EXCHANGE RATE PASS-THROUGH TO INFLATION: A TIME SERIES ANALYSIS USING EVIEWS

1. Overview

Client:

A macroeconomic research unit working with a central policy think tank in Western Europe

Objective:

To investigate the degree and timing of exchange rate pass-through (ERPT) to domestic inflation using quarterly data, with EViews-based time series econometrics.

2. Background

The volatility in global currency markets raised concerns over its inflationary impact in import-reliant economies. Traditional models used by the client lacked dynamic interaction terms and did not quantify the lag structure of ERPT. The research team required a rigorous time series model to explore short-run and long-run responses of inflation to currency shocks.

3. Data Summary

Sample Period:

Q1 2002 – Q4 2022 (84 observations)

Variables:

Variable	Description	Source
CPI	Consumer Price Index (quarterly)	OECD
NEER	Nominal Effective Exchange Rate (index)	BIS
Oil_Price	Brent Crude Oil Price (USD per barrel)	World Bank
Output_Gap	% deviation from potential output	National Statistical Agency

Data was log-transformed and seasonally adjusted prior to analysis. All variables were checked for unit root properties and stationarity.

4. Methodology

Software:

EViews 13

Model Type:

Vector Auto Regression (VAR)

Steps Followed in EViews:

1. **Stationarity Testing:**
   - Applied ADF and KPSS tests
   - All variables found to be I(1); first-differenced before VAR modeling

2. **Lag Selection:**
   - VAR lag length determined using AIC and SC (optimum lag = 2)

3. **Model Estimation:**
   - *Quick > Estimate VAR* with d(CPI), d(NEER), d(Oil_Price), d(Output_Gap)

4. **Granger Causality Tests:**
   - Conducted pairwise tests to check if NEER Granger-causes CPI

5. **Impulse Response Functions (IRFs):**
   - Generated 10-period IRFs for CPI response to 1 SD shock in NEER

6. **Variance Decomposition:**
   - Examined contribution of exchange rate shocks to CPI forecast error variance

5. Key Results

Output	Interpretation
Granger Causality	NEER significantly Granger-causes CPI at 5% level
Impulse Response (CPI to NEER)	Negative response peaking at period 3, gradually fading by period 6
Forecast Error Variance (CPI)	NEER accounts for 21.4% of CPI variance by quarter 4

Model Fit (R² of dCPI equation)	0.63

The pass-through effect was partial and delayed, consistent with price stickiness and invoicing currency theory.

6. Visual Outputs (From EViews)

- IRF graph: CPI's dynamic response to NEER shock
- Forecast variance decomposition bar chart
- Stability condition plot (no root outside unit circle)
- Correlation matrix heatmap (optional overlay)

7. Deliverables

- .wf1 EViews workfile with full model specification and results
- Custom IRF and variance decomposition graphs (exported PNGs)
- Written report (14 pages) covering:
  - Theoretical background on ERPT
  - EViews workflow with screenshots
  - Interpretation of econometric outputs
  - Implications for monetary and exchange rate policy

8. Outcome & Client Use

- Report included in quarterly macroeconomic briefing to policymakers
- Used to validate assumptions in inflation targeting simulations
- Informed the structure of FX risk buffers for energy imports

9. Strategic Value Delivered

- Provided empirical support for gradual and incomplete ERPT in a developed economy
- Delivered an academically robust, EViews-based framework for forecasting inflation under FX volatility

- Enabled integration of econometric insights into practical macro policy modeling