EVALUATING THE MONETARY POLICY TRANSMISSION MECHANISM IN THE UK USING VAR IN EVIEWS

1. Overview

Client:

A macroeconomic consulting firm advising UK-based institutional investors and public sector treasury teams

Objective:

To empirically test how changes in the Bank of England's base rate affect inflation and economic output, using EViews to estimate a structural VAR (SVAR) model and assess the dynamics of the UK monetary policy transmission mechanism.

2. Background

Policy makers and market analysts frequently debate the timing and strength of monetary policy effects on macroeconomic outcomes. Traditional linear models often miss lagged or interaction-based effects. This project used EViews' VAR functionality to simulate real-world economic responses and help stakeholders understand the policy lag and expected direction of key indicators post-rate changes.

3. Data Summary

Sample Period:

Q1 1995 – Q4 2022 (112 quarterly observations)

Variables Used:

Variable	Description	Source
Bank_Rate	Bank of England base rate	Bank of England
CPI_Inflation	Year-on-year Consumer Price Index	ONS
Real_GDP_Growth	Quarterly % change in GDP (seasonally adjusted)	ONS

All variables were seasonally adjusted and tested for stationarity.

4. Methodology

Software Used:

EViews 13

Model Type:

VAR (Vector AutoRegression) with Cholesky decomposition (structural VAR)

Steps in EViews:

1. **Stationarity Testing:**
    - ADF and PP tests confirmed all series to be stationary after first differencing
2. **Lag Length Selection:**
    - AIC and SIC recommended optimal lag of 4
3. **VAR Estimation:**
    - *Quick > Estimate VAR* using first differences of all variables
    - Used Cholesky decomposition ordering: Bank_Rate → CPI_Inflation → GDP_Growth
4. **Model Diagnostics:**
    - Portmanteau test for autocorrelation
    - Stability test (roots within unit circle)
    - Normality of residuals (Jarque–Bera)
5. **Impulse Response Analysis:**
    - IRFs estimated for 12 periods (3 years)
    - Focused on GDP and inflation response to 1 standard deviation shock in interest rates
6. **Variance Decomposition:**
    - Assessed how much of the forecast error variance in GDP and CPI was explained by rate shocks

5. Key Results

Output	Interpretation

Shock: Bank_Rate ↑	GDP drops after 2 quarters, CPI drops after 3–4 quarters
IRF (Bank Rate → GDP)	Peak negative response at quarter 3 (–0.27%)
IRF (Bank Rate → CPI)	Gradual deflationary effect, peaking at quarter 4 (–0.19%)
Variance Decomposition (GDP, 4Q)	28% of GDP forecast error variance attributed to rate shocks
Variance Decomposition (CPI, 6Q)	34% of inflation variance explained by interest rate movements

Model Stability: Confirmed (all roots inside unit circle) **Residuals:** No autocorrelation or heteroskedasticity detected

6. Visual Outputs (Generated in EViews)

- Impulse response function graphs for CPI and GDP
- Variance decomposition bar charts
- Actual vs. fitted plots for each endogenous variable
- Stability condition diagram (unit circle plot)

7. Deliverables

- EViews .wf1 file with complete VAR system, IRFs, and diagnostics
- Technical report (17 pages) detailing:
    - VAR structure and logic
    - Interpretation of lag structure and policy effects
    - Application of Cholesky restrictions
    - Model assumptions, tests, and forecasts
- Executive policy brief (2 pages) with:
    - Key timelines for monetary transmission
    - Strategic implications for rate forecasting and inflation targeting

8. Client Application & Outcome

- Used by client to validate macro scenarios for fixed income forecasting

- Incorporated into risk dashboards for sovereign bond desks
- Referenced in policy whitepaper for central bank advisory forum

9. Strategic Value Delivered

- Enabled client to **visualize and quantify policy transmission lags**
- Supported **macro strategy with a statistically grounded forecast model**
- Provided **dynamic, scenario-based insight** for investment and policy planning under interest rate changes