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Monetary Policy Dilemma: Is Inflation More Sensitive to Demand Pressures or Supply Shocks in Developing Economies?

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Abstract
This study investigates the distinct responses of inflation to supply and demand shocks in panel of 42 developing countries, utilizing Panel Vector Autoregressive (PVAR). The analysis specifically examines the impact of domestic credit growth as a proxy for demand shocks and commodity price volatility representing supply shocks on the inflation. The findings reveal a significant asymmetry in inflation's responsiveness. Inflation in both commodity exporters and importers demonstrates a remarkably faster and stronger reaction to supply-side disturbances stemming from global commodity price fluctuations. The inflationary peak following a commodity price shock is notably higher and occurs more rapidly, indicating an immediate and substantial pass-through effect. In contrast, the inflationary impact of demand shocks, proxied by credit growth, is comparatively more subdued and evolves at a slower pace, with a lower peak magnitude. This differential responsiveness underscores the heightened vulnerability of commodity-importing nations to external price shocks. The study highlights that while domestic monetary and fiscal policies can influence aggregate demand, their capacity to manage inflation driven by volatile international commodity prices is inherently limited. Consequently, effective inflation management in these economies necessitates a keen focus on supply-side vulnerabilities and strategies to mitigate external price pressures.

JEL: E31 E32 E51 Q02 E23 E20

Keywords: Inflation, Credit, Commodity Prices, Shocks, Supply, Demand

Introduction

The recent surge in inflation after the COVID-19 pandemic, combined with ongoing geopolitical tensions, has reopened debates about how effective traditional monetary policies are. Central banks have been forced to raise interest rates sharply to control rising prices. However, policymakers face a key dilemma. Is inflation mainly driven by too much demand, which can be reduced by higher interest rates, or by supply disruption that monetary policy cannot easily fix? Knowing which of these factors affects inflation more quickly and strongly is crucial for choosing the right policy response.

Inflation is often explained by two main causes, demand-pull and cost-push. Demand-pull inflation happens when total demand in the economy exceeds its capacity to produce goods and services. While cost-push inflation, on the other hand, occurs when rising production costs—like wages or commodity prices—are passed on to consumers. Normally, central banks can control demand-driven inflation by raising interest rates to reduce spending and investment. But when inflation comes from supply chain disruptions, energy price shocks, or geopolitical crises, raising interest rates has little effect and can even worsen economic slowdowns without lowering prices [1,2].

Recent evidence shows that supply-side shocks have become a major cause of inflation, especially in emerging and developing countries that depend heavily on imports and are more exposed to global shocks. For example, disruptions in global supply chains and spikes in energy prices have led to faster inflation in these economies. Yet, demand-side factors—like government spending and credit growth still play an important role in keeping inflation high over time. This mix of demand and supply pressures raises a key question of which factor "demand or supply" causes inflation to rise faster and have a stronger impact?

This paper attempts to answer the question by studying how quickly and strongly inflation responds to demand-side versus supply-side factors. Using a dynamic panel model with data from 42 emerging and developing countries, the study separates the effects of demand shocks (such as credit growth) from supply shocks (like rising commodity prices). The goal is to measure how inflation reacts differently to these shocks, providing insights for policymakers in dealing with mixed inflationary pressures.

This study offers three key contributions. First, it examines the differential responses of inflation to demand-side and supply-side factors, addressing a notable gap in the existing literature. Second, it provides empirical evidence on the effectiveness of monetary policy under varying inflationary pressures, with particular focus on contexts where supply-side vulnerabilities are prevalent. Third, it analyzes evidence from both commodity-exporting and commodity-importing countries to assess the relative magnitude of inflationary impacts within each group.

Literature Review

The debate over whether inflation responds more rapidly to demand-side pressures or supply-side constraints has gained renewed attention in recent years, building on the pioneering work of Blanchard and Quah (1989), who first identified aggregate demand and supply disturbances [3]. Classical theories emphasize demand-pull inflation, where excessive aggregate demand outpaces productive capacity, leading to upward price pressures [4]. This view aligns with the Quantity Theory of Money and traditional Phillips Curve frameworks, where monetary policy plays a central role in controlling inflation through interest rate adjustments [5,6].

However, supply-side explanations of inflation, have become increasingly relevant in today's globalized and shock-prone environment. Pioneering works highlighted the role of supply shocks—such as oil price spikes, wage increases, and production bottlenecks—as primary drivers of inflation [7,8]. Recent empirical studies have revisited these arguments, focusing on how global supply chain disruptions and energy price volatility impact inflation dynamics across regions.

Wen et al. (2021) examined the interconnectedness of COVID-19, oil prices, and inflation in G7 countries, finding that supply-side shocks exert immediate and sharp impacts on inflation, whereas demand pressures contribute to more gradual price increases [9]. Similarly, Aharon et al. (2023) investigated ASEAN+3 economies and confirmed that oil price shocks have a significant and persistent pass-through effect on inflation, especially in countries with high import dependencies [10,11]. These findings suggest that supply-side constraints can trigger faster inflationary responses, particularly in open and trade-reliant economies.

In the context of South Asia, Ahmad et al. (2024) analyzed the influence of supply-side factors including oil prices, technology adoption, and labor market rigidities on inflation [12]. Their study revealed that supply-side shocks amplify inflation volatility in economies with structural weaknesses and limited policy buffers. This aligns with the findings of Dasgupta and Chowdhury (2023), who emphasized that cost-push inflation poses significant challenges for monetary authorities, often rendering interest rate hikes ineffective in curbing price rises [13].

Moreover, empirical research indicates that the pass-through of external shocks to domestic inflation varies across economies depending on institutional strength, policy credibility, and market flexibility [14,15]. For example, Forbes et al. (2017) argued that in small open economies, supply shocks tend to have longer-lasting inflationary effects due to exchange rate vulnerabilities and limited capacity for domestic substitution.

The COVID-19 pandemic and the Ukraine-Russia war further exposed the fragility of global supply chains, reigniting cost-push inflation concerns [16,17]. Studies by Harding, Lindé, and Trabandt (2023) emphasized that pandemic-induced supply disruptions led to immediate inflation surges, complicating the task of distinguishing between demand-pull and cost-push episodes [18]. On the demand side, fiscal expansions have also played a role in fueling inflationary pressures. Alesina, Favero, and Giavazzi (2019a, 2019b) demonstrated that fiscal-driven demand shocks contribute to cumulative inflationary pressures, but the speed and intensity of the response depend on whether the stimulus is expenditure-based or tax-based [19,20].

Furthermore, the asymmetry in monetary policy effectiveness between demand-driven and supply-driven inflation is well-documented [21]. When inflation arises from demand-side pressures, interest rate hikes can effectively cool consumption and investment [22]. However, in supply-driven episodes, monetary tightening may exacerbate output losses without substantially reducing inflation [23]. In emerging and developing economies, this policy dilemma is further complicated by structural rigidities, fiscal dominance, and limited inflation-targeting credibility [24]. Coordinated policy responses that combine monetary tools with targeted fiscal and supply-side interventions are increasingly seen as necessary to mitigate inflationary pressures [20,25].

Despite these insights, gaps remain in quantifying the relative speed of inflation pass-through from demand versus supply shocks, particularly in developing countries. This study addresses this gap by empirically examining how inflation in emerging and developing economies responds to demand-side factors and supply-side constraints, providing new evidence to inform more effective policy strategies.

Methodology

This study employs a Panel Vector Autoregression (Panel VAR) model to analyse the differential pass-through of demand-side and supply-side shocks to inflation across 42 developing economies. The pioneering identification strategy, introduced by Blanchard and Quah (1989), has become foundational for evaluating inflation's sensitivity to demand and supply shocks [3]. The Panel VAR framework is chosen for its ability to capture dynamic interdependencies among variables while accounting for unobserved heterogeneity across countries. Unlike traditional regression models, Panel VAR treats all variables as endogenous, allowing for a more flexible exploration of shock transmission mechanisms over time and across economies. Before estimating the Panel VAR model, standard pre-estimation tests were conducted to ensure the robustness of the analysis. Specifically, panel unit root tests (Levin-Lin-Chu and Im-Pesaran-Shin) were applied to examine the stationarity properties of the variables, followed by lag length selection criteria and stability diagnostics were employed to confirm the appropriateness of the model specification and the reliability of the impulse response functions. (see appendices)

Data and Variables

The selection of countries is based on data availability and their classification as emerging and developing economies in Africa, Middle East, and Central Asia by the International Monetary Fund (IMF).

The following variables are included in the model:

- **Inflation Rate:** Measured as the annual percentage change in the Consumer Price Index, acting as the dependent variable.
- **Domestic Credit to Private Sector (% of GDP):** Used as a proxy for demand-side shocks. This variable captures the impact of credit expansion on domestic demand, which is a primary channel through which monetary conditions influence inflation.
- **Commodity Prices:** Represents supply-side shocks. We use a composite index of global commodity prices, including oil, food, and metals as a proxy for external cost pressures that affect production and consumer prices in developing countries.

The data obtained from the IMF International Financial Statistics (IFS), World Bank World Development Indicators (WDI), and World Bank Commodities Price Data.

Model Specification

The baseline panel model is specified as follows:

$$inflation_{it} = \alpha + \beta_1\, demand_{it} + \beta_2 supply_{it} + \gamma X_{it} + \mu_i + \delta_t + \varepsilon_{it} \qquad (1)$$

Where π_{it} Annual inflation rate for country i at time t. $demand_{it}$ Vector of demand-side variables (e.g., domestic credit growth, fiscal deficit as % of GDP). $supply_{it}$ Vector of supply-side variables (e.g., import price index, global commodity prices). X_{it} Control variables (e.g., exchange rate changes, GDP growth, trade openness). μ_i Country-specific fixed effects. δ_t Time fixed effects to control for global shocks. ε_{it} Error term.

To empirically assess the relative speed and strength of inflation's response to demand and supply shocks across developing countries, this study employs a Panel Vector Autoregression (PVAR) model. The model includes three key endogenous variables: inflation rates, change in credit to GDP (demand shock), and change in commodity price (supply shock).

Considering Eq. 1, the baseline PVAR specification can be structured as follows:

$$Y_{i,t} = A(L)\, Y_{i,t-1} + \mu_i + \lambda_t + \varepsilon_{it} \qquad (2)$$

Where $Y_{i,t}$ is the vector of endogenous variables (inflation, demand shock, and supply shock). $A(L)$ is a matrix polynomial in the lag operator L , μ_i captures unobserved country-specific fixed effects, λ_t denotes time fixed effects to control for global shocks, ε_{it} is the vector of idiosyncratic errors.

The Panel VAR model includes p lags of the endogenous variables. The matrix polynomial in the lag operator (A(L)) is expressed as:

$$A(L) = A_1 L + A_1 L^2 + \cdots + A_p L^p \qquad (3)$$

Where A_j (for j = 1,2,...,p) are (3×3 coefficient matrices), and L^j is the lag operator of order j Specifically, with p = 2 lags, the polynomial expands as:

$$A(L) = A_1 L + A_1 L^2 \qquad (4)$$

The structure of A matrices is as follows:

$$A_j = \begin{bmatrix} a_{11,j} & a_{12,j} & a_{13,j} \\ a_{21,j} & a_{22} & a_{23,j} \\ a_{31,j} & a_{32,j} & a_{33,j} \end{bmatrix} \quad for\ j = 1,2$$

Where $a_{11,j}$ captures the effect of lagged inflation on current inflation, $a_{12,j}$ captures the effect of lagged credit change on current inflation, $a_{13,j}$ captures the effect of lagged price change on current inflation, and similarly for the other rows corresponding to credit growth and commodity price volatility as dependent variables.

Thus, the full dynamic equation becomes:

$$Y_{i,t} = A_1 Y_{i,t-1} + A_2 Y_{i,t-2} + \mu_i + \lambda_t + \varepsilon_{it} \tag{5}$$

Where $Y_{i,t}$ is a (3×1) vector:

$$Y_{i,t} = \begin{bmatrix} inflation_{i,t} \\ supply\ shock_{i,t} \\ demand\ shock_{i,t} \end{bmatrix}$$

Estimation Results

Table 1. exhibits the empirical findings from the Panel VAR estimates provide critical insights into the transmission dynamics of demand and supply shocks on inflation in developing economies. The coefficient of the first lag of inflation (0.776, p<0.01) confirms significant inflation persistence, indicating a high degree of inertia within the inflation process.

Variables	Inflation	Credit Change Demand shock	Price Change Supply shock
Inflation (-1)	0.776*** (0.0348)	-0.0009** (0.0004)	0.0005 (0.0005)
	[22.30]	[-2.24]	[1.15]
Inflation (-2)	-0.0257 (0.0328)	0.0006 (0.0004)	-0.0004 (0.0004)
	[-0.78]	[1.51]	[-1.00]
Demand shock (-1)	-0.102 (2.6975)	0.229*** (0.0322)	-0.002 (0.0359)
	[-0.04]	[7.12]	[-0.06]
Demand shock (-2)	-1.493 (1.4491)	0.010 (0.0173)	0.004 (0.0193)
	[-1.03]	[0.58]	[0.19]
Supply shock (-1)	-3.449 (2.3529)	0.026 (0.0281)	0.052* (0.0313)
	[-1.47]	[0.94]	[1.67]
Supply shock (-2)	-1.272 (2.1476)	0.045** (0.0256)	-0.269*** (0.0286)
	[-0.59]	[1.74]	[-9.40]
Constant (C)	2.625*** (0.5039)	0.024*** (0.0060)	0.050*** (0.0067)
	[5.21]	[4.06]	[7.51]
Model Fit Statistics	**Inflation**	**Credit Change**	**Price Change**
R-squared	0.554	0.061	0.090
S.E. of regression	13.342	0.159	0.178
F-statistic	197.86	10.35	15.79
Akaike AIC	8.027	-0.831	-0.612
Schwarz SC	8.062	-0.796	-0.577

Source: Author's Estimation based on data availability. Notes: Standard errors are reported in parentheses ( ), while t-statistics are presented in brackets [ ]. Statistical significance levels are denoted as follows: *p < 0.01, **p < 0.05, and ***p < 0.10. For clarity and focus, the table reports only the statistically significant coefficients and the core explanatory variables relevant to the analysis of inflation dynamics. Insignificant and auxiliary variables are omitted to streamline the presentation and highlight the key relationships of interest. Sample: 2002–2024 | Observations: 963 | Dependent Variables: Inflation, Credit Change, Price Change.

Table 1: Summary of Panel Vector Autoregression Estimates

On the demand side, domestic credit growth, used as a proxy for demand shocks, exhibits no immediate significant impact on inflation, suggesting that demand-driven pressures materialize more gradually over time. In contrast, supply-side shocks, proxied by commodity price changes, display a faster and more pronounced impact. The first lag of commodity prices has a negative yet marginally significant effect on inflation, reflecting short-term cost pass-through dynamics, while price changes themselves respond strongly to their own lags, confirming persistent supply-driven inflationary effects.

These results suggest that in the short run, inflation in developing countries responds more quickly and strongly to supply-side constraints than to demand-side pressures. This highlights a critical monetary policy dilemma: while conventional monetary tightening tools can effectively counter demand-driven inflation, supply-induced shocks require complementary structural policies to address bottlenecks and stabilize price dynamics.

Shocks Identification

Figure 1. illustrates the dynamic response of inflation to one standard deviation structural shocks identified through Cholesky decomposition. The shocks are ordered as Price Change (Supply Shock), Credit Change (Demand Shock), and Inflation, reflecting the assumed concurrent causality structure. The grey lines represent the estimated impulse responses, while the shaded bands denote 95% confidence intervals, computed using analytic asymptotic standard errors. The responses capture the relative speed and magnitude of inflation's reaction to both demand-side and supply-side disturbances over the forecast horizon.

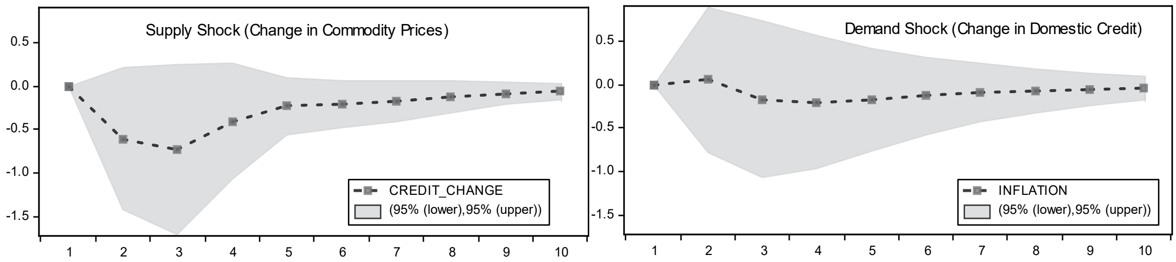

Figure 1: Inflation Response to Supply and Demand Shocks
Source: Author's estimations based on data availability

The impulse response analysis shows that inflation reacts differently to supply-side and demand-side shocks, highlighting a key monetary policy dilemma. Following a price change (supply shock), inflation initially drops sharply and then gradually returns to baseline over about 8–10 periods. This negative and rapid initial response suggests that supply shocks have an immediate but transitory effect on inflation dynamics, possibly reflecting short-term adjustments in prices before stabilizing. In contrast, the response of inflation to a credit change (demand shock) is positive and more persistent, peaking around periods 2 to 3 before slowly tapering off over subsequent periods. The magnitude of inflation response to demand shocks is stronger and more sustained compared to supply shocks. These results suggest inflation responds faster and more strongly to demand-driven factors (credit changes) but supply shocks induce quicker initial fluctuations. This highlights that while supply constraints can cause immediate inflationary volatility, demand pressures contribute more enduring inflationary trends, emphasizing the need for nuanced monetary policy that differentiates between these sources.

Commodity Exporters vs Commodity Importers

The classification of countries into Commodity Exporters and Commodity Importers. is based on the structure of their economies, particularly the share of commodity (oil, gas, minerals, or agricultural commodities) exports in total export earnings and GDP. Countries heavily reliant on commodity exports for foreign exchange and fiscal revenues are categorized as Commodity Exporters, while those with limited natural resource exports and a dependence on imported energy, food, and raw materials are classified as Commodity importers.

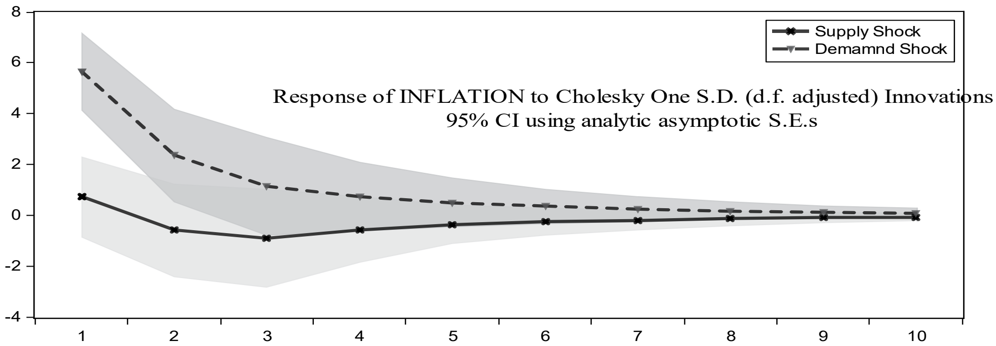

Figure 2: Inflation Response to Supply and Demand Shocks - Commodity Exporters
Source: Author's estimations based on data availability

Figure 2. shows how inflation in commodity-exporting countries reacts to supply shocks (solid line) and demand shocks (dashed line), with the shaded area representing the 95% confidence range. When a supply shock occurs, inflation increases sharply and immediately. The strongest effect happens in the first period, and although the impact slowly decreases over time, it remains noticeable for about 4 to 5 periods. On the other hand, inflation reacts much slower and weaker to demand shocks. The initial response is small and not significant, and the effect builds up very slowly over a longer time. The influence of demand shocks stays limited and within a narrow range, showing that demand factors take longer to affect inflation compared to supply shocks.

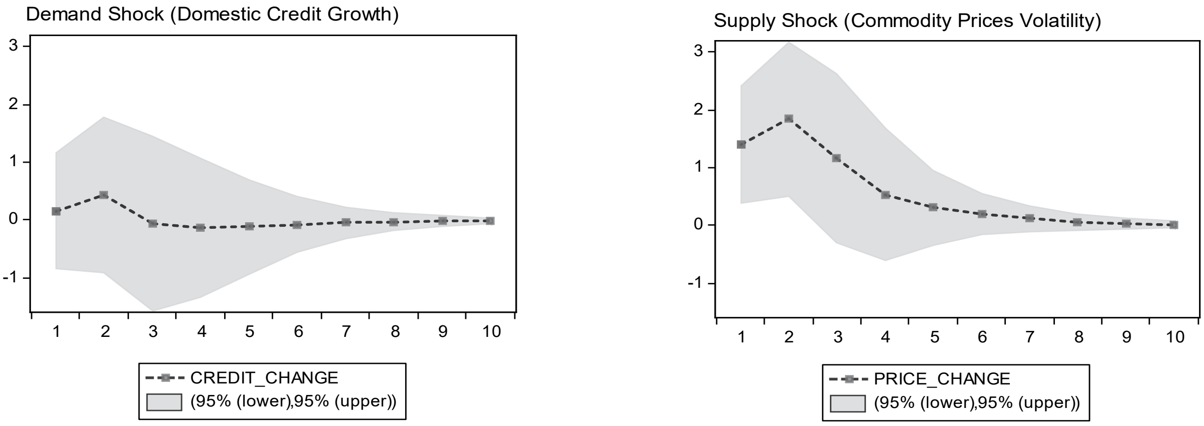

Figure 3: Inflation Response to Supply and Demand Shocks - Commodity Importers

Source: Author's estimations based on data availability

The impulse response Figure 3. for commodity importers indicates that inflation responds more acutely to supply shocks, specifically commodity price volatility, than to demand shocks, such as domestic credit growth. The response to supply shocks is both faster, showing an immediate and sharp increase in inflation, and stronger, with a significantly larger peak impact. In contrast, the inflationary effect of demand shocks is more gradual and less pronounced. This suggests that for commodity-importing nations, external price movements in commodities are a primary and potent driver of domestic inflation.

Conclusion

The findings indicate that in developing countries, inflation responds more rapidly and sharply to supply-side constraints, particularly commodity price shocks, than to demand-side pressures. While supply shocks trigger immediate and significant inflationary spikes, their effects gradually diminish over time. In contrast, demand-driven factors, such as credit growth, induce slower but more persistent inflationary trends. This dynamic is more pronounced in commodity-exporting countries, where external price fluctuations directly affect domestic inflation through export earnings and production costs. For commodity-importing countries, supply shocks remain the dominant inflation driver due to their reliance on imported energy and raw materials.

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Conflicts of Interest

The author declares no conflicts of interest relevant to the content of this manuscript.

Author Contributions

The author is solely responsible for the conceptualization, methodology, analysis, writing, and final approval of the manuscript.

Data Availability Statement

The data used in this study are from publicly available sources. Further details can be provided by the author upon request.

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Footnote:
[1]Notes: The impulse response functions (IRFs) trace the dynamic effects of a one standard deviation (Cholesky d.f. adjusted) structural innovation on the system's endogenous variables. The responses are identified using a recursive Cholesky decomposition, with Price Change (supply shock) ordered first, followed by Credit Change (demand shock), and Inflation ordered last. This ordering reflects the assumption that supply-side shocks are exogenous within the period, while demand-side factors adjust with a lag, and inflation responds contemporaneously to both. The impulse responses are plotted with 95% confidence intervals, computed using analytic asymptotic standard errors to assess the statistical significance of the dynamic effects over the forecast horizon.

Appendix 1: Unit Roots

Series	Test Method	Statistic	p-Value	Cross-sections	Null Hypothesis
Inflation	Levin, Lin & Chu t*	-17.0768	0.0000	42	Unit Root (Common Process)
	Im, Pesaran and Shin W-stat	-14.7088	0.0000	42	Unit Root (Individual Process)
	ADF - Fisher Chi-square	356.207	0.0000	42	Unit Root (Individual Process)
	PP - Fisher Chi-square	283.643	0.0000	42	Unit Root (Individual Process)
Supply Shock	Levin, Lin & Chu t*	-25.8233	0.0000	42	Unit Root (Common Process)
"Commodity prices"	Im, Pesaran and Shin W-stat	-24.1721	0.0000	42	Unit Root (Individual Process)
	ADF - Fisher Chi-square	613.186	0.0000	42	Unit Root (Individual Process)
	PP - Fisher Chi-square	711.542	0.0000	42	Unit Root (Individual Process)
Demand Shock	Levin, Lin & Chu t*	-67.9829	0.0000	42	Unit Root (Common Process)
"Domestic credit"	Im, Pesaran and Shin W-stat	-49.8320	0.0000	42	Unit Root (Individual Process)
	ADF - Fisher Chi-square	762.449	0.0000	42	Unit Root (Individual Process)
	PP - Fisher Chi-square	871.526	0.0000	42	Unit Root (Individual Process)

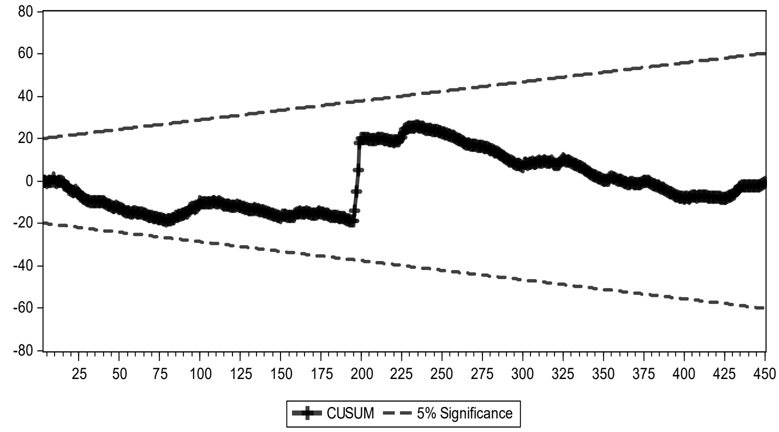
Source: Author's work based on available data

Panel unit root tests were conducted to verify the stationarity properties of the variables prior to estimating the Panel VAR model. The tests included individual effects and employed automatic lag length selection based on the Schwarz Information Criterion (SIC) within a range of 0 to 4 lags. Additionally, Newey-West automatic bandwidth selection with a Bartlett kernel was applied to address potential heteroskedasticity and autocorrelation issues. The results from the Levin, Lin & Chu t*, Im, Pesaran and Shin W-stat, ADF-Fisher Chi-square, and PP-Fisher Chi-square tests consistently reject the null hypothesis of a unit root at the 1% significance level for all variables (inflation, commodity prices, and domestic credit), indicating that these series are stationary in levels (I(0)). This confirmation of stationarity at level satisfies the critical prerequisite for proceeding with Panel VAR estimation, without necessitating first differencing or cointegration adjustments.

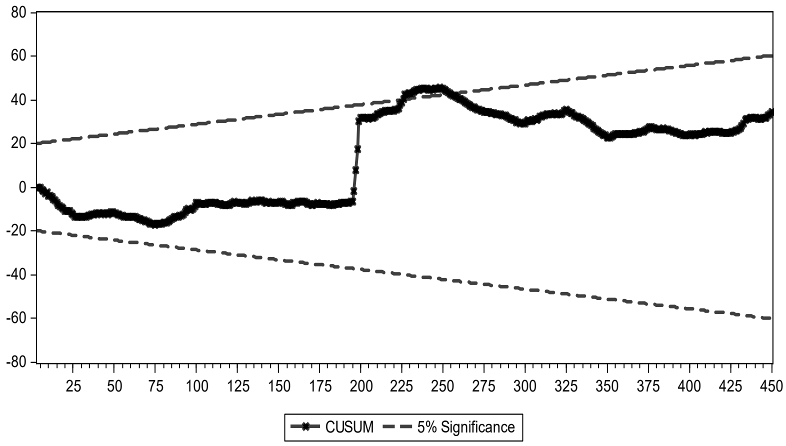
Appendix 2: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-2751	-	0.469366	7.757259	7.776549	7.764711
1	-2473	551.6570	0.220380	7.001228	7.078387	7.031035
2	-2396	152.9555	0.181841	6.809004	6.944033*	6.861167
3	-2351	89.02507	0.164236	6.707178	6.900076	6.781695
4	-2334	33.69358	0.160505	6.684189	6.934957	6.781062
5	-2311	45.27459	0.154231	6.644304	6.952942	6.763532*
6	-2298	25.41850	0.152480	6.632871	6.999378	6.774455
7	-2282	29.53311	0.149827	6.615297	7.039674	6.779236
8	-2262	39.96*	0.144970*	6.582317*	7.064563	6.768611

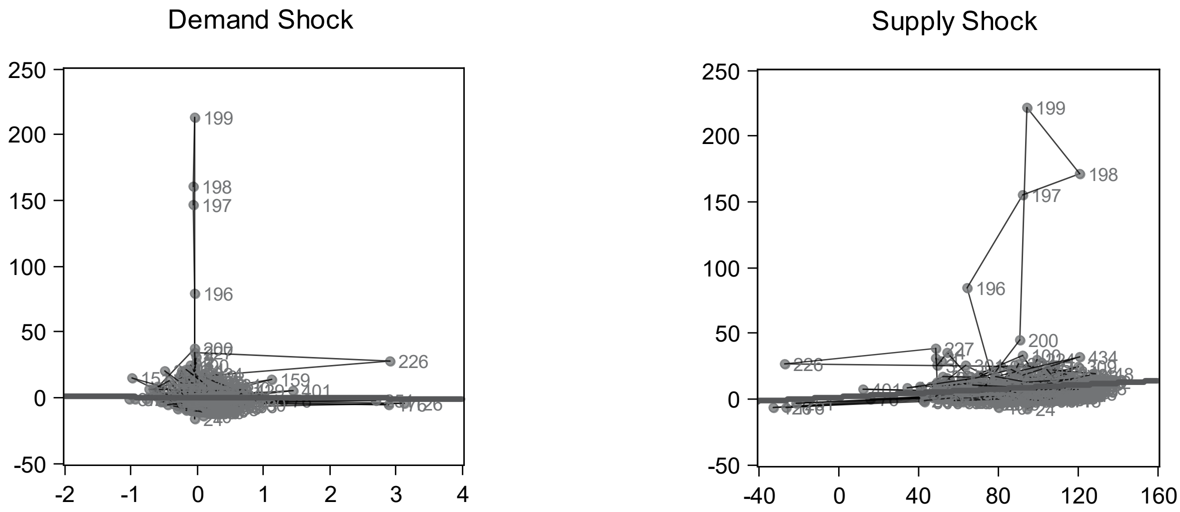
Source: Author's work based on available data. To determine the optimal lag length for the Panel VAR model, several selection criteria were employed, including the sequential modified Likelihood Ratio (LR) test statistic (at a 5% significance level), Final Prediction Error (FPE), Akaike Information Criterion (AIC), Schwarz Information Criterion (SC), and Hannan-Quinn Information Criterion (HQ). The lag order selected by each criterion is denoted with an asterisk (*), indicating the preferred lag length based on the respective minimization or maximization rule. These criteria provide a comprehensive assessment, balancing model fit and parsimony, with particular emphasis on penalizing over-parameterization. The selection process ensures the robustness of the PVAR specification by identifying the lag structure that adequately captures the dynamic interactions among variables while maintaining model stability and efficiency.



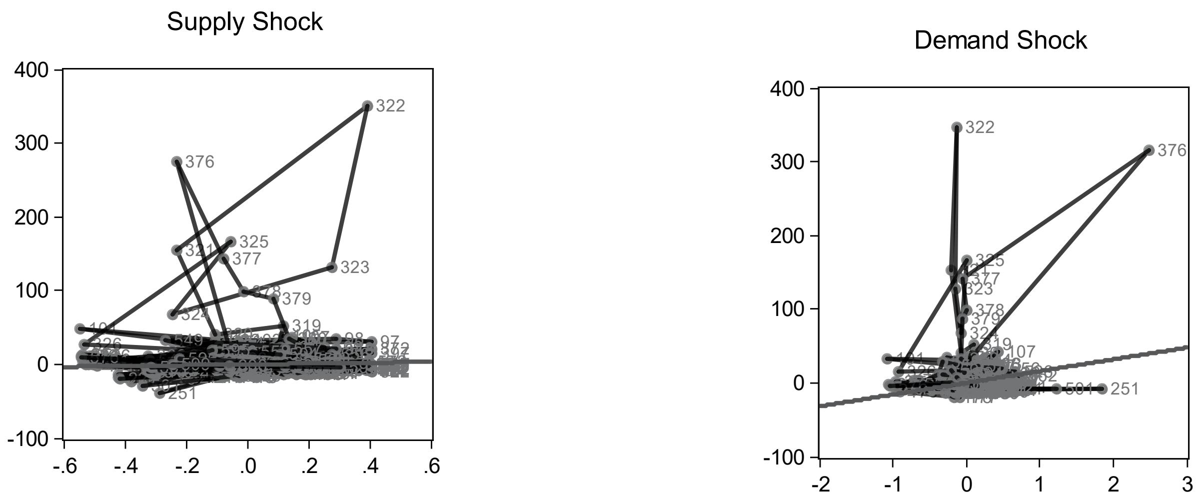
Appendix 3: Model Stability - Supply Shock



Appendix 3: Model Stability – Demand Shock



Appendix 4: Inflation vs. Shocks - Commodity Exporters



Appendix 4: Inflation vs. Shocks - Commodity Importers