

Este estudio investiga los efectos de los factores monetarios y económicos internacionales en el crecimiento económico y la estabilidad de Laos utilizando datos de series temporales trimestrales desde el primer trimestre de 2017 hasta el tercer trimestre de 2023. A la estimación del modelo se le aplicó un modelo de retardo de distribución autorregresivo automático (ARDL). Este estudio también reveló el problema y el mecanismo de transmisión de la recuperación económica de Laos. A partir de los resultados empíricos, se puede afirmar una relación negativa entre el IPC y el PIB. Además, se puede confirmar que la oferta monetaria, los tipos de interés bancarios y los tipos de cambio tienen un impacto positivo en el IPC y el PIB. Sin embargo, la relación entre el valor de las exportaciones de bienes y el PIB es negativa. Además, se puede concluir que todas las variables independientes tienen efectos más variados sobre el PIB que sobre el IPC. Por lo tanto, el gobierno puede adaptar los resultados empíricos como herramientas y directrices para la implementación efectiva y eficiente de la política monetaria y económica internacional para mejorar la recuperación económica y acelerar el desarrollo y el crecimiento económico sostenibles. En la actualidad, el problema económico crítico de Laos que debe resolverse es el rápido aumento de la inflación. Por lo tanto, la alta tasa de inflación debe reducirse para evitar el riesgo a largo plazo de hiperinflación.

Palabras claves: República Democrática Popular Lao, Política Monetaria, Comercio, PIB, Tasa de Inflación y Tipo de Cambio.

Introduction

The economies of almost all countries around the world have been recovering from the Covid-19 pandemic. However, both the pressure of global economic uncertainty and geopolitical turbulence can be considered risk factors in a nation's recovery. The Lao People's Democratic Republic (PDR) is one of the countries that suffered greatly from these factors, as reflected in its post-pandemic low economic growth and sustained rate of high inflation.

Laos is a developing country in Southeast Asia with 7.425 million people. The Mekong River flows through this landlocked nation of mountainous terrains, plateaus, and lowlands that contain abundant natural resources. However, it lacks the potential to fully utilize these natural resources, including the ability to process agricultural products for commercial purposes, due to limitations in public education. Its economy depends on trade with neighboring countries in the Greater Mekong sub-region, especially Thailand, which is among Laos' major trading partners and an important source of foreign investment in various sectors such as construction, energy, banking, finance, insurance, and food services. China is another essential trade partner with large investments through One Belt One Road Strategy and a high-speed train line between the two nations to boost the Laotian economy through trade, investment, and tourism.

Laos' economic growth rate fell considerably from 5.5 percent in 2019 to 0.5 percent at the start of the Covid-19 pandemic in 2020. As the pandemic receded in 2021, its economic growth rate recovered to 2.5 percent, but the rate grew only 2.7 percent in 2022. The inflation rate declined slightly from more than 5 percent in 2019 to 3.19 percent during the first year of the pandemic before rising to 5.27 percent in 2021. As the direction of economic recovery continued in 2022, the rate soared to 39.27 percent (Bank of Laos, 2023).

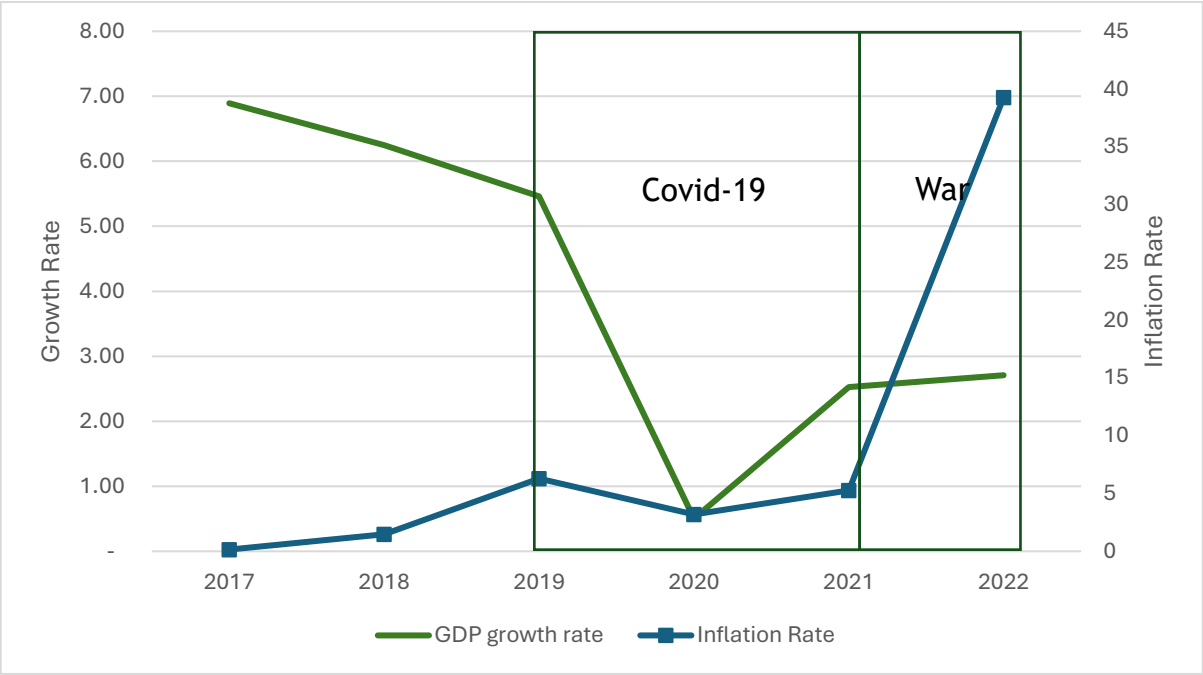


Figure 1. GDP economic growth rate and inflation rate of laos

Sources: World Bank (2023) and Bank of Laos PDR (2023)

Lao inflation can explained by correlating with the exchange rate of Lao kip per baht. As measured from the start of the Covid-19 pandemic, inflation peaked in February 2023 before retreating in contrast with the direction of the exchange rate. The fluctuation of these data can be seen over a short period (in Figure 2). The resultant border closing from the pandemic can be regarded as one factor contributing to the high depreciation of the Lao Kip KIP, which sharply decreased international transactions in trade, investment, logistics, and tourism.

The post-pandemic economic growth has been driven by the recovery of the tourism sector and the development of transport systems as well as an accommodative monetary policy to revive the economy (World Bank, 2023). However, economic recovery was low due to both instability and other factors including limited foreign reserves as well as a low level of income, consumption, and domestic investment. As a result, the value of the domestic currency fell sharply.

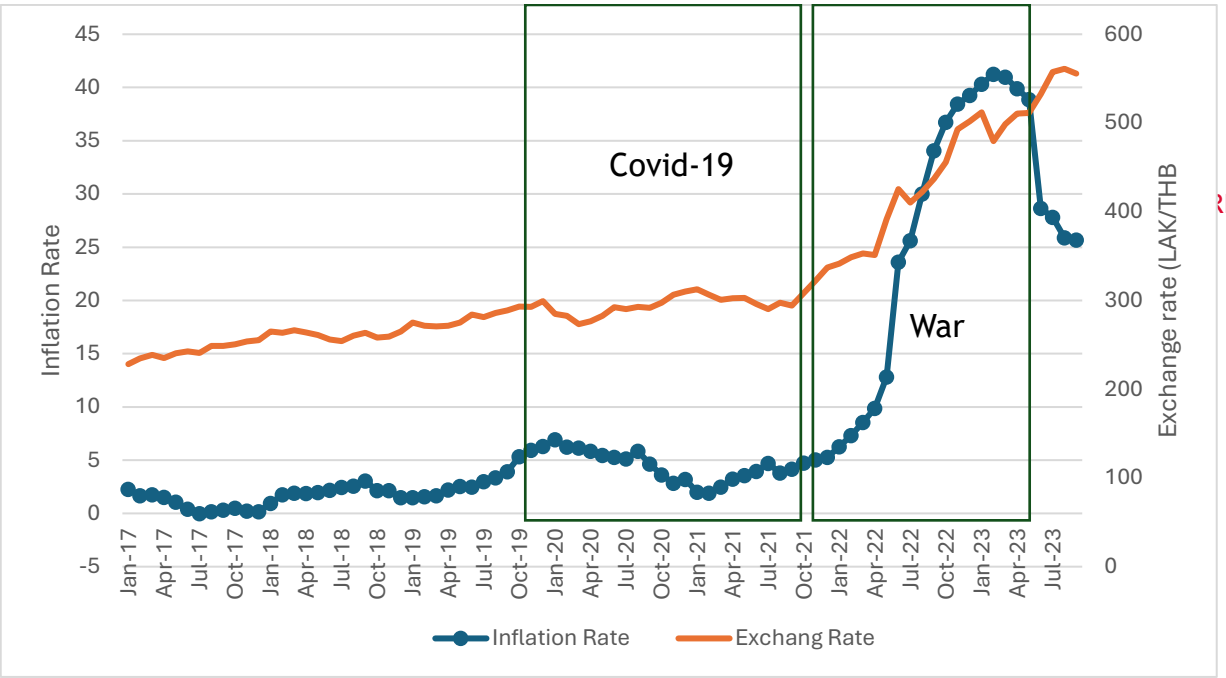


Figure 2. Inflation rate and exchange rate of laos

Source: Bank of Laos PDR (2023)

The government has implemented many policies to accelerate GDP growth by using monetary policy such as lowering interest rates and raising the money supply to increase liquidity. However, these policies can contribute to rising inflation, with increased economic instability as a trade-off, though the typically negative effects of CPI on GDP can occasionally turn positive during an economic expansion (Kyo, 2018). Domestic economic recovery can be overwhelmed by international economic factors, especially import and export values as well as by exchange rates (Hemzawi & Umutoni, 2021; Usman & Bashir, 2022). However, these relationships may vary by country (Tivatyi et al., 2022).

Therefore, this study aims to analyze the primary causes of Laos' problematic economic recovery in the post-pandemic era. The influence of economic factors including monetary factors such as money supply (M2), and bank interest rates, are considered. International economic factors comprise exchange rates and import/export values The influence of these factors on economic growth as

measured by gross domestic product (GDP) and economic stability determined by consumer price index (CPI) were explored.

Research objectives

- To investigate the impacts of macroeconomic factors on the economic recovery of Laos after the Covid-19 pandemic.
- To explore the transmission mechanisms contributing to the economic recovery of Laos after the Covid-19 pandemic.

Conceptual framework

This research was conducted within the following conceptual framework. Many essential theories and concepts are included to address the research objectives and conduct discussion accurately. These theories and concepts comprise monetary economics, international economics, and economic development, which are explained as follows.

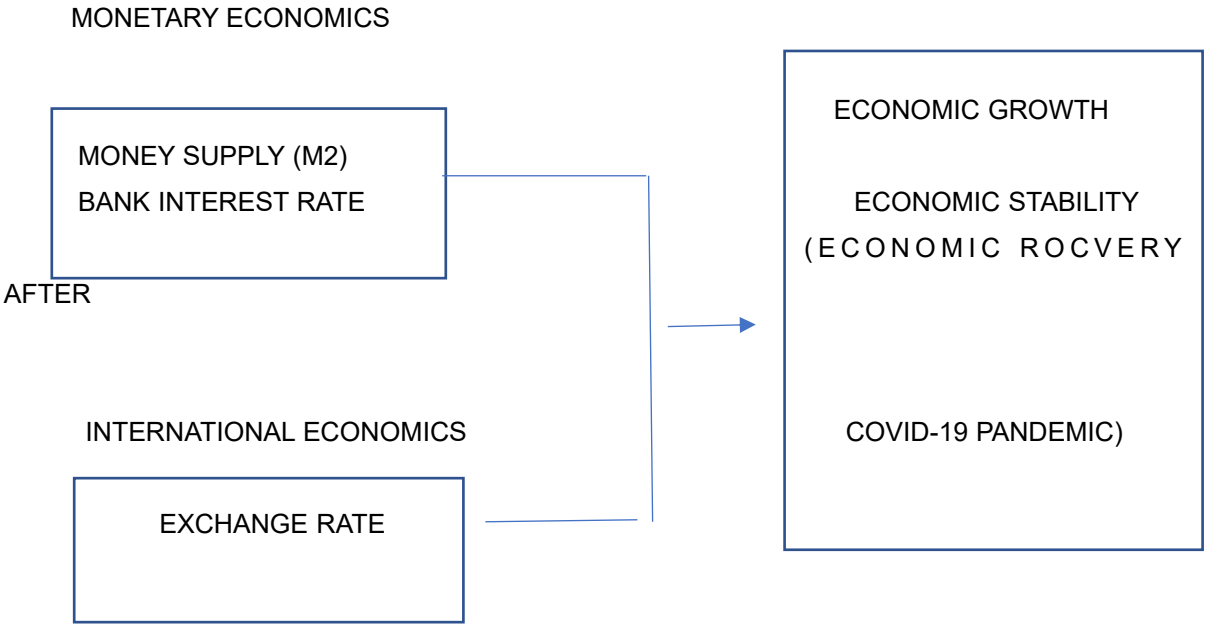


Figure. 1 Conceptual framework

The above conceptual framework illustrates that both monetary and international economics were deployed in this research. The variables were included in monetary dimensions combined with broad money supply and bank interest rates. The variables were plugged into an international economics perspective combined with exchange rate and import/export values. These variables were considered for the development of an appropriate model to examine the effects on post-pandemic economic growth and stability. The transmission mechanisms also require investigation to reveal and propose practical and effective suggestions.

Methodologies and Data

This study investigates the impact of macroeconomic factors on Lao economic growth and stability by using quarterly data from 2017 Q1 to 2023 Q2 to determine whether these factors aided economic recovery following the Covid-19 pandemic

Economic growth was proxied by the logarithmic form of gross domestic product at the current level in millions of dollars (GDP). This yearly data were collected from the World Bank (2023) for 2017 to 2022. The 2023 forecasting data of a 3.7 percent growth rate were obtained from the Asian Development Outlook database (ADO) and converted from yearly to quarterly figures. Economic stability was proxied by the logarithmic form of the customer price index (CPI) collected from Bank of Lao PDR quarterly reports from 2017 Q1 to 2023 Q2.

In this study, the proxy variables of monetary factors were money supply (M2) and interest rate (Int) collected from the Bank of Lao PDR (2023). The international economic factors of Laos were import (Imp) and export values (Exp) of goods, and the exchange rates between the Laos kip and Thai baht (Eth) were also collected from the bank's quarterly reports from 2017 Q1 to 2023 Q2. All independent variables were transformed into the logarithmic for accuracy and reliability in terms of percent changes for the model estimation and empirical results discussion.

The stationary property and order of integration of each variable tested at first differences with ADF and PP tests are presented in Table 1 and 2. The non-stationary variable can be possible because of the biased estimator in the regression; thus, the property must be checked. However, these estimators can be seen as non-stationary when they are in co-integration. There are many alternative types of co-integration methods. According to the stationary test results in Table 1 and 2, there was a difference in the order of integration in which these variables were stationary. As a result, an autoregressive distribution lag model (ARDL) is suitable for proving co-integration and detecting both long-term and short-term relationships.

After testing various types of the ARDL model, the model that included the interception was selected and appropriate because of the stability test results, which are presented in cumulative sum (CUSUM) and cumulative sum of square (CUSUMQ) charts. Therefore, the co-integration of monetary factors and international economic factors on GDP and CPI were proven by the following equations:

$$GDP_t = \alpha + \Sigma_{h=1}^{a}\beta_h GDP_{t-h} + \Sigma_{i=0}^{b}\gamma_i CPI_{t-i} + \Sigma_{j=0}^{c}\epsilon_j M2_{t-j} + \Sigma_{k=0}^{d}\zeta_k Int_{t-k} + \Sigma_{l=0}^{e}\eta_k Imp_{t-l} + \Sigma_{m=0}^{f}\theta_m Exp_{t-m} + \Sigma_{n=0}^{g}\vartheta_n Eth_{t-n} + \varepsilon_t$$

Eq 1

$$CPI_t = \alpha + \Sigma_{h=1}^{a}\beta_h CPI_{t-h} + \Sigma_{i=0}^{b}\gamma_i GDP_{t-i} + \Sigma_{j=0}^{c}\epsilon_j M2_{t-j} + \Sigma_{k=0}^{d}\zeta_k Int_{t-k} + \Sigma_{l=0}^{e}\eta_k Imp_{t-l} + \Sigma_{m=0}^{f}\theta_m Exp_{t-m} + \Sigma_{n=0}^{g}\vartheta_n Eth_{t-n} + \varepsilon_t$$

Eq 2

where Eq (1) represents the investigation of the co-integration between independent variables and GDP, while Eq (2) is considered to be CPI. The co-integration properties of these relationships were identified by the bound test when the null hypothesis that “all coefficients of independent variables are zero” was rejected if the F-stat from the Wald test was higher than the criteria of Pesaran et al. (2001).

Moreover, if there was co-integration, the long-term relationship of these variables would be estimated by the following equations:

$$GDP_t = \Omega_0 + \Omega_1 CPI_t + \Omega_2 M2_t + \Omega_3 Int_t + \Omega_4 Imp_t + \Omega_5 Exp_t + \Omega_6 Eth_t + \epsilon_t$$

Eq (3)

$$CPI_t = \varphi_0 + \varphi_1 GDP_t + \varphi_2 M2_t + \varphi_3 Int_t + \varphi_4 Imp_t + \varphi_5 Exp_t + \varphi_6 Eth_t + \epsilon_t$$

Eq (4)

where Eq (3) and Eq (4) represented the long-term relationship between the independent variable to GDP and CPI, respectively.

The investigation of the short-term relationship was considered by the following equations:

$$\Delta GDP_t = \alpha + \Sigma_{h=1}^{a-1}\beta_h \Delta GDP_{t-1} + \Sigma_{i=0}^{b-1}\gamma_i \Delta CPI_{t-i} + \Sigma_{j=0}^{c-1}\epsilon_j \Delta M2_{t-j}$$
$$+\Sigma_{k=0}^{d-1}\zeta_k \Delta Int_{t-k} + \Sigma_{l=0}^{e-1}\eta_l \Delta Imp_{t-l} + \Sigma_{m=0}^{f-1}\theta_m \Delta Exp_{t-m}$$
$$+\Sigma_{n=0}^{g-1}\vartheta_n \Delta Eth_{t-n} - \phi EC_{t-1} + \mu_t \qquad \text{Eq (5)}$$

where $EC_t = GDP_t - \Omega_0 - \Omega_1 CPI_t - \Omega_2 M2_t - \Omega_3 EInt_t - \Omega_4 Imp_t - \Omega_5 Exp_t - \Omega_6 Eth_t$

and

$$\Delta CPI_t = \alpha + \Sigma_{h=1}^{a-1}\beta_h \Delta CPI_{t-1} + \Sigma_{i=0}^{b-1}\gamma_i \Delta GDP_{t-i} + \Sigma_{j=0}^{c-1}\epsilon_j \Delta M2_{t-j}$$
$$+\Sigma_{k=0}^{d-1}\zeta_k \Delta Int_{t-k} + \Sigma_{l=0}^{e-1}\eta_l \Delta Imp_{t-l} + \Sigma_{m=0}^{f-1}\theta_m \Delta Exp_{t-m}$$
$$+\Sigma_{n=0}^{g-1}\vartheta_n \Delta Eth_{t-n} - \phi EC_{t-1} + \mu_t \qquad \text{Eq (6)}$$

where $EC_t = CPI_t - \varphi_0 - \varphi_1 GDP_t - \varphi_2 M2_t - \varphi_3 EInt_t - \varphi_4 Imp_t - \varphi_5 Exp_t - \varphi_6 Eth_t$

Eq (5) and Eq (6) represent the short-term relationship between the independent variable and GDP and CPI, respectively. These equations can be used to confirm the co-integration properties in each relation by the significantly negative value of ϕ, which represents the speed of adjustment.

In addition, the Granger Causality test was applied to detect the causality effect from the impact of the independent lag on GDP and CPI as follows:

$$GDP_t = \alpha_0 + \Sigma_{p=1}^{q} \alpha_p \Delta GDP_{t-p} + \Sigma_{i=0}^{j} \beta_i \Delta X_{t-i} + e_t \quad \text{Eq (7)}$$

$$CPI_t = \gamma_0 + \Sigma_{p=1}^{q} \gamma_p \Delta CPI_{t-p} + \Sigma_{i=0}^{j} \theta_i \Delta X_{t-i} + e_t \quad \text{Eq (8)}$$

where Eq (7) and Eq (8) investigate the Granger Causality from the independent variable to GDP and CPI, respectively. The Granger Causality of the independent variable can be confirmed through hypothesis testing by a null hypothesis that "all coefficients of independent variables are zero".

Results and discussion

According to the stationary test results from the ADF and PP tests (Table 1 and 2), these data were stationary at a difference order of integration of less than 2. As a consequence, the ARDL method was suitable for investigating their relationship.

Table 1. Stationary test results (1)

Variables	ADF-test			PP-test		
	None	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend
CPI	1.3589	2.4965	0.0538	2.4700	2.8683	0.8179
GDP	-0.2382	-1.2024	-1.6194	-0.2382	-1.2577	-1.6193
M2	2.0607	0.1747	-2.4988	1.4103	-3.6907**	-4.6852***
Int	0.829313	-4.8145***	-3.5876*	0.6731	-0.3950	-0.2679
Imp	1.0083	1.7425	0.8449	0.8168	-2.6458*	-3.4884*
Exp	2.4335	-0.7186	-4.3001*	0.9446	-0.9719	-4.2902*
Eth	-0.5904	1.5709	2.5049	3.4419	2.2816	-0.7837

Notes: *** Significance level of 99%. ** Significance level of 95 %. * Significance level of 90 %.
Source: Model Estimation

Table 2. Stationary test results (2)

Variables	ADF-test			PP-test		
	None	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend
CPI	0.5707	-0.8865	-4.9093***	-1.2777	-1.8688	-2.4192
GDP	-4.7958***	-4.7011***	-2.4193	-4.7958***	-4.7011***	-4.8832***
M2	-8.0704***	-2.3019	-0.8589	-12.6424***	-19.4218***	-22.6227***

Variables	ADF-test			PP-test		
	None	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend
Int	-1.6676*	-1.7056	0.0741	-3.7172***	-3.7389**	-4.1330**
Imp	-5.0767***	-5.1739***	-0.7291	-8.1350***	-9.1275***	-10.5945***
Exp	-7.7263***	-4.7546***	-2.0525	-7.7263***	-10.1701***	-9.8976***
Eth	0.6825	0.7773	-4.3801**	-2.8495***	-3.8490***	-4.6631***

Notes: *** Significance level of 99%. ** Significance level of 95 %. * Significance level of 90 %.
Source: Model Estimation

Cointegration testing with ARDL models was determined by the bound test (Table 3), which indicates that the independent variables have a long-term relationship with both GDP and CPI. The results are confirmed with the indication of ϕ values in Eq (5) and Eq (6), which are significantly negative because they represent the speed of adjustment and direction into the long-term equilibrium after the deviation has occurred.

Table 3. Co-integration test results

Results	GDP	CPI
ARDL Bound test (F-statistic)	9.5680***	5.4779***
Speed of Adjustment (the ϕ value in Eq (5) and Eq (6))	-0.5085 (-11.5738)***	-1.3842 (-8.7573)***

Notes: *** Significance level of 99%. ** Significance level of 95 %. * Significance level of 90 %.
Source: Model Estimation

Additionally, when considering the estimation of the long-term relationship between independent variables and GDP and CPI, it found t a negative relationship between GDP to CPI and CPI, which was inconsistent with macroeconomic concepts. These results can be explained by the period of study. However, an increase in inflation (CPI) will decrease purchasing power, thus contributing to a lower level of spending due to decreasing disposable income and a higher cost of living. Nevertheless, economic expansion can motivate and attract entrepreneurs to invest and thus lead to price competition over the long term for business survival and sustainability.

In contrast, M2, Eth, and Int have a positive impact on GDP and CPI, which is consistent with macroeconomic theories. The increase in M2 indicates an increase in borrowing or credit for business expansion. At the same time, this mechanism causes an increase in CPI. The influence of Eth on GDP and CPI may be explained by the impact of an expanded tourism sector and increased tourist spending. Regarding interest rates, the Lao financial system can be considered doubtful, which makes it preferable to hold assets that offer greater returns, such as baht or gold, rather than saving Lao kip in a bank deposit rising interest rates, which normally attract deposits and reduce credit to business by raising borrowing costs. These consequences influence the nation's money supply.

Table 4. Long-term relationship estimation

Independent Variables	Model	
	GDP	CPI
CPI	-4.38	-
	(-4.6339)***	
GDP	-	-0.2159
		(-4.4674)***
M2	0.2172	0.031
	(4.5656)***	(2.5364)**
Interest Rate	0.0635	0.0156
	(2.6461)**	(3.79)***
Import	0.1364	0.0263
	(1.0365)	(0.7638)
Export	-0.6785	-0.1334
	(-3.5323)**	(-3.911)***
Exchange rate	3.0265	0.7276
	(4.1907)***	(22.7871)***

Notes: *** Significance level of 99%. ** Significance level of 95 %. * Significance level of 90 %.
Source: Model Estimation

Furthermore, it was found that the influence of Exp is contrary to GDP and CPI, a situation that can result from the nature of Lao exports, which comprise mostly minerals, electricity, and other natural resources (Observatory of Economic Complexity, 2023). These export businesses are owned by foreigners and often

employ more workers from their home countries than from Laos. Therefore, not all of the worker's earnings are circulated in Lao economy, thus counteracting the common belief that exports normally bring income into a country. This explanation supports the empirical result that exports have a negative impact on GDP.

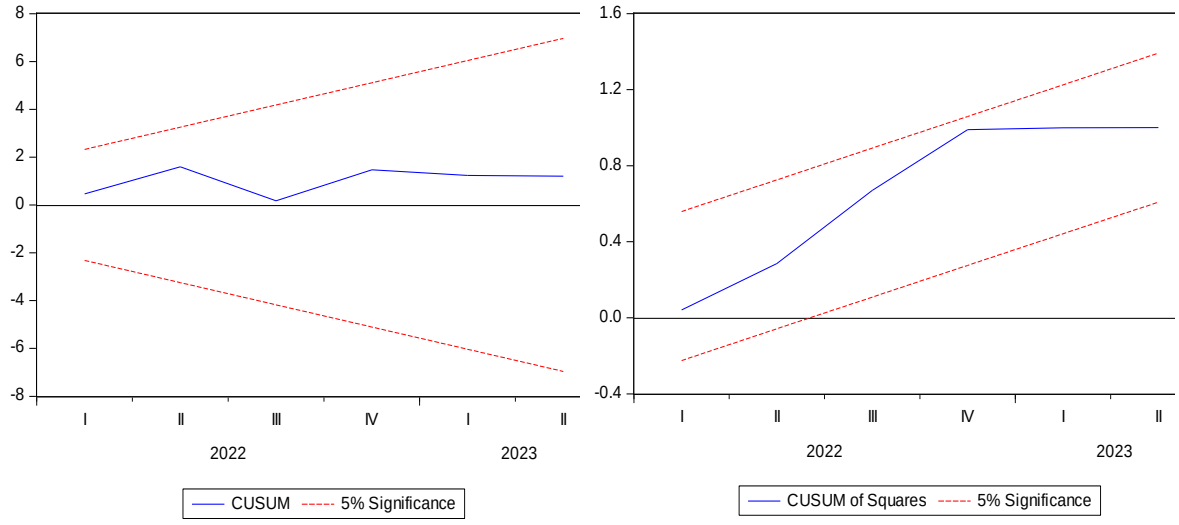
When considering the short-term relationship (Table 5), it can be affirmed that CPI, M2, imports, and exports have a negative relationship to GDP. In contrast, Int and ETH have a positive relationship to GDP. It was found that only M2 had a negative relationship to CPI, both in historical and current data, but others differ by lag in terms of a short-term relationship with CP. Moreover, when considering the rationality properties from independent variables to GDP and CPI, it was found that only M2 has a Granger causality with GDP. GDP, Exp, and Eth have Granger causality with CPI. The ARDL model's stability was proven by the CUSUM and CUSUMQ charts in Figure 2, which indicates that all estimated models were stable.

Table 5. Short run relationship estimation (VECM)

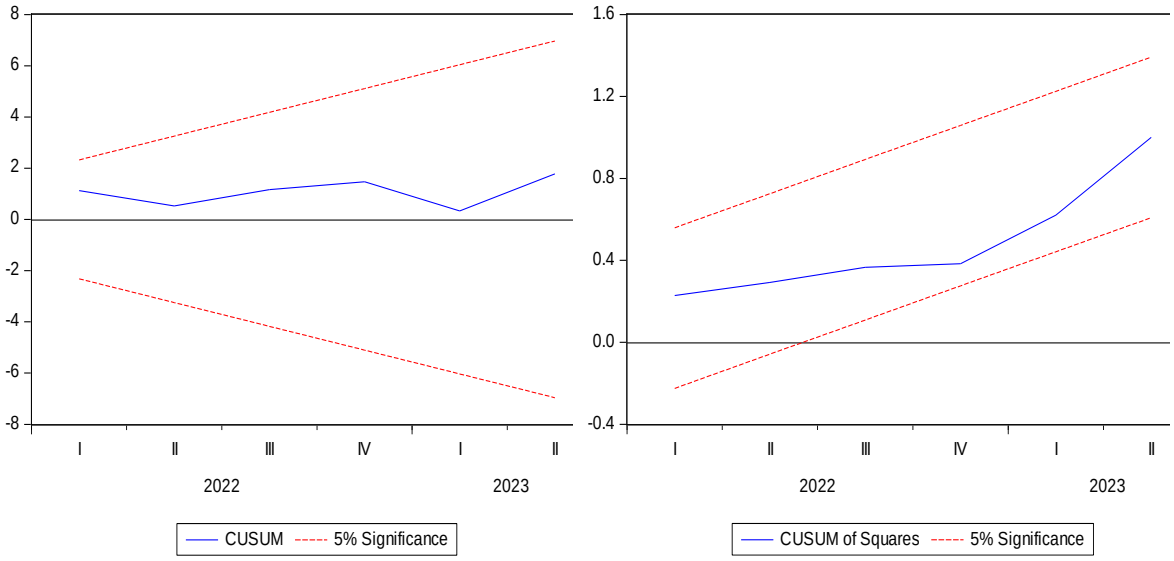
Independent Variables		D(GDP)		D(CPI)	
		Short Run relationship	Granger Causality test	Short Run relationship	Granger Causality test
C	-	6.645		3.8182	
		(11.5813)***		(8.7556)***	
EC (Long run Causality)	-1	-0.5085		-1.3842	
		(-11.5738)***		(-8.7573)***	
D(CPI)	-	-0.9214	0.7323		
		(-5.3947)***			
	-1	-0.0187			
		(-4.678)***			
D(GDP)					5.1433**
D(M2)	-	-0.0187	22.5424***	-0.0052	4.0523
		(-4.678)***		(-1.9163)	
	-1	-0.0585		-0.029	
		(-5.2093)***		(-6.7442)***	

Independent Variables		D(GDP)		D(CPI)	
		Short Run relationship	Granger Causality test	Short Run relationship	Granger Causality test
D(Int)	-	0.0114	0.2867	0.0071	0.7160
		(4.3314)***		(4.9933)***	
	-1			-0.0045	
				(-2.2622)*	
D(Imp)	-	-0.0702	0.0375	-0.0213	0.4257
		(-3.7228)***		(-1.8589)	
	-1	-0.0711		-0.0297	
		(-3.7286)***		(-2.268)*	
D(Exp)	-	-0.0711	2.1421	-0.0563	2.6423*
		(-3.7286)***		(-3.3635)**	
	-1	-0.0292		0.0418	
		(-0.9283)		(2.0324)*	
D(Eth)	-	0.1822	0.99996	0.5013	6.5963**
		(6.5919)***		(12.9234)***	
	-1	0.6921		-0.2624	
		(5.1577)***		(-3.1132)**	

Notes: *** Significance level of 99%. ** Significance level of 95 %. * Significance level of 90 %.
Source: Model Estimation



GDP



CPI

Figure 3. Stability tested results: cusum and cusumq chart

Conclusion

Based on the empirical results, the long-term negative relationship between GDP and CPI can be regarded as the main point of this study. The positive effect of interest rates on GDP and CPI can be reflected in the confidence lag in monetary policy implementation. The negative effect of exports on GDP and CPI can be attributed to the problem of ineffective rules and regulations regarding agreements for foreign investments.

Lao economic growth has been lower than expected due to high inflation during the Covid-19 pandemic when the major border crossing between Thailand and Laos at the Thai-Laos Friendship Bridge was closed. This situation contributed to a massive decrease in international economic activity, particularly in trade, investment, logistics, and tourism. The value of the Lao kip has also dropped considerably. Lao economic recovery remains low in the Covid-19 post-pandemic era.

For many reasons, China is currently Laos' largest trade partner, with the highest level of investments. The high-speed train route between Kunming and Vientiane will lead to greater convenience and reduce the cost of trade, investment,

and logistics. These benefits will contribute to a potentially massive expansion of trade and investment between the two nations, especially in this post-pandemic recovery era.

From the above, it can be affirmed that the Lao government and central bank must determine the necessary goals to reach and efficiently coordinate policy implementation to solve the nation's economic problems. The ultimate aims consist of achieving sustainable economic growth while simultaneously eliminating the high inflation rate to prevent an outbreak of hyperinflation.

Policy implications and recommendations can be addressed as follows.

1. Effective monetary policies must be implemented via appropriate instruments and transmission channels to decrease the fluctuation of the Lao kip and control inflation.

2. Export industries must enhance competitiveness, provide more value-added export products, and increase market share with major partners so as to increase export revenue.

3. Policies to attract massive foreign investment and capital must be continuously implemented due to inadequate domestic capital accumulation.

4. Laws, rules, and regulations to manage foreign investment must be updated and revised to seek long-term foreign investment and capital to invest in high-potential sectors. These sectors include construction, real estate, entertainment, tourism, health care, and education. The expansion of these sectors can be supported by attracting a high number of foreign investors and their family members, particularly from China, to operate businesses and live in Laos.

5. The central bank must implement efficient measurements and policies to control and manage the money supply as well as international reserves to ensure sufficient international reserves that directly relate to ensuring exchange rate stability

and reducing fluctuations. The currently high exchange rate instability and fluctuation weakens the confidence of foreign investors.

6. The quality of infrastructure and human resources needs to be considered as essential elements to improve the economy. A higher quality of infrastructure not only decreases the cost of logistics to operate businesses but also attracts more foreign investment and capital. Improvements in human resource quality by raising the levels of technical knowledge and foreign language skills need to be implemented.

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