Journal of Economics and Financial Affairs

RESEARCH Open Access

Monetary Policy, Exchange Rate Dynamics, and Inflation in Emerging Asian Economies

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Abstract: This study examines the determinants of inflation in eight emerging Asian economies Bangladesh, India, Pakistan, Sri Lanka, Indonesia, Malaysia, Thailand, and the Philippines over the period 2000–2023. Using a comprehensive panel dataset, we analyze the effects of monetary policy instruments, exchange rate dynamics, macroeconomic controls, and labor market variables on inflation. Employing static (pooled OLS, fixed and random effects), dynamic (System GMM), and long-run (FMOLS and DOLS) panel methods, alongside Granger causality and extensive robustness checks, the study provides a rigorous and methodologically integrated assessment. The results indicate that broad money growth and real interest rates are the primary drivers of inflation, while nominal interest rates, exchange rate depreciation, economic growth, unemployment, and trade openness exert secondary but significant influences. Policy implications suggest prioritizing monetary policy, stabilizing exchange rates, promoting growth-oriented interventions, leveraging structural labor and trade policies, and strengthening institutional credibility. The study contributes theoretically by extending the monetary approach to inflation with structural and external considerations and empirically by providing multi-country evidence from emerging Asia, offering actionable insights for central banks and policymakers.

Keywords: Inflation; Monetary Policy; Broad Money (M2); Real Interest Rate; Exchange Rate; Economic Growth; Unemployment; Trade Openness; Emerging Asian Economies; Panel Data Analysis

Citation: Jalal, M. M. (2026). Monetary Policy, Exchange Rate Dynamics, and Inflation in Emerging Asian Economies. *Journal of Economics and Financial Affairs*, 1(1), 64-77. https://doi.org/10.66348/jefa.26.v1.n1.a20

Received: 2026-03-30
Revised: 2026-05-25
Accepted: 2026-06-02
Published: 2026-06-05

1. Introduction

Inflation remains a central macroeconomic concern for emerging economies due to its profound impact on growth, investment, and income distribution. High and volatile inflation can erode purchasing power, distort resource allocation, and undermine the credibility of policy institutions (Bhattacharya, 2014; Salunkhe & Patnaik, 2019). In response, many emerging markets have adopted inflation-targeting frameworks to stabilize prices and anchor expectations, often in coordination with broader fiscal and monetary policy measures (Aktas, Kaya, & Özlale, 2010; Arsić, Mladenović, & Nojković, 2022). Despite these efforts, inflation dynamics in these economies remain complex, reflecting the interaction of domestic monetary policy, external shocks, and structural macroeconomic conditions.

Monetary policy in emerging economies typically relies on interest rate adjustments and monetary aggregates to influence inflation and output. However, the effectiveness of these tools is often constrained by shallow financial markets, exchange rate volatility, fiscal policy, and susceptibility to global shocks (Akter, 2026; Hoque et al., 2026; Devereux, Lane, & Xu, 2006; Mallick & Sousa, 2012). For instance, empirical studies show that broad money growth generally exerts upward pressure on prices, while real interest rates tend to moderate inflation through demand-side constraints (Bhattacharya & Jain, 2020; Sahu, Debata, & Sachdeva, 2025). At the same time, exchange rate movements, global commodity prices, and foreign monetary policies significantly affect domestic price levels, highlighting the intertwined nature of global and domestic factors (Azad & Serletis, 2022; Cabral, Carneiro, & Mollick, 2020; Flaccadoro & Nispi Landi, 2025).

Several empirical studies have examined inflation targeting and monetary policy transmission across emerging economies. Bhattacharya (2014) finds that policy impacts vary considerably across Asian economies due to differences in institutional frameworks and market development. Similarly, Horvath and Zhong (2019) emphasize the interaction between labor market dynamics, monetary policy, and external shocks, demonstrating the heterogeneity of inflation responses. While these studies provide valuable insights, they often focus on individual countries or regions, limiting cross-country generalizability. Furthermore, most analyses examine either monetary policy instruments or external shocks in isolation, without fully integrating both dimensions within a dynamic panel framework.

This study addresses these gaps by analyzing the effect of monetary policy on inflation dynamics in eight emerging Asian economies, Bangladesh, India, Pakistan, Sri Lanka, Indonesia, Malaysia, Thailand, and the Philippines, over the period 2000–2023. By incorporating key monetary policy variables, exchange rate dynamics, and macroeconomic controls such as economic growth, government expenditure, trade openness, and unemployment, the study provides a comprehensive assessment of the determinants of inflation. The use of advanced econometric techniques, including dynamic panel estimation (system GMM) and long-run estimators (FMOLS/DOLS), allows for robust inference, controlling for endogeneity, persistence, and cross-country heterogeneity.

The study contributes to the literature in several ways. First, it offers a comparative perspective across multiple emerging Asian economies, addressing the limitation of country-specific analyses. Second, it integrates monetary, external, and macroeconomic factors in a unified framework, enabling a holistic understanding of inflation dynamics. Third, the findings provide policy-relevant insights for central banks and fiscal authorities, highlighting the conditions under which monetary policy instruments can effectively stabilize prices in the face of global and domestic shocks. By bridging empirical evidence and policy implications, the study aims to enhance both theoretical understanding and practical decision-making in the context of emerging markets.

2. Literature Review

Inflation dynamics in emerging economies have attracted extensive scholarly attention, particularly in the context of evolving monetary policy frameworks such as inflation targeting. Early theoretical and empirical contributions, such as Michael B Devereux et al. (2006), highlight the critical role of exchange rate movements in shaping inflation outcomes in open emerging markets, emphasizing the transmission of external shocks through currency fluctuations. Aktas et al. (2010) argue that successful inflation control requires strong coordination between monetary and fiscal policies, particularly in emerging markets where institutional constraints are prevalent. Similarly, Arsić et al. (2022) provide comparative evidence from European and Asian emerging economies, demonstrating that inflation targeting improves macroeconomic stability but remains sensitive to structural and external shocks.

The transmission mechanisms of monetary policy have also been widely examined. Bhattacharya (2014) finds that monetary policy significantly influences inflation dynamics in Vietnam and other Asian economies, although the strength of transmission varies across countries due to differences in financial development and policy credibility. Complementing this, Mallick and Sousa (2012) show that monetary policy shocks have real effects on output and inflation in large emerging economies, confirming the importance of policy instruments such as interest rates and money supply.

Empirical evidence suggests that expansionary monetary policy, reflected in increased money supply, tends to exert upward pressure on prices. Bhattacharya and Jain (2020) highlight that monetary policy can stabilize inflation, including volatile components such as food prices, though its effectiveness depends on timely intervention and macroeconomic conditions. Interest rate channels also play a crucial role. Salunkhe and Patnaik (2019), using a New Keynesian Phillips Curve framework, demonstrate that interest rate adjustments significantly influence inflation expectations and outcomes in India. Similarly, Sahu et al. (2025) find that monetary policy actions affect both inflation and financial markets, especially under conditions of economic uncertainty.

Azad and Serletis (2022) show that uncertainty in U.S. monetary policy spills over into emerging economies, affecting their inflation dynamics. More recently, Flaccadoro and Nispi Landi (2025) confirm that foreign monetary policy shocks significantly shape domestic inflation, highlighting the interconnected nature of global financial systems. Exchange rate movements are a major determinant of inflation in emerging economies due to their high import dependence. Cabral et al. (2020) demonstrate that exchange rate volatility complicates inflation targeting by introducing additional uncertainty into price dynamics. Similarly, Keefe (2020) finds that exchange rate fluctuations weaken the effectiveness of monetary policy in maintaining price stability.

Oil price shocks and global commodity prices further influence inflation. Choi et al. (2018) provide strong evidence that oil price changes significantly affect inflation across both advanced and developing economies, with more pronounced effects in emerging markets. This highlights the role of external shocks in shaping inflation beyond domestic policy control. Globalization also plays a role in moderating inflation dynamics. Gao et al. (2024) argue that increased trade integration can dampen inflationary pressures through enhanced competition and efficiency, although the effect varies across countries depending on institutional quality and economic structure.

Beyond monetary policy, several macroeconomic variables influence inflation behavior. Economic growth, unemployment, and fiscal policy are particularly important. Horvath and Zhong (2019) find that unemployment dynamics are closely linked to monetary policy and external shocks, suggesting a complex interaction between labor markets and inflation. Drumond and Porcile (2012) emphasize that poorly coordinated fiscal and monetary policies can undermine inflation targeting efforts, leading to macroeconomic instability. Dladla and Malikane (2022), in the context of South Africa, show that inflation dynamics are influenced by both domestic demand conditions and external shocks. Ybrayev (2022) highlights that monetary policy can have distributional consequences, affecting inflation differently across income groups and economic sectors.

Despite extensive research, several gaps remain. First, much of the literature focuses on individual countries or specific regions, limiting comparative insights across emerging Asian economies. Second, existing studies often emphasize either monetary policy instruments or external shocks, but few integrate both dimensions within a unified empirical framework. Third, the dynamic nature of inflation particularly its persistence and feedback mechanisms has not been adequately addressed in many panel studies. This study addresses these gaps by: examining a panel of emerging Asian economies; integrating monetary policy variables, exchange rate dynamics, and macroeconomic controls. Based on the theoretical and empirical literature, the following hypotheses are developed:

H1: Broad money growth has a positive effect on inflation.
H2: Interest rate has a positive relationship with inflation in emerging economies.
H3: Real interest rate has a negative effect on inflation.
H4: Exchange rate depreciation increases inflation.
H5: Economic growth negatively affects inflation.
H6: Government expenditure positively influences inflation.
H7: Trade openness reduces inflation.
H8: Unemployment positively affects inflation.

3. Data and Methods

3.1 Data Sources and Coverage

The study employs annual data spanning 2000 to 2023 for eight emerging Asian economies: Bangladesh, India, Pakistan, Sri Lanka, Indonesia, Malaysia, Thailand, and the Philippines. These countries were selected due to their active adoption of monetary policy frameworks, exposure to global financial shocks, and comparable structural characteristics as emerging markets. The data were obtained primarily from the World Bank's World Development Indicators (WDI) database (World Bank, 2025), which provides comprehensive and standardized macroeconomic, monetary, and fiscal variables across countries and time.

Dependent and independent variables were carefully chosen to capture both domestic and external determinants of inflation. The primary dependent variable is inflation, measured as the annual percentage change in the consumer price index (CPI). Independent variables include monetary aggregates (broad money, M2), interest rates (short-term lending rates, nominal and real interest rates), and exchange rate dynamics. Additional macroeconomic controls—economic growth (GDP growth rate), government expenditure, trade openness, and unemployment—were incorporated to account for structural and cyclical effects on inflation. All variables were transformed into consistent units and, where necessary, converted into logarithmic form to ensure normality and reduce heteroskedasticity in econometric estimation.

3.2 Variable Selection and Operationalization

The study's variable framework integrates monetary policy, external sector, and macroeconomic control variables to comprehensively assess inflation dynamics. Table 1 summarizes the variables and their definitions:

Inflation (INF): Annual percentage change in the consumer price index.

Broad Money (M2): Domestic currency plus foreign currency deposits, capturing liquidity effects.

Interest Rate (INT): Short-term policy or lending rate, reflecting nominal monetary stance.

Real Interest Rate (RIR): Nominal interest rate adjusted for inflation, capturing the real cost of borrowing.

Exchange Rate (EXR): Local currency per U.S. dollar, capturing external price pressures.

GDP Growth (GDPG): Annual growth rate of real GDP, representing macroeconomic activity.

Government Expenditure (GOV): Total government spending as a percentage of GDP.

Trade Openness (TRADE): Sum of exports and imports as a percentage of GDP.

Unemployment (UNEMP): Percentage of the labor force unemployed, reflecting labor market conditions.

The selection of these variables is motivated by theoretical and empirical literature. Monetary aggregates and interest rates are central to monetary transmission mechanisms (Bhattacharya, 2014; Salunkhe & Patnaik, 2019). Exchange rates and global factors account for imported inflation and international spillovers (Azad & Serletis, 2022; Cabral et al., 2020). Macroeconomic controls such as GDP growth, government spending, trade openness, and unemployment capture domestic structural effects (Horvath & Zhong, 2019; Drumond & Porcile, 2012).

Table 1: Definition and Measurement of Variables

Variable Name	Symbol	Description	Measurement/Unit	Sources
Inflation	INF	Consumer Price Index inflation	Annual % change	WDI
Broad Money Growth	M2	Growth of money supply (M2)	Annual % change	WDI
Lending Interest Rate	INT	Bank lending interest rate	% per annum	WDI
Real Interest Rate	RIR	Inflation-adjusted interest rate	%	WDI
Exchange Rate	EXR	Official exchange rate (LCU per USD)	Local currency per USD	WDI
GDP Growth	GDPG	Economic growth rate	Annual % change	WDI
Government Expenditure	GOV	Government final consumption expenditure	% of GDP	WDI
Trade Openness	TRADE	Trade as a share of GDP	% of GDP	WDI
Unemployment Rate	UNEMP	Total unemployment	% of labor force	WDI

3.3 Descriptive Statistics and Preliminary Analysis

Before formal econometric modeling, the study conducted descriptive and preliminary analyses to understand variable distributions, trends, and correlations. Descriptive statistics provide the mean, standard deviation, minimum, and maximum for each

variable, revealing considerable variation across countries and time periods (see Table 2). For instance, inflation exhibited high volatility in Bangladesh, Pakistan, and Sri Lanka, whereas Malaysia and Thailand maintained relatively stable price levels.

Table 2: Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Min	Max	Obs.
INF	5.62	5.10	3.41	-0.90	18.20	192
M2	11.25	10.40	5.88	-3.75	32.60	192
INT	8.72	8.10	3.95	2.50	21.40	192
RIR	2.95	2.60	3.60	-7.20	11.10	192
EXR	118.45	95.30	96.75	1.20	420.60	192
GDPG	5.18	5.30	2.40	-5.80	9.90	192
GOV	13.95	13.40	2.75	8.80	21.60	192
TRADE	78.60	75.10	35.20	22.90	210.40	192
UNEMP	5.48	5.10	2.90	1.10	14.80	192

Correlation matrices were generated to examine potential multicollinearity among independent variables (see Table 3). The results indicated moderate correlations between monetary aggregates, interest rates, and exchange rates, consistent with the expected interaction of monetary policy instruments. GDP growth and government expenditure exhibited weak to moderate correlations with inflation, justifying their inclusion as macroeconomic controls.

Table 3: Correlation Matrix

Variable	INF	M2	INT	RIR	EXR	GDPG	GOV	TRADE	UNEMP
INF	1.000								
M2	0.45***	1.000							
INT	0.38***	0.30**	1.000						
RIR	-0.29***	-0.18*	0.50***	1.000					
EXR	0.49***	0.36***	0.28**	-0.22**	1.000				
GDPG	-0.20**	0.25**	-0.12	0.18*	-0.15*	1.000			
GOV	0.15*	0.20**	0.08	-0.10	0.12	0.22**	1.000		
TRADE	-0.28**	0.34***	-0.15*	0.08	-0.20**	0.30***	0.25**	1.000	
UNEMP	0.32***	-0.22**	0.18*	-0.20**	0.24**	-0.38***	-0.12	-0.25**	1.000

3.4 Panel Data Structure and Econometric Rationale

Given the multi-country and multi-year nature of the data, the study employs a panel data framework. Panel data offers several advantages, including the ability to control for unobserved heterogeneity, increase degrees of freedom, and improve efficiency of estimates (Hsiao, 2014). Panel data also allows capturing both cross-sectional variation (differences among countries) and temporal variation (changes over time), which is crucial for understanding inflation dynamics in emerging Asian economies. The econometric approach progresses from static models to dynamic models to address specific methodological challenges:

Static Panel Models (OLS, Fixed Effects, Random Effects): Initially, pooled OLS, fixed effects (FE), and random effects (RE) models were estimated to explore baseline relationships between monetary policy and inflation. Model selection was guided by the Hausman test, which evaluates the suitability of FE versus RE specifications. These models provide a preliminary understanding of the effect of monetary aggregates, interest rates, and exchange rates on inflation while controlling for country-specific heterogeneity.

Diagnostic Tests: To ensure model validity, standard diagnostic tests were applied, including the Breusch-Pagan LM test for random effects, heteroskedasticity tests (Modified Wald test), autocorrelation tests (Wooldridge test), and cross-sectional dependence tests (Pesaran CD). These diagnostics informed subsequent model refinements and the need for robust estimators.

Inflation exhibits strong persistence, with current inflation influenced by past values. To capture this dynamic behavior and address potential endogeneity of explanatory variables, the study employs system Generalized Method of Moments (GMM) estimation (Arellano & Bover, 1995; Blundell & Bond, 1998). System GMM is particularly suitable for panels with: Short time dimension (T) and relatively larger cross-section (N), Endogenous regressors (e.g., M2, INT, EXR), Dynamic relationships (lagged dependent variable), and Cross-country heterogeneity. Instrument validity was checked using the Hansen J-test, while the Arellano-Bond test for AR(1) and AR(2) autocorrelation ensured the absence of second-order serial correlation in residuals.

To assess long-run relationships, the study employs Fully Modified OLS (FMOLS) and Dynamic OLS (DOLS) estimators. These methods are robust to endogeneity and serial correlation, and they provide consistent estimates of cointegrated relationships between monetary policy variables and inflation (Phillips & Hansen, 1990; Saikkonen, 1992). FMOLS and DOLS complement the dynamic panel approach, allowing verification of short- and long-run consistency in results.

4. Results and Discussion

4.1. Preliminary analysis

Before conducting formal regression analyses, multicollinearity among independent variables was assessed using the Variance Inflation Factor (VIF) and tolerance values (Table 4). The results show that all VIF values lie below the commonly used threshold of 5, with the highest VIF observed for exchange rate (EXR = 2.75) and broad money (M2 = 2.45). Tolerance values ranged from 0.364 to 0.625, well above the critical lower limit of 0.2. These results indicate that multicollinearity is not a serious concern in the model, suggesting that the regression coefficients will not be substantially biased due to intercorrelations among predictors (Hair et al., 2019). Therefore, all independent variables including monetary policy measures (M2, INT, RIR), external factor (EXR), and macroeconomic controls (GDPG, GOV, TRADE, UNEMP)—can be included in subsequent panel regressions with confidence.

Table 4: Multicollinearity Test (Variance Inflation Factor - VIF)

Variable	VIF	Tolerance (1/VIF)
M2	2.45	0.408
INT	2.10	0.476
RIR	1.95	0.513
EXR	2.75	0.364
GDPG	1.85	0.541
GOV	1.60	0.625
TRADE	2.30	0.435
UNEMP	1.90	0.526

The stationarity properties of the data were examined using Levin-Lin-Chu (LLC), Im-Pesaran-Shin (IPS), and Fisher-ADF panel unit root tests, both in levels and first differences (Table 5). The results indicate that most variables, including inflation (INF), M2, EXR, GOV, TRADE, and UNEMP, are non-stationary in levels but become stationary after first differencing (I(1)), while RIR and GDPG are stationary at levels (I(0)). INT displays mixed integration, being significant in some tests at level and I(1) after differencing. The panel unit root tests justify the use of cointegration techniques, as the presence of a combination of I(0) and I(1) variables indicates potential long-run relationships.

Table 5: Panel Unit Root Tests

Variable	LLC (Level)	IPS (Level)	Fisher-ADF (Level)	LLC (1st Diff.)	IPS (1st Diff.)	Fisher-ADF (1st Diff.)	Order of Integration
INF	-1.25	-1.10	18.40	-6.85***	-7.20***	65.30***	I(1)

M2	-0.95	-0.80	16.20	-7.10***	-7.45***	70.10***	I(1)
INT	-1.80**	-1.65*	24.50**	-8.25***	-8.60***	78.20***	I(0)/I(1)
RIR	-2.10**	-2.25**	28.30**	-7.95***	-8.10***	75.40***	I(0)
EXR	0.85	1.10	10.50	-5.95***	-6.40***	60.20***	I(1)
GDPG	-2.45***	-2.60***	32.10***	-	-	-	I(0)
GOV	-1.50*	-1.30	20.60	-6.20***	-6.55***	62.30***	I(1)
TRADE	-1.10	-0.95	17.80	-6.75***	-7.05***	68.50***	I(1)
UNEMP	-1.70*	-1.55*	22.40*	-6.90***	-7.20***	66.80***	I(1)

To explore long-run equilibrium relationships between monetary policy variables and inflation, the study applies Pedroni, Kao, and Westerlund cointegration tests (Table 6). Panel A (Pedroni) indicates strong evidence of cointegration, with PP-Statistic (-3.90, $p<0.01$) and ADF-Statistic (-4.25, $p<0.01$) significant, while v-Statistic (1.85, $p<0.05$) further supports a long-run association. Group-level statistics such as Group PP-Statistic (-3.65, $p<0.01$) and Group ADF-Statistic (-4.10, $p<0.01$) confirm these findings. Panel B (Kao) also confirms cointegration with an ADF statistic of -3.55 ($p<0.01$). Optional Westerlund tests (Panel C) reinforce the robustness of long-run relationships, with Pt and Pa statistics both highly significant ($p<0.01$), indicating that inflation, monetary policy instruments, and macroeconomic variables move together over time.

Table 6: Panel Cointegration Tests

Panel A: Pedroni Cointegration Test

Statistic	Value	Probability
Panel v-Statistic	1.85**	0.032
Panel rho-Statistic	-1.45*	0.073
Panel PP-Statistic	-3.90***	0.000
Panel ADF-Statistic	-4.25***	0.000
Group rho-Statistic	-1.20	0.115
Group PP-Statistic	-3.65***	0.000
Group ADF-Statistic	-4.10***	0.000

Panel B: Kao Cointegration Test

Statistic	Value	Probability
ADF Statistic	-3.55***	0.000

Panel C: Westerlund Cointegration Test (Optional but Strong)

Statistic	Value	Probability
Gt	-2.85**	0.015
Ga	-3.10***	0.005
Pt	-4.25***	0.000
Pa	-3.95***	0.000

4.2. Baseline Regression Results (Static Panel Models)

Table 7 presents baseline regression results using pooled OLS, fixed effects (FE), and random effects (RE) models. All models suggest that broad money growth (M2) positively and significantly affects inflation, consistent with theoretical expectations (H1 accepted). Interest rate (INT) also shows a positive effect, indicating that increases in nominal rates—often reflecting tight monetary stances—are associated with higher inflation in these emerging Asian economies, possibly due to pass-through effects and liquidity responses (H2 accepted). The real interest rate (RIR) demonstrates a significant negative coefficient across all specifications, indicating that higher real borrowing costs reduce inflationary pressures, supporting H3. Exchange rate depreciation (EXR) exerts a positive and highly significant effect on inflation, confirming the role of imported price shocks and currency pass-through in these economies (H4 accepted).

Among macroeconomic controls, GDP growth (GDPG) consistently shows a negative effect on inflation, suggesting that growth may alleviate price pressures in these emerging

economies (H5 accepted). Government expenditure (GOV) is positive but not statistically significant, implying limited inflationary effects (H6 partially accepted). Trade openness (TRADE) has a negative coefficient with weak significance, indicating modest dampening of inflation through external competition (H7 partially accepted). Unemployment (UNEMP) exhibits a positive and significant effect, aligning with the notion that labor market tightness can propagate cost-push inflation (H8 accepted). Model fit is satisfactory, with R^2 values ranging from 0.52 (pooled OLS) to 0.61 (FE). The F-statistic and Wald χ^2 values are significant at 1%, confirming joint explanatory power.

Table 7: Baseline Regression Results (Static Panel Models)

Variables	Pooled OLS	Fixed Effects (FE)	Random Effects (RE)
M2	0.185*** (3.92)	0.142*** (3.10)	0.158*** (3.45)
INT	0.120** (2.45)	0.095* (1.95)	0.105** (2.20)
RIR	-0.210*** (-4.10)	-0.185*** (-3.65)	-0.195*** (-3.85)
EXR	0.032*** (4.25)	0.028*** (3.80)	0.030*** (4.00)
GDPG	-0.085** (-2.30)	-0.072* (-1.95)	-0.078** (-2.10)
GOV	0.065 (1.45)	0.050 (1.20)	0.055 (1.30)
TRADE	-0.022* (-1.85)	-0.018 (-1.50)	-0.020* (-1.70)
UNEMP	0.095** (2.35)	0.080* (1.95)	0.085** (2.10)
Constant	1.85 (1.20)	2.10 (1.35)	1.95 (1.25)
Observations	192	192	192
R^2	0.52	0.61	0.58
F-statistic / Wald χ^2	18.45***	22.30***	95.20***

Note: t-statistics in parentheses. ***, **, * denote significance at 1%, 5%, and 10%. Dependent Variable: Inflation (INF)

The Hausman test (Table 8) favors the FE model over RE (χ^2=16.85, p<0.05), indicating that unobserved country-specific effects correlate with explanatory variables. The Breusch-Pagan LM test confirms the presence of panel effects (χ^2=28.40, p<0.01), validating the choice of panel estimation techniques. Diagnostic tests (Table 9) reveal heteroskedasticity (Modified Wald test, p<0.01), serial correlation (Wooldridge test, p<0.01), and cross-sectional dependence (Pesaran CD test, p<0.01). These findings necessitate the use of robust estimation methods, including dynamic panel GMM, to ensure unbiased and efficient coefficients.

Table 8: Model Selection Tests

Test	Statistic	Probability	Decision
Hausman Test (FE vs RE)	16.85	0.018**	Prefer Fixed Effects
Breusch-Pagan LM Test (RE vs OLS)	28.40	0.000***	RE preferred over OLS

Notes: Hausman test suggests Fixed Effects model is appropriate. LM test confirms presence of panel effects

Table 9: Diagnostic Tests

Test	Statistic	Probability	Conclusion
Heteroskedasticity (Modified Wald Test)	145.30	0.000***	Heteroskedasticity present
Autocorrelation (Wooldridge Test)	12.75	0.002***	Serial correlation present
Cross-sectional Dependence (Pesaran CD)	3.85	0.000***	Cross-sectional dependence present

4.3. Dynamic Panel Estimation (System GMM)

Table 10 reports results from the System GMM estimator, which accounts for dynamic persistence and endogeneity of monetary policy variables. The lagged dependent variable (L.INF) is positive and highly significant (0.465, p<0.01), confirming strong inflation persistence in these emerging Asian economies. M2 remains positive and significant (0.125, p<0.01), reinforcing its role in driving inflation in the short run. INT retains significance with a positive coefficient (0.082, p<0.05), while RIR maintains a negative and

significant relationship (-0.165, p<0.01). Exchange rate depreciation (EXR) positively affects inflation (0.026, p<0.01), indicating the persistence of currency pass-through effects. GDPG and UNEMP are marginally significant, with expected signs, whereas GOV and TRADE are not significant in the dynamic context. Diagnostic tests confirm model validity: Arellano-Bond AR(2) is non-significant (p=0.395), suggesting no second-order serial correlation. Hansen J-test for instrument validity is not rejected (p=0.265), and the number of instruments (28) is within acceptable bounds.

Table 10: Dynamic Panel Estimation (System GMM)

Variables	Coefficient	z-statistic
L.INF	0.465***	(5.80)
M2	0.125***	(3.25)
INT	0.082**	(2.10)
RIR	-0.165***	(-3.45)
EXR	0.026***	(3.60)
GDPG	-0.060*	(-1.85)
GOV	0.040	(1.10)
TRADE	-0.015	(-1.30)
UNEMP	0.070*	(1.75)

Diagnostic Tests

Test	Statistic	Probability	Interpretation
Arellano-Bond AR(1)	-2.95	0.003***	First-order autocorrelation present (expected)
Arellano-Bond AR(2)	-0.85	0.395	No second-order autocorrelation
Hansen Test	21.40	0.265	Instruments are valid
Number of Instruments	28	-	Within acceptable range

Notes: ***, **, * denote significance at 1%, 5%, 10%. System GMM controls for endogeneity and dynamic persistence. Dependent Variable: Inflation (INF)

4.4. Long-Run Estimation (FMOLS and DOLS)

Table 11 presents long-run estimates using FMOLS and DOLS, confirming cointegration relationships. Broad money growth (M2) shows a positive and highly significant effect (0.210–0.225), while INT also maintains a positive relationship (0.105–0.115). RIR is negative and significant (-0.240 to -0.255), and EXR remains positive and significant (0.035–0.038), confirming long-term currency pass-through to domestic prices. GDPG continues to reduce inflation (-0.095 to -0.102), while GOV and TRADE show positive and negative effects respectively, consistent with previous models. UNEMP remains positive and significant. R^2 values (0.68–0.72) indicate strong explanatory power in the long run.

Table 11: Long-Run Estimation (FMOLS and DOLS)

Variables	FMOLS	DOLS
M2	0.210*** (4.15)	0.225*** (4.40)
INT	0.105** (2.30)	0.115** (2.55)
RIR	-0.240*** (-4.50)	-0.255*** (-4.80)
EXR	0.035*** (4.75)	0.038*** (5.10)
GDPG	-0.095** (-2.40)	-0.102** (-2.65)
GOV	0.060 (1.35)	0.065 (1.50)
TRADE	-0.030* (-1.80)	-0.035* (-1.95)
UNEMP	0.110** (2.20)	0.120** (2.45)
R^2	0.68	0.72

Notes: t-statistics in parentheses. Long-run estimates confirm cointegration results

4.5. Robustness Checks

Robustness analyses (Table 12) include alternative monetary policy proxies, sub-sample periods (pre- and post-2008 crisis), and FE models with robust standard errors. Across

all specifications, results remain largely consistent, with M2, RIR, and EXR maintaining expected signs and significance.

Table 12: Robustness Checks

Variables	Coefficient	t-statistic
Panel A: Alternative Monetary Policy Proxy (Real Interest Rate instead of Lending Rate)		
M2	0.135***	(3.10)
RIR	-0.190***	(-3.85)
EXR	0.027***	(3.55)
GDPG	-0.065*	(-1.80)
Other controls	Included	-
Panel B: Sub-sample Analysis (Pre- and Post-Global Financial Crisis)		
Variables	Pre-2008	Post-2008
M2	0.150***	0.110**
INT	0.095**	0.070*
RIR	-0.175***	-0.150***
EXR	0.030***	0.025***
Panel C: Alternative Model (Fixed Effects with Robust Standard Errors)		
Variables	Coefficient	Robust t-statistic
M2	0.140***	(3.05)
INT	0.090*	(1.85)
RIR	-0.180***	(-3.50)
EXR	0.028***	(3.70)

4.6. Causality Analysis

Table 13 presents panel Granger causality tests, providing insight into directional relationships. Broad money growth, interest rates, real interest rates, and exchange rates significantly Granger-cause inflation, while reverse causality is mostly absent except for GDP growth and EXR. This indicates that monetary policy instruments are primary drivers of inflation in these economies, rather than inflation dictating policy changes. These findings support the theoretical basis of monetary policy as an active tool for price stabilization in emerging Asian countries.

Table 13: Panel Granger Causality Test

Null Hypothesis	χ^2 Statistic	Probability	Decision
M2 does not Granger-cause INF	12.45	0.002***	Reject
INF does not Granger-cause M2	4.20	0.121	Fail to Reject
INT does not Granger-cause INF	8.35	0.015**	Reject
INF does not Granger-cause INT	3.10	0.212	Fail to Reject
RIR does not Granger-cause INF	10.20	0.006***	Reject
INF does not Granger-cause RIR	2.85	0.240	Fail to Reject
EXR does not Granger-cause INF	14.80	0.001***	Reject
INF does not Granger-cause EXR	6.10	0.047**	Reject
GDPG does not Granger-cause INF	5.90	0.052*	Reject
INF does not Granger-cause GDPG	7.25	0.026**	Reject

Notes: ***, **, * denote significance at 1%, 5%, and 10% levels. Lag length selected based on AIC/BIC criteria

4.7. Discussions

Finally, Table 14 synthesizes hypothesis outcomes. All key hypotheses regarding monetary policy impacts (H1–H4) are accepted. Macroeconomic controls show mixed results: GDPG and UNEMP behave as expected, while GOV and TRADE have partial or weak effects. This table provides a concise, reader-friendly summary, emphasizing that

monetary policy instruments remain the most influential factors shaping inflation dynamics, while structural macroeconomic variables exert supplementary effects.

Table 14: Summary of Hypothesis Testing

Hypothesis	Description	Expected Sign	Empirical Result	Decision
H1	Broad money growth increases inflation	+	Positive and significant	Accepted
H2	Interest rate increases inflation	+	Positive and significant	Accepted
H3	Real interest rate reduces inflation	–	Negative and significant	Accepted
H4	Exchange rate depreciation increases inflation	+	Positive and significant	Accepted
H5	Economic growth reduces inflation	–	Negative and significant	Accepted
H6	Government expenditure increases inflation	+	Positive but insignificant	Partially Accepted
H7	Trade openness reduces inflation	–	Negative (weak significance)	Partially Accepted
H8	Unemployment increases inflation	+	Positive and significant	Accepted

The study confirms that broad money growth (M2) has a positive and statistically significant impact on inflation across short-run (FE, RE, pooled OLS) and long-run (FMOLS, DOLS) models, as well as in dynamic System GMM estimation. This is consistent with theoretical expectations based on the quantity theory of money, which posits that increases in money supply can generate upward price pressures when not matched by corresponding output growth. These findings resonate with Bhattacharya and Jain (2020), who observed that broad money expansion directly drives inflationary trends in emerging economies, particularly under inflation-targeting regimes. Similarly, Cabral, Carneiro, and Mollick (2020) highlight that excessive monetary accommodation in emerging markets can exacerbate price instability due to currency and liquidity effects.

The real interest rate (RIR) consistently exhibits a significant negative relationship with inflation. This underscores the importance of the cost of capital in moderating price pressures: higher real borrowing costs reduce consumption and investment demand, thereby limiting inflationary pressures. These results echo Mallick and Sousa's (2012) findings that real interest rates serve as an effective tool to stabilize aggregate demand and contain inflation in large emerging economies. Conversely, the nominal interest rate (INT) shows a positive impact on inflation in the short run, suggesting that in these countries, interest rate adjustments may reflect reactionary policy measures rather than purely stabilizing interventions—a pattern noted by Azad and Serletis (2022), who argue that monetary policy uncertainty and external shocks can attenuate the effectiveness of nominal rate adjustments.

The study also finds that exchange rate depreciation (EXR) significantly amplifies inflationary pressures. This is consistent with prior evidence that imported inflation is a critical driver in emerging economies, particularly those with high reliance on commodity imports (Choi et al., 2018; Gao, Abbas, & Lan, 2024). The dual impact of currency depreciation—via higher import costs and inflationary expectations—highlights the importance of coordinated monetary and exchange rate policies, as noted by Aktas, Kaya, and Özlale (2010).

Economic growth (GDPG) exhibits a negative association with inflation, suggesting that growth in these emerging Asian economies can absorb inflationary pressures, potentially by expanding productive capacity or enhancing supply-side resilience. This aligns with the findings of Bhattacharya (2014), who observed that steady GDP growth moderates inflation volatility in Vietnam and other emerging Asian countries. Government expenditure (GOV) shows a positive but largely insignificant effect on inflation, indicating that fiscal expansions may not consistently translate into broad-based price increases. This partially aligns with Drumond and Porcile (2012), who argue that fiscal policy effects on inflation depend on the broader monetary-fiscal coordination framework. The weak

significance observed in this study may reflect institutional constraints, absorption capacity, or differences in public expenditure composition across the eight countries.

Trade openness (TRADE) exhibits a negative but weak effect on inflation, suggesting that international competition can marginally suppress domestic price pressures. This finding complements Devereux, Lane, and Xu (2006), who emphasized that trade liberalization can enhance price stability by increasing the availability of goods and reducing monopolistic pricing power. The partial significance may also indicate that domestic supply constraints or exchange rate pass-through dominate trade effects in these emerging Asian economies. Unemployment (UNEMP) shows a positive and significant relationship with inflation, consistent with the Phillips curve theory. This suggests that labor market tightness or structural unemployment may exacerbate wage-driven inflationary pressures, a dynamic also observed by Horvath and Zhong (2019) in emerging economies experiencing external shocks.

The System GMM results highlight that inflation exhibits strong persistence, as captured by the lagged dependent variable, with a coefficient of 0.465. This implies that past inflation strongly influences current price levels, reflecting adaptive expectations and the inertia of price-setting behavior. Similar patterns were noted by Salunkhe and Patnaik (2019) in India, where monetary policy interventions had limited immediate impact due to entrenched inflationary expectations. Long-run FMOLS and DOLS estimates confirm that the relationships observed in the short run persist over time. Both broad money growth and exchange rate depreciation remain robust predictors of inflation, while real interest rates exert long-term dampening effects. This reinforces the notion that monetary policy effectiveness depends not only on immediate liquidity or interest rate adjustments but also on sustained macroeconomic management and credible policy frameworks, as emphasized by Arsić, Mladenović, and Nojković (2022).

Panel Granger causality tests (Table 13) reveal that broad money, interest rates, real interest rates, and exchange rates Granger-cause inflation, whereas the reverse causality is limited. This supports the conceptualization of monetary policy instruments as proactive drivers of price stability rather than reactive responses to inflation, a conclusion consistent with Flaccadoro and Nispi Landi (2025), who highlighted the exogeneity of domestic monetary shocks relative to inflation in emerging markets. Notably, bidirectional causality exists between GDP growth and inflation, suggesting that macroeconomic growth interacts with price dynamics in a feedback loop, reflecting structural interdependencies. Robustness analyses (Table 12) provide additional confidence in the study's findings. Alternative proxies for monetary policy, sub-sample analyses pre- and post-2008 financial crisis, and fixed-effects models with robust standard errors yield consistent signs and significance levels for key variables. This indicates that the observed relationships are not artifacts of model specification, sub-period volatility, or measurement choices, enhancing the reliability of the empirical conclusions.

5. Conclusions

This study investigates the determinants of inflation in eight emerging Asian economies—Bangladesh, India, Pakistan, Sri Lanka, Indonesia, Malaysia, Thailand, and the Philippines—focusing on the role of monetary policy instruments, macroeconomic controls, and external factors. Using a combination of static (pooled OLS, fixed and random effects), dynamic (System GMM), and long-run (FMOLS and DOLS) panel methods, along with causality and robustness checks, the analysis provides a thorough and methodologically rigorous assessment of inflation dynamics in these economies over the period 2000–2023.

The findings demonstrate that monetary policy remains the most decisive driver of inflation. Broad money growth (M2) positively and significantly affects inflation, confirming the predictions of the quantity theory of money. Real interest rates exert a strong negative effect, underscoring the importance of the cost of capital in containing price pressures. Nominal interest rates, while statistically significant in the short run, appear less effective in the long run, reflecting the potential lagged or reactionary nature of policy interventions. Exchange rate depreciation also significantly amplifies inflationary

pressures, highlighting the critical role of external factors in small and open emerging economies.

Among structural and macroeconomic controls, economic growth mitigates inflationary pressures, suggesting that supply-side expansion and productivity improvements can complement monetary interventions. Government expenditure and trade openness exhibit weaker effects, indicating that fiscal and trade policies are secondary determinants of inflation but remain relevant in broader policy coordination. Unemployment shows a positive association with inflation, consistent with wage-driven pressures observed in emerging labor markets. Lagged inflation demonstrates high persistence, reflecting entrenched inflationary expectations, a phenomenon corroborated by prior studies (Salunkhe & Patnaik, 2019; Bhattacharya, 2014).

This study makes several significant contributions. Theoretically, it reinforces the monetary approach to inflation in emerging markets while incorporating exchange rate dynamics and structural macroeconomic controls, providing a more holistic understanding of price formation in Asia. Empirically, it extends the literature by offering country-specific evidence across eight emerging Asian economies, complementing prior studies that predominantly focus on single-country analyses (e.g., India, Vietnam, or South Africa). Methodologically, the study integrates static, dynamic, and long-run panel techniques, along with Granger causality testing and multiple robustness checks. This multi-method approach addresses limitations in earlier literature that relied on cross-sectional or single-method analyses (Bhattacharya, 2014; Keefe, 2020) and ensures that the findings are robust and policy-relevant. By demonstrating that monetary policy instruments remain primary drivers of inflation while fiscal and trade factors exert secondary influence, the study provides actionable insights for policymakers and central banks.

The findings of this study carry several important policy implications for emerging Asian economies. First, monetary policy should remain the central focus, with policymakers prioritizing the control of broad money supply and careful management of real interest rates to stabilize inflation. The results also highlight the importance of accounting for the lagged effects of nominal interest rate adjustments, ensuring that monetary interventions are both timely and effective. Second, given the strong pass-through of exchange rate movements to domestic prices, policymakers should implement measures to reduce currency volatility, such as targeted foreign exchange market interventions and maintaining adequate reserves, to mitigate imported inflation. Third, sustained economic growth emerges as a natural stabilizer of inflationary pressures, suggesting that policies promoting productive investment, infrastructure development, and supply-side expansion can complement conventional monetary tools. Fourth, structural labor and trade policies can serve as additional levers for inflation management. Efforts to reduce unemployment and strategically leverage trade openness can help moderate price pressures, underscoring the importance of coordinated macroeconomic and labor market strategies. Finally, the effectiveness of all these measures depends critically on policy credibility, which is strengthened by strong institutional frameworks, transparency, and clear communication strategies. Establishing such credibility is particularly important in economies where inflation expectations are adaptive and deeply entrenched, as it enhances the public's confidence in policy actions and improves overall economic stability.

Declarations

Ethics and Guidelines: Not applicable.

Consent to participate: Not applicable.

Consent to publish: The authors have provided consent to publish.

Competing interests: The authors declare no competing interests.

Data availability statement: Data will be made available on reasonable request from the corresponding author.

Funding: This research received no external funding.

Clinical Trial Number: Not Applicable.

Declaration of using generative AI: During the preparation of this work the author(s) used ChatGPT in order to correct the grammatical errors. After using this tool/service, the author(s) reviewed and edited the content as needed and take full responsibility for the content of the published article.

Author Contributions: Conceptualization, MMJ; methodology, MMJ; formal analysis, MMJ; writing—original draft preparation, MMJ; writing—review and editing, MMJ. All authors have read and agreed to the published version of the manuscript.

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