INTEREST RATE AND HOUSING PRICE DYNAMICS: A COINTEGRATION AND VECM ANALYSIS USING EVIEWS

1. Overview

Client:

An economic policy consultancy advising mortgage lenders and housing policy teams in the UK

Objective:

To determine whether a long-run relationship exists between interest rates and housing prices, and to quantify short-term adjustments in the UK housing market using EViews' econometric capabilities.

2. Background

Despite stable monetary policy, the UK housing market experienced sharp fluctuations in recent years. Policymakers and financial analysts raised questions about whether interest rate signals were still effectively anchoring long-term housing values. The client required an empirical investigation using time series methods to determine both equilibrium and adjustment dynamics.

3. Data Summary

Sample Period:

Q1 2000 – Q4 2022 (92 observations)

Variables:

Variable	Description	Source
House_Price	UK Average Residential Property Price (log form)	Office for National Statistics (ONS)
Interest_Rate	Bank of England Base Rate (quarterly average)	Bank of England
GDP	Real GDP (control variable, log form)	OECD

All variables were converted to real terms and tested for stationarity.

4. Methodology

Software Used:

EViews 13

Model Type:

Johansen Cointegration Test → Vector Error Correction Model (VECM)

Steps in EViews:

1. **Unit Root Testing:**
    - ADF and PP tests confirmed all variables are I(1)
2. **Lag Length Selection:**
    - Chose optimal lag = 2 using AIC and HQC
3. **Johansen Cointegration Test:**
    - *Quick > Group Statistics > Cointegration Test (Johansen)*
    - One cointegrating equation at 5% level (trace statistic)
4. **VECM Estimation:**
    - *Estimate VEC Model* with two lags and one cointegration relation
    - House price as dependent variable
5. **Impulse Response & Variance Decomposition:**
    - Assessed shock propagation and explanatory power of interest rates

5. Key Results

Output	**Interpretation**
Cointegration Rank	1 cointegrating equation found ($p < 0.05$)
Error Correction Term (ECT)	Negative and significant (–0.24), showing convergence to long-run path
Short-Run Impact (ΔInterest)	Statistically significant with a lag of 2 quarters ($p = 0.03$)
Long-Run Coefficients	-0.89 (Interest_Rate), +1.35 (GDP) on House_Price

Variance Decomposition (6Q)	Interest rate shocks explain ~18% of housing price variation

6. Visual Outputs (From EViews)

- Cointegration equation graph (level relationship)
- IRF: House_Price response to 1 SD shock in Interest_Rate
- Error correction term adjustment path
- Forecast error variance charts over 10 periods

7. Deliverables

- EViews .wf1 file with all tests, models, and IRFs saved
- Model diagnostics and stationarity log summary
- Written report (15 pages) containing:
    - Economic rationale and model structure
    - EViews output explanation
    - Policy and business implications
    - Appendices with command history and graphs

8. Outcome & Client Impact

- Report used by client to support risk modeling assumptions for interest rate stress testing
- Presented in advisory brief to a housing policy working group
- Used to adjust forecast models in a UK mortgage pricing simulation tool

9. Strategic Value Delivered

- Provided statistical evidence of **interest rate transmission to the housing market** over both long and short horizons
- Supported the client's strategic forecasting and stress-testing capabilities with **transparent and repeatable EViews-based analysis**
- Delivered **empirical justification for housing policy sensitivity thresholds**