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TAYLOR RULE AND IMPLEMENTATION OF MONETARY POLICY IN VIETNAM

A REGRA DE TAYLOR E A IMPLEMENTAÇÃO DA POLÍTICA MONETÁRIA NO VIETNÃ

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Abstract
Using quarterly data, this paper measures the response of the State Bank of Vietnam's policy rate to inflation and the output gap of the economy. The policy rate responds to inflation, but not to the output gap. There is no evidence that the response of the interest rate to inflation is nonlinear or asymmetric. Two characteristics of the structure of the Vietnamese economy contribute to this result: i. Vietnam's foreign economic sector is not affected by domestic interest rate, making the relationship between interest rate and aggregate demand much weaker when compared to other developing countries; ii. The credit limit tool can be used in addition to the interest rate tool, making the asymmetric response of interest rate, which is stronger when inflation is high, unnecessary for Vietnam.

Keywords: Monetary Policy. Taylor Rule. State Bank of Vietnam.

Resumo
Utilizando dados trimestrais, este artigo avalia a resposta da taxa de juros de referência do Banco Estatal do Vietnã à inflação e ao hiato do produto da economia. A taxa de juros de referência responde à inflação, mas não ao hiato do produto. Não há evidências de que a resposta da taxa de juros à inflação seja não linear ou assimétrica. Duas características da estrutura da economia vietnamita contribuem para esse resultado: i. O setor econômico externo do Vietnã não é afetado pela taxa de juros doméstica, tornando a relação entre a taxa de juros e a demanda agregada muito mais fraca quando comparada à de outros países em desenvolvimento; ii. A ferramenta de limite de crédito pode ser utilizada em conjunto com a ferramenta da taxa de juros, tornando desnecessária para o Vietnã a resposta assimétrica da taxa de juros, que é mais forte quando a inflação é alta.

Palavras-chave: *Política Monetária. Regra de Taylor. Banco Estatal do Vietnã.*

1 MONETARY POLICY AND THE TAYLOR RULE

Monetary policy is an essential tool that a country can deploy to maintain domestic prices and sustainable economic growth. For most countries. the goals of monetary policy include price stability. maintaining a balance of payments equilibrium. promoting employment and output growth. and sustainable development. Tight monetary policy is

implemented to curb inflation. and expansionary monetary policy is used to stimulate economic activity. as well as to combat unemployment and economic recession (Walsh. 2017; BIS. 2019). The role of monetary policy in economic development and changes in aggregate economic activity depends on how monetary policy is conducted. and the independence of the central bank in choosing appropriate monetary instruments to achieve macroeconomic objectives (Aguir. 2018; Wachtel & Blejer. 2020). In the context of modern monetary policy. the Taylor Rule (Taylor. 1993) serves as an important benchmark for determining policy interest rate. This rule proposes how central banks should set interest rates. taking into account factors such as inflation and GDP growth through the following equation:

$$i_t = r_L + \varphi_\pi(\pi_t - \pi^*) + \varphi_y(y_t - y_t^*) \qquad (1)$$

In this equation: i_t is the central bank's policy rate; r_L is the long-term real interest rate; π_t is inflation and π* is the inflation target. $(\pi_t - \pi^*)$ is the difference between inflation and the inflation target; y_t is GDP in log form; y_t^* is potential GDP in log form; $(y_t - y_t^*)$ is the output gap. or the difference between GDP and the economy's potential output; φ_π and φ_y reflect the responsiveness of the policy interest rate to changes in inflation and the output gap. The Taylor rule recommends that when actual output exceeds potential output. that is. $(y_t - y_t^*)$ >0 . or when actual inflation is higher than the inflation target. that is. $(\pi_t - \pi^*)$ >0 . the central bank raises interest rate. Conversely. when the economy is in recession or inflation shows signs of cooling down. monetary policy should be loosened by lowering interest rate to stimulate aggregate demand.

This rule was shown by Taylor (1993) to be consistent with the operating rule of the US Federal Reserve (FED). The FED's interest rate movements are matched by a simple rule. according to which the interest rate is increased by 1.5 percentage points in response to a one percentage point increase in the inflation rate. and by 0.5 percentage point in response to a one percentage point increase in GDP above its potential. This means that the coefficients φ_π and φ_y are 1.5 and 0.5. respectively. The FED's inflation target. π*. is 2%. The long-run real interest rate r_L is 2%.

Many empirical studies conducted based on the analysis of data on the US economy confirm the relationship between the central bank's short-term nominal interest rate and the output gap and inflation (Clarida. et. al.. 1998. 2000; Orphanides. 2001; Ball & Tchaidze. 2002; Orphanides & Williams. 2003). This relationship is also proved by empirical studies of other economies and regions. including the UK. France. Italy (Clarida et al.. 1998). The study of the European Monetary Union (EMU) area from 1990–98 by Gerlach and Schnabel (1998). and a study by Peersman and Smets (1998). using aggregate data from five EU countries in the period from 1975–97 also gave similar results on the response of the average short-term nominal interest rate to the average output gap and inflation. The empirical results for experimental economies show that: i. The policy rate responds to inflation and the output gap; ii. The response of the policy rate to inflation. φ_π. is stronger than the response to the output gap. φ_y.

2 MONETARY POLICY FOR DEVELOPING COUNTRIES

The economic and institutional characteristics of developing countries have specific characteristics. making the response of central bank policy rates to inflation and output gap in these countries different from those of developed countries. Developing countries have the following characteristics:

Weak institutions: manifested through the lack of independence and low credibility of the central bank in conducting monetary policy (Frankel. 2010). The central bank may be subject to significant political pressure. leading to decision-making not being based solely on macroeconomic principles but influenced by short-term goals. weakening the ability to control inflation and stabilize prices. The regularity in conducting monetary policy may be lower than in developed countries. Dominance of fiscal policy over monetary policy is also more common in developing countries (Zoli. 2005). leading central banks issuing currency to finance government budget deficits. Central banks may also be under pressure to maintain low interest rate so that the government can borrow cheaply. Fiscal policy dominance often leads to a higher inflation level (Catão & Terrones. 2005).

Export and foreign investment dependent economy: When the economy depends heavily on export markets and foreign direct investment (FDI) as in many developing

countries. the impact of monetary policy on aggregate demand will be small. because the two important variables in aggregate demand are exports and investment. in which foreign investment plays a large role. Exports depend on factors such as foreign markets. trade agreements. and arrangements between countries. etc. FDI investment usually mobilizes capital in investing countries. with higher levels of economic development and lower interest rates. Therefore. domestic interest rate does not have a large impact on exports and FDI. and therefore will have a smaller impact on aggregate demand. Interest rates in these countries. therefore. may not react to output gap (Mohanty & Klau. 2005).

The economy and financial system are vulnerable to shocks. Developing economies share several common characteristics of their financial systems: i. Their financial systems are bank-based and capital markets play a minor role (Stiglitz. 1998); ii. Firms are highly leveraged (Glen & Pinto. 1994); iii. Hedging tools for firms. such as interest rate and exchange rate derivatives. are limited (Sundaram. 2012). Therefore. firms in developing countries are more vulnerable to abrupt changes in interest rates (Arteta. et. al.. 2022). Central banks in these countries have a greater incentive to smooth interest rates.

Dollarization of the economy (Nidhiprabha. 2017). With inflation rates typically higher than those in developed countries. and the absence of financial investment instruments to hedge against inflation risks due to underdeveloped financial systems. developing countries often have higher levels of dollarization of their economies than developed countries. When inflation rises abnormally high. in addition to the negative impacts as in developed countries. people may increase their hoarding of gold and dollars. causing instability in the financial system and other negative impacts on the economy. Therefore. central banks in these countries have incentives to react more strongly when inflation rises.

Due to the aforementioned economic characteristics. the monetary policies of developing countries are different from those of developed countries. Developing countries could focus more on controlling inflation. rather than output gap. for two reasons:

- Response to output gap is ineffective. since aggregate demand depends on external factors. such as FDI and global demand for domestic exports. Developing economies often depend heavily on exports and FDI. FDI inflows are mainly

determined by interest rates and economic conditions in the investing countries (usually developed countries). while exports depend on world market demand. growth rates of major economies. trade agreements. etc. Therefore. changing the central bank's interest rate to affect the output gap level through aggregate demand is not as effective as in developed countries. Empirical studies have shown that central banks in these countries often react more strongly to exchange rate fluctuations than to output gaps. This reflects the fact that external shocks (fluctuations in world commodity prices. international investment flows) have a much larger impact on aggregate demand than adjustments in domestic interest rates. Kamin et al. (1998) argued that monetary policy has smaller impact on aggregate economic activity in developing countries.

- Fragile domestic financial system and currency. High inflation erodes and depreciates the value of domestic currency. causing economic and social instability. severely affecting vulnerable groups such as the poor and those with fixed incomes. thereby promoting dollarization. making it difficult for the central banks to control money supply and interest rates. Schmitt-Grohe and Uribe (2001) measured the costs of dollarization for Mexican economy. which were within 0.1 – 0.3 percent of steady-state consumption. Yeyati (2014) found empirical evidence that dollarized economies suffered from slower and more volatile output growth.

3 MONETARY POLICY AND VIETNAM'S ECONOMY

3.1 Limited central bank independence

Vietnam's monetary policy is implemented by the State Bank of Vietnam. a ministerial-level agency of the Government. Monetary policy has contributed to macroeconomic stability and inflation control in Vietnam. but its independence is still limited and easily influenced by fiscal policy and political institutions (Phung & Tran. 2022). Based on Decree 16/2017/ND-CP and the Law on the State Bank of Vietnam 2010. it shows that the State Bank of Vietnam develops a monetary policy. then submits it to the Government and has its targets approved by the National Assembly. The Prime

Minister has the right to decide on the use of monetary policy tools. Therefore. although the State Bank performs the function of a central bank. taking on the role of state management of currency. credit. and banking. it is at the same time greatly influenced by political goals and socio-economic development requirements set by the Government. Therefore. Vietnam's monetary policy rules could be different from those of developed countries.

3.2 Exports and foreign investment are not affected by domestic monetary policy

Since 1986. Vietnam has strived to transform her economy from a planned mechanism to a market mechanism. implementing economic opening and international integration. The Law on Foreign Investment in Vietnam was approved by the National Assembly on December 29. 1987. becoming a foundational legal document that marked a crucial turning point for attracting FDI into the country. FDI has become an important source of capital and a driving force for growth in production. export and technology. A large number of free trade agreements since WTO entry in 2007 has further attracted FDI and transformed the country into an export-processing base for many multinational companies. Vietnam has actively participated in the international integration process through engagement with ASEAN. China. Korea. Japan. and others. Furthermore. Vietnam has become actively involved with major international institutions. such as: The World Trade Organization (WTO). The Vietnam-EU Free Trade Agreement (EVFTA). as well as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP). the last of which has been especially helpful in increasing opportunities to participate in the global production network. Free trade agreements have had great impacts and created great conditions for coordination and linkage activities between localities and economic sectors in the whole country. and facilitated economic exchange and international integration. This reality. along with many domestic research projects. clearly demonstrates that exports and foreign direct investment are two important pillars of Vietnam's economic growth (Pham & Le. 2014; Phan & Nguyen. 2017; Le. 2021).

With this very open economy. according to the report of the General Statistics Office in 2024: Vietnam's total import-export turnover is 786.9 billion USD. equivalent to 165.21% of GDP. of which 72% of export turnover is provided by the FDI sector; FDI

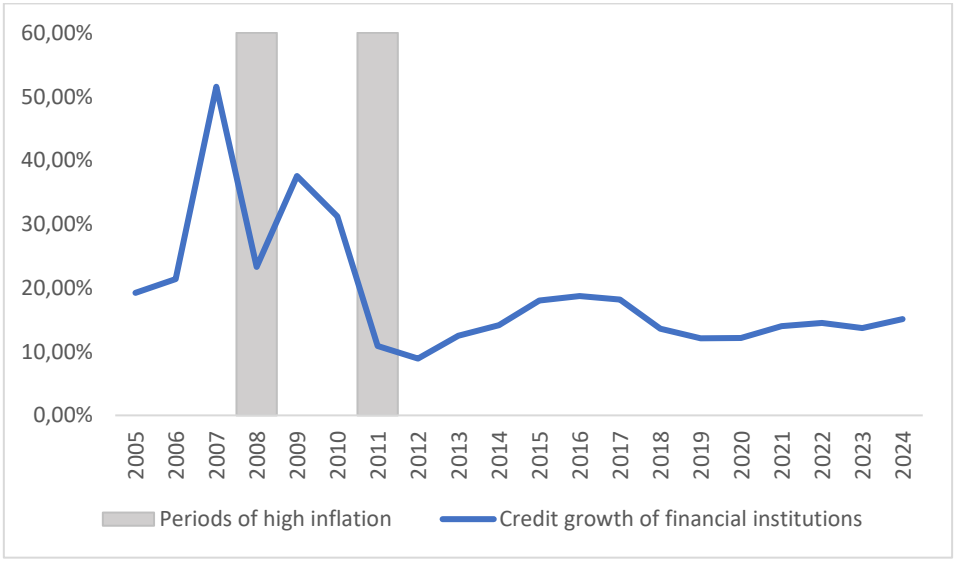
capital accounts for about 22 - 24% of total capital investment. not including indirect capital flows. Determinants of FDI in developing Asia includes political stability. weak currency. trade openness. infrastructure capability. inflation and macroeconomic factors (Esclanda-Lo et al. 2024). FDI often mobilizes capital from investing countries. Vietnam's monetary policy does not have a first order effect on FDI nor their exports.

3.3 Central bank's tools during high inflation periods include credit growth limit

Credit growth is an important transmission channel to promote GDP growth. Based on the economic growth target set by the National Assembly. the State Bank sets an annual credit growth target to inject capital into the economy. encourage investment in production. business. and consumption. Research by Bhattacharya (2014) has shown that the credit channel is one of the main transmission channels of monetary policy in Vietnam. emphasizing the role of credit provision in influencing economic activities. During periods of high inflation. in addition to interest rate tool. the State Bank could reduce credit growth rate. This policy was evident in 2008 and 2011. the two years with record high levels of inflation (Figure 2). The credit growth rates in these years were reduced to less than half compared to preceding years (Figure 1).

Figure 1

Credit growth rate of financial institutions in Vietnam



Souce: General statistics office

Through practical analysis of Vietnam's economic situation from the post-renovation period to 2024. it can be concluded that the State Bank's policy interest rate could behave differently than ones from developed countries due to three factors: i. Vietnam’s aggregate demand is not as strongly affected by interest rate. as FDI and exports. which account for a substantial part of aggregate demand. are not affected by domestic interest rate; ii. The State Bank’s has more tools than policy interest rate. which includes credit growth limits; iii. The lack of independence of the central bank is commonly known as associated with high long-term inflation. However. controlling inflation is also seen as the central Government’s duty. Fiscal policy could coordinate with monetary policy during periods of high inflation.

4 QUANTIFYING THE RESPONSE OF INTEREST RATE TO INFLATION AND GROWTH

Data for regression models are collected from the first quarter of 2005 to the third quarter of 2023. To increase the number of observations. the author collects data on a quarterly basis. There are a total of 75 observations. of which 74 are used for the regression models. To quantify the response of interest rate to inflation and growth. the author uses OLS regression models. with the explanatory variables referred to by Mohanty and Klau (2005) and other studies:

$$i_t = \alpha + \beta_1 i_{t-1} + \beta_2 \pi_t + \beta_3 (y_t - y_t^*) + \varepsilon_t \quad (2)$$

$$i_t = \alpha + \beta_1 i_{t-1} + \beta_2 \pi_t + \beta_3 \pi_t^2 + \beta_4 (y_t - y_t^*) + \varepsilon_t \quad (3)$$

$$i_t = \alpha + \beta_1 i_{t-1} + \beta_2 \pi_t^c + \beta_4 (y_t - y_t^*) + \varepsilon_t \quad (4)$$

$$i_t = \alpha + \beta_1 i_{t-1} + \beta_2 \pi_t + \beta_3 dummy\_\pi_t + \beta_4 (y_t - y_t^*) + \varepsilon_t \quad (5)$$

in these equations:

i_t is the discount rate of the State Bank of Vietnam. Data collected from the website: https://www.ceicdata.com/en/indicator/vietnam/policy-rate;

i_{t-1} is the discount rate of the previous quarter. This variable represents the interest rate smoothing of the central bank. Evidence of interest rate smoothing has been found in both developed (Clarida. et al.. 2000; Orphanides. 2001; Orphanides & Williams. 2003) and developing countries (Mohanty & Klau. 2005);

π_t is quarterly inflation (Figure 2). This inflation rate is calculated as the percentage change of the CPI price index. collected from the website: https://www.ceicdata.com/en/indicator/vietnam/consumer-price-index-cpi-growth;

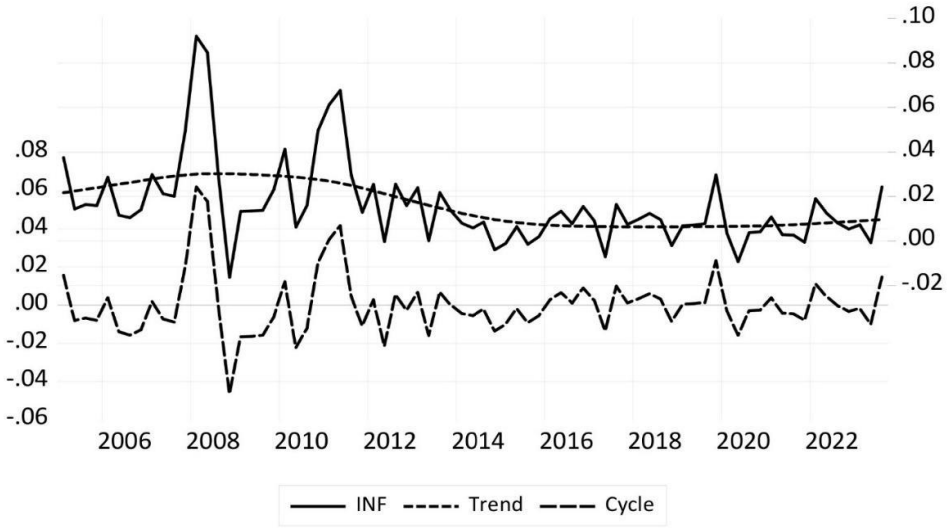
π_t^c is the cyclical component of π_t after being filtered by HP-Filter (Figure 2). Unlike central banks of developed countries. which usually pursue an explicitly announced inflation target. such as 2% for the FED. many central banks of developing countries. including Vietnam. do not announce a long-term inflation target. Therefore. like Mohanty and Klau (2005). we use absolute inflation data for regression models 1 and 2. For regression model 3. we use the cyclical component of inflation as $\pi_t^c = \pi_t - \pi_t^T$ (π_t^T is the trend component of π_t). For model 4. we add the variable $dummy\_\pi_t$ to look for evidence of an asymmetric response by the State Bank of Vietnam when inflation is above or below the trend (π_t^T). This variable takes the value 1 if inflation is above the long-term trend ($\pi_t^c > \pi_t^T$). and 0 otherwise;

$(y_t - y_t^*)$ is the output gap. equal to the difference between real GDP and potential GDP (in log form). Real GDP data are calculated from nominal GDP (Vietstock.com) and CPI for each quarter. In order to increase the number of observations. the author collects data on a quarterly basis. Real GDP data are deseasonalized. using the X-13 tool in Eviews (Figure 3). Next. the HP-Filter is applied to separate real GDP from potential real GDP. $(y_t - y_t^*)$ is the log difference between real GDP and potential real GDP (Figure 4).

Information about the dataset. including the correlation matrix and descriptive statistics. is reported in Tables 1 and 2.

Figure 2

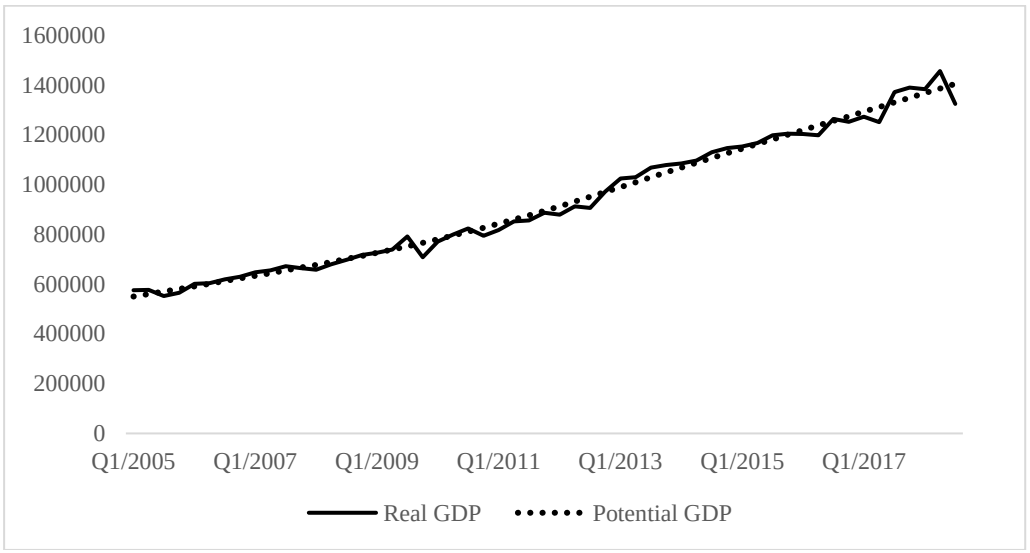
Inflation. trend. and cyclical components of inflation



Source: Author's calculation from Vietstock.com and ceicdata.com data

Figure 3

(Deseasonalized) Real GDP and Potential GDP



Source: Author's calculation from Vietstock.com and ceicdata.com data

Figure 4

Output Gap (Log deviation from trend. $y_t - y_t^*$)

Source: Author's calculation from Vietstock.com and ceicdata.com data

Table 1

Correlation Matrix

	i_t	i_{t-1}	π_t	π_t^2	π_t^c	$dummy\_\pi_t$	$y_t - y_t^*$
i_t	1.00	0.89	0.48	0.45	0.25	0.14	-0.08
i_{t-1}	0.89	1.00	0.20	0.18	-0.05	0.04	-0.10
π_t	0.48	0.20	1.00	0.91	0.86	0.51	0.02
π_t^2	0.45	0.18	0.91	1.00	0.81	0.36	-0.05
π_t^c	0.25	-0.05	0.86	0.81	1.00	0.67	0.02
$dummy\_\pi_t$	0.14	0.04	0.51	0.36	0.67	1.00	0.10
$y_t - y_t^*$	-0.08	-0.10	0.02	-0.05	0.02	0.10	1.00

Source: Eviews output

Table 2

Descriptive statistics

	i_t	i_{t-1}	π_t	π_t^2	π_t^c	$dummy\_\pi_t$	$y_t - y_t^*$
Mean	0.07	0.07	0.02	0.00	0.00	0.45	-343.95
Median	0.07	0.07	0.01	0.00	0.00	0.00	2435.03
Maximum	0.15	0.15	0.09	0.01	0.06	1.00	298257.80
Minimum	0.04	0.04	-0.02	0.00	-0.05	0.00	-290363.30
Std. Dev.	0.03	0.03	0.02	0.00	0.02	0.50	76943.62
Skewness	1.53	1.53	1.99	3.95	1.34	0.22	-0.34
Kurtosis	5.03	5.03	7.84	19.10	7.33	1.05	9.12
Jarque-Bera	41.80	41.80	120.94	991.42	79.89	12.34	116.76

Probability	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Sum	5.31	5.31	1.17	0.04	-0.02	33.00	-25452.41
Sum Sq. Dev.	0.05	0.05	0.03	0.00	0.02	18.28	432000000000.00
Observations	74.00	74.00	74.00	74.00	74.00	74.00	74.00

Source: Eviews output

5 RESULTS AND DISCUSSION

Regression results are reported in Table 4. In all four regression models. the coefficient of i_{t-1} is quite large and statistically significant. This suggests that the State Bank of Vietnam. like many central banks in developed and developing countries. tends to smooth interest rate. Mohanty and Klau (2005) found evidence of interest rate smoothing in 13 developing countries. In their study. the coefficient of i_{t-1} was lowest in South American countries such as Chile (0.32) or Mexico (0.50) and highest in Asian countries and economies. such as Taiwan (0.83) or India (0.70). Clarida. et. al. (2000). Orphanides (2001). and Orphanides and Williams (2003) found evidence of interest rate smoothing in the United States. with the coefficient of i_{t-1} ranging from 0.66 to 0.79. Vietnam's financial system is heavily dependent on bank credit (Dao. et. al. 2023). In addition. businesses have a very high debt leverage ratio and limited tools to hedge interest and exchange rate risks. Abrupt interest rate changes can cause serious shocks to business operations. leading to mass bankruptcies and financial system instability. Monetary policy smoothing interest rate helps reduce the negative impact of tight monetary policy on businesses and the economy.

In all four models. interest rate responds to inflation. The coefficients associated with π_t in models 1. 2. and 4. and the coefficients associated with π_t^c in model 3 are all statistically significant. With coefficients associated with inflation ranging from 0.395478 to 0.510848. this result is within the estimates of previous studies for the Asian region. Mohanty and Klau (2005) measured coefficients ranging from 0.13 (India) to 0.66 (Korea). Like other countries in the region. Vietnam's monetary policy responds to inflation. The long-term relationship between interest rate and inflation. which is equal to $\beta_2/(1-\beta_1)$ in our models. theoretically must be greater than one. The estimated results in all four models are consistent with the theory.

There is no evidence that interest rate responds strongly during periods of high inflation. The coefficient of π_t^2 is not statistically significant (model 2). The coefficient of $dummy\_\pi_t$ is small and not statistically significant (model 4). Mohanty and Klau (2005) did not find a non-linear response of interest rates to inflation in the 13 developing countries in their study. In their study. the evidence for the asymmetric response of interest rates to inflation was weak. and the results varied widely across countries. For India. the Philippines. or South Africa. the coefficients of $dummy\_\pi_t$ were close to zero. For Korea or the Czech Republic. these coefficients were highly statistically significant. In addition to the interest rate tool. the State Bank of Vietnam also has other tools to implement monetary policy. such as credit growth limit tools and regulations on priority sectors for credit granting. Furthermore. during periods of high inflation. contractionary fiscal policy is often implemented. which helps quickly bring down inflation. The highest inflation periods were in the first and second quarters of 2008. and from the fourth quarter of 2010 to the second quarter of 2011 (Figure 2). During these periods. the Vietnamese Government issued resolutions to quickly cut down government expenditure and investment of state-owned enterprises (table 3). which helped greatly reduce aggregate demand. With these additional measures. it is not necessary for interest rate to react strongly to periods of high inflation.

Table 3

Government policies during periods of high inflation

Periods of high inflation	Documents issued	Policies undertaken
1st quarter– 2nd quarter 2008	• Resolution No. 10/2008/NQ-CP; • Resolution No. 20/2008/NQ-CP.	• Reduce and increase efficiency of public expenditure; • Strengthen supervision of state-owned enterprises investment; • Replace public-investment projects by BOT (build – operate – transfer) projects. which use private sector finance; • Increase import tariff on luxury goods. including cars and car parts.
4th quarter 2010 – 2nd quarter 2011	• Resolution No. 11/2011/NQ-CP.	• Reduce expenditure of all government branches at central and provincial levels by 10%; • Reduce fiscal deficits to no more than 5% of GDP; • Suspension of advance payments in all public projects; • Suspension of imbursement of government money on projects of low priority; • Suspension of ground-breaking of all new public projects; • State-owned enterprises must reduce investments and focus on core-businesses only.

Source: Author's compilation from government documents

There is no evidence that interest rate responds to the output gap in all four models. The coefficients associated with the output gap are very small and not statistically significant. For developed economies. the output gap has a significant impact on monetary policy. For developing economies. the empirical evidence varies across countries. Mohanty and Klau (2005) found evidence that interest rates responded to the output gap in 7 of the 13 countries studied. For the remaining countries. the coefficients associated with the output gap were not statistically significant. The coefficients associated with the output gap were also smaller in Asian countries than in European or Latin American countries. Interest rates affect the economy by changing aggregate demand. However. for Vietnam. two very important components of aggregate demand. exports and foreign direct investment. are not affected by domestic interest rate. Foreign investment accounted for 23.6% of the total investment of the economy in the period from 2006-2018 (MPI. 2019). This sector often mobilizes capital from parent enterprises or banks of investing countries. with more attractive interest rates. In 2023. Vietnam's total import-export turnover was equal to 147% of GDP. The contribution of FDI to the total export turnover of the country is increasing (57.2% in 2007 and 71.7% in 2018. 73.1% in 2023). In 2023 alone. the FDI sector's trade surplus was 50.1 billion USD. offsetting the 21.8 billion USD trade deficit of the domestic sector. bringing the national trade surplus up to 28.3 billion USD. Thus. it can be seen that the foreign economic sector accounts for a very large proportion of the economy but is less affected by domestic interest rate.

Table 4

Regression Results

	Model 1	Model 2	Model 3	Model 4
i_{t-1}	0.889123 (Prob. = 0.0000)	0.894868 (Prob. = 0.0000)	0.989432 (Prob. = 0.0000)	0.895838 (Prob. = 0.0000)
π_t	0.462694 (Prob. = 0.0000)	0.395478 (Prob. = 0.0052)		0.499647 (Prob. = 0.0000)
π_t^2		0.982112 (Prob. = 0.5874)		
π_t^c			0.510848 (Prob. = 0.0000)	
$dummy\_\pi_t$				

				-0.002599 (Prob. = 0.3070)
$y_t - y_t^*$	5.13E-10 (Prob. = 0.9719)	1.93E-09 (Prob. = 0.8966)	3.28E-09 (Prob. = 0.8291)	2.22E-09 (Prob. = 0.8794)
R^2	0.880601	0.881106	0.869764	0.882381

Source: Eviews output

6 CONCLUSION

The research results show that the coefficient associated with inflation is statistically significant in all four models. consistent with theory and within the estimation range of previous studies for developing economies in the Asia-Pacific region. Vietnam's monetary policy tends to smooth interest rate and does not respond to output gaps. This is consistent with the structure of Vietnam's economy. As a developing country with a vulnerable financial system. sudden and high interest rate hikes can cause shocks to the financial system. The economy's aggregate demand depends largely on the foreign economic sector led by FDI enterprises. which is not significantly affected by the State Bank's policy interest rate. In addition. no evidence of non-linear or asymmetric response of interest rate to inflation is found. Other than the interest rate tool. the Central Bank also has other tools. such as credit growth limits. Contractionary fiscal policy helps bring inflation down quickly during high-inflation periods. Therefore. non-linear or asymmetric response of interest rate to inflation is unnecessary.

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APPENDIX

DEPENDANT VARIABLE I: i_t

LAGGED_I**:** i_{t-1};

INF: π_t;

INF_SQUARED: π_t^2;

INF_CYCLE: π_t^c

INF_DUMMY: $dummy\_\pi_t$;

LNDRY: $(y_t - y_t^*)$

Model 1

Eviews output

Dependent Variable: I
Method: Least Squares
Date: 09/02/25 Time: 17:06
Sample (adjusted): 2005Q2 2023Q3
Included observations: 74 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAGGED_I	0.889123	0.019116	46.51123	0.0000
INF	0.462694	0.059543	7.770820	0.0000
LNDRY	5.13E-10	1.45E-08	0.035341	0.9719

R-squared	0.880601	Mean dependent var	0.071757
Adjusted R-squared	0.877238	S.D. dependent var	0.027166
S.E. of regression	0.009518	Akaike info criterion	-6.431546
Sum squared resid	0.006432	Schwarz criterion	-6.338138
Log likelihood	240.9672	Hannan-Quinn criter.	-6.394284
Durbin-Watson stat	1.866016		

Model 2

Eviews output

Dependent Variable: I
Method: Least Squares
Date: 09/02/25 Time: 17:09
Sample (adjusted): 2005Q2 2023Q3
Included observations: 74 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAGGED_I	0.894868	0.021913	40.83760	0.0000
INF	0.395478	0.137056	2.885517	0.0052
INF_SQUARED	0.982112	1.801594	0.545135	0.5874
LNDRY	1.93E-09	1.48E-08	0.130460	0.8966

R-squared	0.881106	Mean dependent var	0.071757
Adjusted R-squared	0.876011	S.D. dependent var	0.027166
S.E. of regression	0.009566	Akaike info criterion	-6.408755
Sum squared resid	0.006405	Schwarz criterion	-6.284211
Log likelihood	241.1239	Hannan-Quinn criter.	-6.359073
Durbin-Watson stat	1.866720		

Model 3

Eviews output:

Dependent Variable: I
Method: Least Squares
Date: 09/02/25 Time: 17:11
Sample (adjusted): 2005Q2 2023Q3
Included observations: 74 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAGGED_I	0.989432	0.015091	65.56278	0.0000
INF_CYCLE	0.510848	0.072643	7.032260	0.0000
LNDRY	3.28E-09	1.51E-08	0.216649	0.8291

R-squared	0.869764	Mean dependent var	0.071757
Adjusted R-squared	0.866095	S.D. dependent var	0.027166
S.E. of regression	0.009941	Akaike info criterion	-6.344666
Sum squared resid	0.007016	Schwarz criterion	-6.251258
Log likelihood	237.7526	Hannan-Quinn criter.	-6.307404
Durbin-Watson stat	1.877980		

Model 4

Eviews output:

Dependent Variable: I
Method: Least Squares
Date: 09/02/25 Time: 17:13
Sample (adjusted): 2005Q2 2023Q3
Included observations: 74 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LAGGED_I	0.895838	0.020192	44.36642	0.0000
INF	0.499647	0.069510	7.188143	0.0000
INF_DUMMY	-0.002599	0.002526	-1.029139	0.3070
LNDRY	2.22E-09	1.46E-08	0.152244	0.8794

R-squared	0.882381	Mean dependent var	0.071757
Adjusted R-squared	0.877340	S.D. dependent var	0.027166
S.E. of regression	0.009514	Akaike info criterion	-6.419536
Sum squared resid	0.006336	Schwarz criterion	-6.294992
Log likelihood	241.5228	Hannan-Quinn criter.	-6.369853
Durbin-Watson stat	1.795895		

Authors' Contribution

All authors contributed equally to the development of this article.

Data availability

All datasets relevant to this study's findings are fully available within the article.

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