

Monetary Policy Transmission to Great Britain's Housing Market: An IV-Local Projections Analysis of Mortgage Rates, House Prices, and Rent Prices

Amelie Hallam

Professional Economist BSc and Apprenticeship Level 6

School of Economics

University of Kent, 2026

Executive summary

This study examines how monetary policy transmits through the housing market in Great Britain, with particular focus on the cash flow channel. The analysis traces the dynamic response of three key parts of the channel: mortgage rates, house prices and rent prices for two years following a contractionary shock to Bank Rate. An instrumental-variable local projection (IV-LP) framework is employed using monthly data from January 2005 to December 2024 to estimate impulse response functions (IRFs). The point estimates and direction of the IRFs suggest that the pass-through from Bank Rate to two-year fixed mortgage rates is relatively weak and delayed. In contrast, house prices decline gradually with a lag, while rent prices rise at a lag before returning close to baseline. This pattern suggests that housing market adjustment reflects multiple transmission channels, rather than the cash-flow channel alone, and could potentially have disproportionate impacts. Notably, IRFs have greater precision in a pre-COVID sample, suggesting that monetary policy transmission may weaken during periods of heightened volatility or regime change. This study also provides evidence on the applicability of IV-LP methodology to UK housing market data, as it is a methodology that has had limited use in the existing UK literature.

AI Statement

I acknowledge the use of generative AI in parts of the drafting and code development in this paper. However, the work reported remains my own.

Acknowledgements

I would like to thank my family and friends for their constant encouragement and support throughout the past four years of my degree apprenticeship. I am also extremely grateful to the academic staff at the University of Kent, and to my amazing colleagues and managers at the Bank of England for all their guidance and support throughout.

1. Introduction

1.1 Background

Over recent years, the UK has experienced the most aggressive monetary tightening cycle in decades. Between December 2021 and August 2023, the Bank of England (BoE) raised Bank Rate from 0.1% to 5.25% across 14 consecutive meetings to combat high inflation (Smith, 2023). Bank Rate has since been gradually cut to 3.75%, as of April 2026, but remains well above the post-2008 average (BoE Database, 2026). However, recent Monetary Policy Committee (MPC) communications emphasise a cautious approach to future decisions, due to ongoing geopolitical uncertainties that may pose inflation risks (BoE, 2026).

Increases in Bank Rate reduce inflation by moderating aggregate demand through higher borrowing costs and returns to savings. This occurs through various monetary transmission channels, with several operating through the housing market (Burr and Willems, 2024). The housing impact is significant in the UK, as it is the largest component of household wealth, approximately 40% of total assets (ONS, 2026).

1.2 Research question and hypothesis

Given the importance of housing in monetary transmission to the economy, this study investigates how monetary tightening impacts the housing market in Great Britain between 2005 and 2024. The analysis focuses on the cash-flow channel of monetary transmission, where changes to Bank Rate first transmit to mortgage rates, which subsequently affect households' mortgage repayments, disposable income, and housing demand (Burr and Willems, 2024). This channel is particularly important in the UK context, given the BoE's 2023 household survey found that borrowers cut spending by £50 for every £100 increase in mortgage payments. Recent empirical evidence suggests rents rise due to mortgage cost pass-through by landlords and tenure switching from ownership to renting.

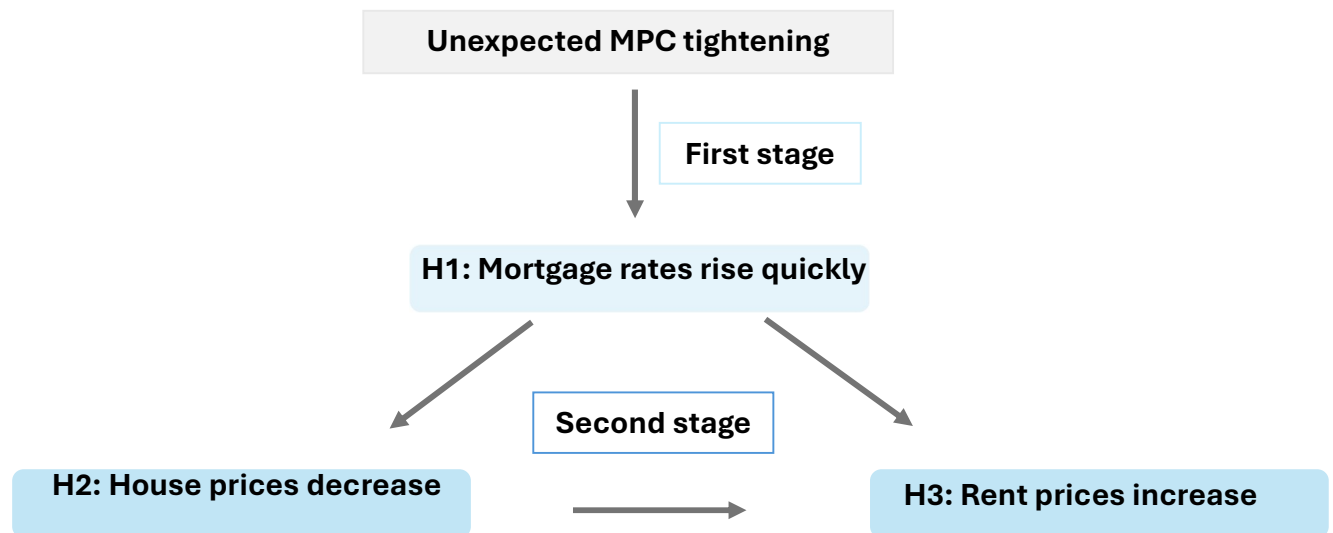
To trace the transmission of the cash-flow channel, this study estimates impulse response functions (IRFs) for three outcomes along the channel: two-year fixed mortgage rate, house prices and rent prices. It estimates IRFs using instrumental-variable local projections (IV-LP), instrumented using a high-frequency monetary policy shock series. This enables responses to be traced at future horizons and be interpreted as an unexpected contractionary shock to Bank Rate, avoiding endogeneity. The hypotheses are set out below and illustrated in Figure 1.

H1: Two-year fixed mortgage rates rise relatively quickly.

H2: House prices decline with a lag.

H3: Rent prices increase with a lag.

Figure 1: Hypothesised transmission



1.3 Literature contribution and policy relevance

This study contributes to the literature on monetary policy transmission and the housing market in several ways. First, it provides an updated empirical analysis of UK housing market responses to monetary policy, incorporating more of the recent tightening cycle. Second, the existing UK evidence on rent price responses and fixed rate mortgages is limited, with seemingly no other specifically considering the two-year fixed rate, therefore filling a gap in the literature. Finally, an IV-LP methodological approach has not been widely applied to UK housing market data and therefore provides a potential benchmark for future research.

The findings are relevant for policymakers seeking to understand how contractionary shocks to Bank Rate transmit through the economy in practice. They highlight whether there could be any potential distributional consequences, which is particularly important as the proportion of renters has doubled since 2000, and typically lower paid in society (English Housing Survey, 2024). Additionally, the use of the IV-LP methodological approach provides relevance for future research on the related topics.

1.4 Roadmap for the study

The remainder of the study is structured as follows. Section 2 reviews the theoretical and empirical literature on the transmission of monetary policy and compares methodological approaches. Section 3 describes the data and testing. Section 4 outlines the methodology. Section 5 presents and discusses the results. Section 6 considers limitations and future research. Section 7 concludes with key findings and policy implications.

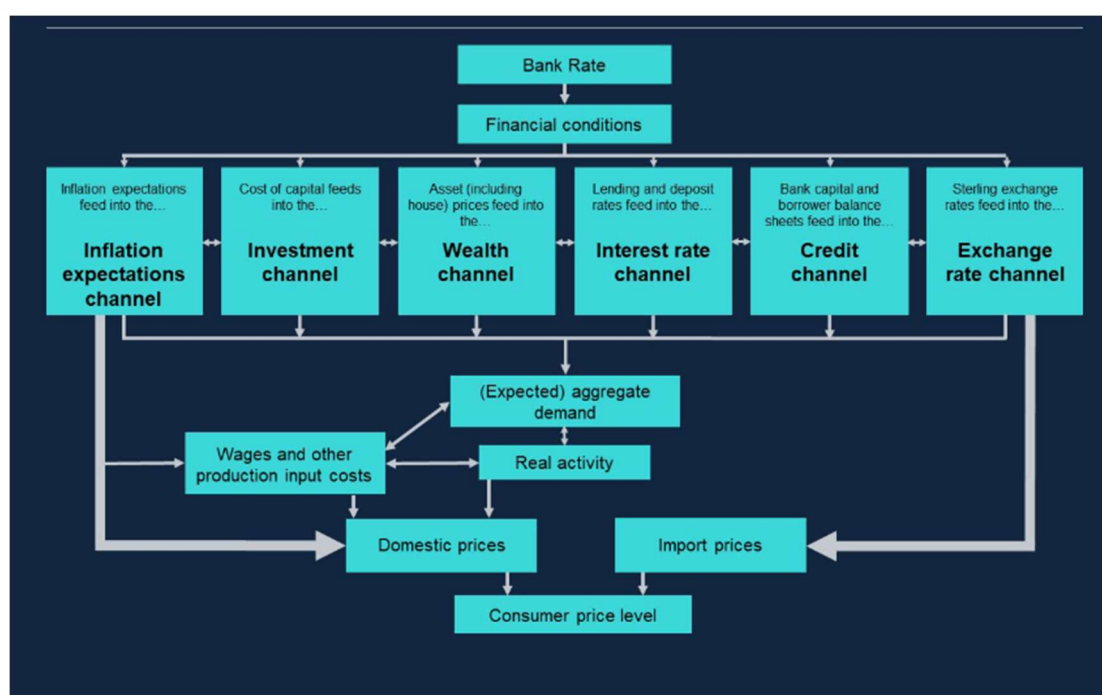
2. Literature Review

2.1 Theory

The theoretical literature on monetary policy transmission provides a foundation for understanding how changes in Bank Rate affect housing markets. Mishkin (1995) synthesises a Journal of Economic Perspectives symposium on monetary transmission to identify four key transmission channels: interest rates, exchange rates, asset prices and credit conditions. The interest rate channel reflects the traditional Keynesian view that tighter monetary policy raises real interest rates, increases borrowing costs and hence reduces investment, consumption and aggregate demand. Taylor (1995) presents this mechanism within a New Keynesian framework that includes rational expectations and price rigidities. However, the interest rate channel alone cannot fully explain the size and timing of monetary policy's real effects, motivating other channels (Mishkin, 1995). Meltzer (1995) emphasises asset price transmission through Tobin's q , while Bernanke and Gertler (1995) argue that credit market frictions amplify monetary policy through the credit channel.

Although Mishkin (1995) synthesises US papers, the transmission channels are neither US-specific nor time-specific. Burr and Willems (2024) show that the same four transmission channels operate in the UK. They develop a "bottom-up" representation of the UK monetary transmission mechanism (MTM), which includes additional channelling and a staged structure (Figure 2). The channels are present in models used by the BoE in their forecasting (BoE, 2013), making it relevant for this study.

Figure 2: “Bottom-up” MTM (Burr and Willems, 2024)



Burr and Willems (2024) explain the MTM through two main stages. In the first stage, Bank Rate transmits to financial conditions as firms and households do not encounter Bank Rate directly and instead face mortgage rates and deposit rates that are determined by financial markets. When Bank Rate is increased, banks’ funding costs increase (Wheelock, 2016), and should pass relatively quickly to households and firms. The second stage then transmits these higher rates through the various transmission channels.

The interest rate channel

As explained by Burr and Willems (2024), when Bank Rate rises, the interest rate channel reduces housing demand through two mechanisms: intertemporal substitution and cash-flow. Intertemporal substitution raises borrowing costs and the returns to saving, which encourages households to substitute spending for saving, therefore reducing consumption. The cash flow channel operates directly through mortgage rates, where banks raise mortgage rates and pass down to mortgagors who have to pay more for their mortgage, reducing disposable income and constraining spending. Both therefore reduce demand for housing, which exerts downward pressure on house prices. The impact on rents is more ambiguous, where prices should fall since along with other goods; however, the cash-flow channel may generate supply and demand pressures that can push rents up. Homeowners may get priced out of

ownership and shift into the rental market, increasing demand and prices, additionally landlords who face higher mortgage repayments may then increase rent prices they charge to tenants (Abramson et al., 2025; Zemaityte et al., 2023).

Wealth and credit channels

The wealth channel acts as an amplification mechanism, where declines in asset prices reduce households' wealth and consequently reduce consumption further. Housing accounts for 40% of total household wealth (ONS, 2026), so reductions in house prices amplify this. The credit channel tightens household borrowing capacity through two key channels formalised by Bernanke and Gertler (1995). The balance sheet channel can be explained through a collateral constraint, where decline in asset prices reduces borrowing capacity, amplifying effects of monetary policy (Kiyotaki and Moore, 1997). The bank lending channel operates through changes in the supply of bank credit, which can reduce banks' willingness to lend further amplifying transmission (Bernanke and Gertler, 1995).

A limitation of the theoretical literature is that the strength and outcomes of monetary transmission vary in practice, with particularly ambiguous effects on rents. Burr and Willems (2024) note that transmission depends on debt levels, macroeconomic conditions, and the policy stance, motivating empirical analysis.

2.2 Empirical Evidence

The following subsections review the evidence on each variable in turn. The last subsection 2.2.4 compares methodological approaches and motivates the use of LPs for this study.

2.2.1 Mortgage rates

Early empirical studies examine the pass-through from Bank Rate to variable mortgage rates using error-correction models (ECMs) and find a near complete pass-through in the long run. Heffernan (1997) employs a linear ECM on UK retail rates between 1981-1991 and finds that pass-through is close to complete in the long run, but gradual in the short run due to pricing frictions and imperfect competition. However, the linear ECM imposes constant adjustment speeds across regimes. Hofmann and Mizen (2004) directly address this in their asymmetric ECM using data on deposit and mortgage rates offered by UK financial institutions. They show that whilst long-run pass-through is near complete, the short run is asymmetric, and the speed of adjustment is quicker when the gap between rates and Bank Rate is widening.

The limitation with early studies is their focus on variable rate mortgages, since fixed rate products have accounted for the majority of new UK mortgage lending since the mid-2000s (BoE, 2025). De Stefani and Mano (2025) find that fixed mortgages weaken the monetary transmission in comparison to variable rates. Using a panel local projection analysis of 35 countries, they find that variable rates respond near to 1:1 with Bank Rate, whilst fixed rates adjust to their peak of around half the amount approximately two quarters after the increase. This is because fixed rates depend on expected borrowing costs over their term (Private Finance, 2024). Therefore, evidence on fixed rate mortgages is more applicable to this study.

UK evidence on fixed-rate transmission is limited. Albuquerque et al., (2025) report IRFs for the UK average five-year mortgage spread in their appendix as part of a wider housing study. Using a high frequency shock series in a proxy-SVAR, they find that unexpected contractionary monetary policy increases mortgages rates up to around 6 months before gradually declining and turning slightly negative at longer horizons. However, the response is not statistically significant, with large confidence intervals. Given limited UK evidence this study contributes by analysing the response of the two-year fixed mortgage rate to monetary policy shocks.

2.2.2 House prices

Most empirical studies find that house prices decline following a contractionary monetary policy shock, which is consistent with theoretical predictions. However, there is heterogeneity of the shape and magnitude of responses across studies and countries.

Ehrenbergerová et al. (2023) conduct a meta-analysis of 1,555 impulse responses drawn from 37 VAR-based studies across countries and seven decades. On average, they estimate that a 1 percentage point (pp) unexpected increase in the policy rate leads to a gradual decline in real house prices to approximately 1.2% after two years, before rising. Whilst informative, the average masks heterogeneity across countries and may be affected by publication bias since insignificant estimates are likely to be reported.

Differences in mortgage market structures and credit transmission channels are two potential explanations for country heterogeneity. Calza et al., (2013) show that monetary transmission is typically stronger in economies with more developed and flexible mortgage markets. Additionally, Iacoviello and Minetti (2008) find that credit transmission channels vary across European countries due to differing housing finance and mortgage structures, impacting the strength and amplification effects of monetary policy. Consistent with this heterogeneity,

Ehrenbergerová et al., (2023) find that UK house prices decline by around 2.2% following a contractionary shock, compared to approximately 0.6% in Germany. Germany has a low property ownership rate, and their mortgage structure is typically long-term fixed mortgage rates, beyond ten years, so this could explain relative weakness (Fitch, 2020; Barasinska et al., 2019). The variation motivates focus on UK-specific evidence.

Albuquerque et al., (2025) estimate a proxy-SVAR between 1997 and 2023 to find that nominal and real UK house prices decline following a contractionary shock and exhibiting a hump shaped profile. The point estimates show that following a 1pp increase in Bank Rate, real house prices gradually fall to approximately 6% after 16 months, before rising. This suggests a greater fall in comparison to the 2.2% Ehrenbergerová et al. (2023) reported for the UK. They rationalise these findings using a heterogeneous-agent New Keynesian (HANK) model with a modelled housing sector, showing housing market activity falls and transaction volumes decline, suggesting a sluggish price adjustment following a contractionary shock.

2.2.3 Rent prices

Empirical research on rents' response to monetary policy shocks is sparser than for house prices. Most studies find real rents rise after Bank Rate increases, though magnitudes and timings vary, reflecting the theoretically ambiguous channel.

In the US, most studies conclude similar findings, where real rents gradually rise and stay above their initial values for at least two years following a contractionary shock to Bank Rate. Dia and Duarte (2019) estimate a proxy-SVAR to find that rents increase by approximately 1%, whilst rent vacancies and homeownership rates decline. They interpret this as evidence that monetary tightening induces households to shift from owning to renting, increasing demand and prices for rental properties. Abramson et al., (2025) reach a similar finding using an IV local projection approach on a constructed US repeat rent index. Using the 30y mortgage rate as the instrumented variable, they find that a 25-basis point (bp) unexpected increase in mortgage rates raises real rents by approximately 0.7% after 12 months, and up to 1.5% by 24 months. The 68% confidence bands are greater than zero for all horizons, suggesting sustained rise. However, the US rental market has different properties to the UK, such as tenancy structures, which motivates a UK focus.

UK evidence is more mixed. Albuquerque et al. (2025) estimate a proxy SVAR using an aggregate rental index over 1997 and 2023 and find that real rents rise modestly following a

contractionary monetary policy shock, reaching a peak at 16 months before gradually falling. They rationalise a muted increase using a heterogeneous agent New Keynesian (HANK) model where private landlords behave like “wealthy hand to mouth agents” and do not pass higher mortgage costs on to tenants in the short run. Using UK private rental microdata from Zoopla, Lazarowicz and Richard (2023) find that rents respond more quickly, increasingly shortly after a shock, and remaining elevated for around 5 months before declining. The difference between these results likely reflects rent indices used since aggregate data reflects the existing stock of rents at the time, whilst micro level data captures the newly listed rates. Interestingly Lazarowicz and Richard (2023) also estimate impulse responses for the same aggregate index as Albuquerque et al. (2025) and find that rents gradually rise and continue to do so without falling. Given this study uses the same index, it will be useful to compare results.

2.2.4 Methodological approaches

The empirical literature on monetary policy transmission to the housing sector primarily estimates IRFs to examine how variables respond over time, recognising that monetary policy affects the economy at a lag. IRFs are commonly estimated using two methodological approaches: structural vector autoregressions (SVARs) and LPs. They differ in the way they are estimated and have trade-offs that motivate the approach chosen for this study.

SVARs, introduced by Sims (1980), estimate IRFs from a multivariate system, whilst LPs, introduced by Jordà (2005), estimate the response at each horizon through a sequence of regressions. The literature increasingly combines both approaches with high-frequency monetary policy surprises to isolate the unanticipated component of policy rate changes. High-frequency shocks were initially used in event-study regressions (Kuttner, 2001; Bernanke and Kuttner, 2005), and more recently applied as external instruments for policy rate movements in SVARs (Gertler and Karadi, 2015) and LPs within an IV framework (Stock and Watson, 2018).

Empirical studies report a variance-bias trade-off between the methods. Castellanos (2025) uses a Monte Carlo simulation study to show that LPs produce IRFs with lower small sample bias than VARs, as they avoid imposing restrictive dynamic structure, but at the cost of higher variance. Plagborg-Møller and Wolf (2021) similarly show that while LP and VAR estimators target the same impulse responses in population, LPs display substantially higher variance at intermediate and long horizons in finite sample. In related work, Montiel Olea and

Plagborg-Møller (2021) introduce a lag-augmented local projection approach, that delivers valid inference in the presence of non-stationary and highly persistent data.

The lower bias of LPs is attractive for this study given its robustness to misspecification. Moreover, the lag-augmented variant is particularly suited to housing market data, as it is typically non-stationary. Therefore, this study uses lag-augmented LPs, with a high frequency shock series as an IV.

3. Data

This study uses a monthly time series dataset spanning January 2005 to December 2024. This period ensures data consistency, sufficient observations, and coverage of the recent monetary tightening cycle. IRFs are estimated for three outcome variables: mortgage rates, house prices and rent prices, using a high frequency monetary policy shock series as an instrument. The identification strategy and estimation framework are provided in section 4. Variable definitions, transformations and tests are detailed below.

Outcome variables

The UK average monthly two-year fixed mortgage rate at 75% loan to value (LTV) is used, reflecting one of the most popular UK mortgage products. Two-year fixed mortgage rates accounted for 64% of new mortgage lending in 2024, reflecting their importance in household borrowing decisions (Uswitch, 2024). The series is sourced from the BoE database (code “IUMB34”) and measures average rates on new lending. New lending ensures that the estimated responses capture the pass-through of monetary policy to borrowing costs.

House prices and rents are measured using the House Price Index (HPI) and Index of Private Housing Rental Prices (IPHRP) for England. The HPI reflects the average transaction prices, while the IPHRP measures the monthly average rental prices in the private sector. Both indices are provided by the Office for National Statistics (ONS, 2025). To account for changes in the general price level, the series are deflated using the Consumer Prices Index (CPI), using formula (1).

$$(1) \quad Real\ Price = \frac{Nominal\ Price}{CPI\ Index} \times 100$$

Once deflated into real terms, they are converted into log-levels to be interpreted in percentages. Nominal prices are also converted to log-levels and estimated for comparability.

Identification Instrument

Identification uses a high-frequency monetary policy shock series from the UK Monetary Policy Event Study Database (UKMPD), constructed by Braun et al. (2024). The series captures intraday movements in financial market instruments within narrow windows around MPC announcements, providing a measure of market expectations of Bank Rate. Values range between -1 and 1, with positive values indicating an unexpected tightening and negative values indicating an unexpected easing, including cases where Bank Rate remains unchanged.

Following Albuquerque et al. (2025), the analysis restricts attention to the target factor around MPC decision announcements, excluding Monetary Policy Report releases, as these capture conventional interest-rate shocks. As the MPC meets eight times per year, the series is aggregated to a monthly frequency to align with the dataset. In months with multiple MPC announcements, such as March 2020, surprise values are summed, while months with no policy events are assigned zero.

The series is displayed in Figure 3, with expected spikes around unexpected policy decisions. Bank Rate is specified in first differences so that the UKMPD shock series can be used as an external instrument for unexpected changes in Bank Rate.

Figure 3: UKMPD Monetary policy shock series



Controls

While high-frequency monetary policy shocks are exogenous by construction, and do not require control variables (Ramey, 2016), the empirical literature commonly uses a small set of macroeconomic controls to absorb residual variation. Therefore, this study includes lags of real GDP. Inflation is not applied as a control since house and rent prices are already converted to real terms. In addition, COVID dummies covering March 2020 to July 2021 are included and 12-month dummies to deal with seasonality.

As discussed in section 4, I apply a lag augmented approach to the IV-LPs, where 12 lags of the outcome variable are included, alongside three lags of Bank Rate and real GDP in each regression to help account for persistence in the data. Lag choice is discussed further in this section too.

Figure 4: Summary of variables

**Lags and dummies not included.*

Variable	Description	Source	Summary statistics
Outcome variables			
2y fixed mortgage rate	Monthly average UK 2-year fixed mortgage rate on new lending 75% LTV (%)	BoE Database	Mean:3.32 Maximum:6.6 Minimum:1.35 Standard Dev:1.52
Nominal house prices	House Price Index for England, log-levels.	ONS	Mean:12.13 Maximum:12.37 Minimum:11.92 Standard Dev:0.14
Real house prices	Nominal house prices deflated by CPI, log-levels.	ONS	Mean:12.19 Maximum:12.04 Minimum:12.32 Standard Dev: 0.09
Nominal rent prices	Index of Private Housing Rental Prices for England, log-levels.	ONS	Mean:6.81 Maximum:6.97 Minimum:6.65 Standard Dev:0.09
Real rent prices	Nominal rent prices deflated by CPI, log-levels.	ONS	Mean:6.88 Maximum:6.93 Minimum:6.84 Standard Dev:0.03
Identification Instrument			
High frequency shock series	UK Monetary Policy Event Study Database target factor, aggregated to monthly	BoE Database	Mean:0.002 Maximum:0.21 Minimum:-0.42 Standard Dev:0.04
Policy rate			
Bank Rate	BoE Base Rate first differenced	BoE Database	Mean:-0.02 Maximum:0.25 Minimum:-1.5 Standard Dev:0.17
Controls			
Real GDP	Monthly real GDP indicator for the UK. (YoY)	ONS	Mean:1.61 Maximum:4.8 Minimum:-6.3 Standard Dev:2.14

Data diagnostics

Unit roots and structural breaks

When working with time-series data, unit-root tests assess persistence and inform modelling choices, as non-stationary series can generate spurious results. Augmented Dickey-Fuller (ADF) tests were conducted for all variables to test for unit roots. The null hypothesis (H_0) is that the series contains a unit root and can be rejected when the p-value falls below the 5% significance level (0.05). The results are reported in figure 5. Several housing market variables exhibit unit-root behaviour, particularly rents, so a lag-augmented approach is adopted, where additional lags of the outcome absorb stochastic trends.

Figure 5: ADF test results

Variable	ADF test P-value	Stationary/non-stationary
Real House prices	0.58	Non-stationary Stationary when I(1)
Nominal House prices	0.03	Non-stationary, Stationary when I(1)
Real Rents	0.24 0.19	Non-stationary, Non-stationary when I(1)
Nominal Rents	0.61 0.66	Non-stationary, Non-stationary when I(1)
2y Fixed Mortgage	0.73	Non-stationary, Non-stationary when I(1)
UKMPD shock	<0.01	Stationary
Changes in Bank Rate	<0.01	Stationary
Real GDP	<0.01	Stationary

To assess structural breaks, the Bai-Perron multiple break test is applied, which identifies the points the average level of a time series changes. The results, reported in Appendix Figure 1, indicate common breaks around the COVID-19 period, motivating testing the inclusion of dummy variables for these episodes. The rent series also exhibits a break likely associated with a methodological change, which is addressed in robustness checks.

4. Methodology

4.1 Empirical approach

An ordinary least squares (OLS) approach was initially considered to estimate the relationship between Bank Rate and the housing variables. However, OLS estimates would likely be biased due to endogeneity as monetary policy decisions respond to macroeconomic developments including in the housing market. Furthermore, financial markets often anticipate changes in Bank Rate, causing housing variables to adjust in advance, further violating the exogeneity assumption required for OLS.

To address this issue and align with empirical literature, this study uses LPs to estimate IRFs. The IRFs trace the responses of the mortgage rates, house prices, and rent prices over 24 months following an unexpected contractionary shock to Bank Rate. The methodology follows the LP framework introduced by Jordà (2005) combined with an instrumental-variable (IV) to accommodate endogeneity and lag-augmentation for non-stationarity.

LPs estimate IRFs by running separate regressions for each future horizon. For each outcome variable (e.g. house prices), and each horizon: $h = 1, 2, \dots, H$, the future value of the outcome variable is related to the change in Bank Rate at time t . As Bank Rate is endogenous, this study applies an IV approach, introduced by Stock and Watson (2018). Changes in Bank Rate are instrumented using the UKMPD high frequency shock series to isolate the unexpected component of Bank Rate movements. Estimation is conducted within a two-stage least squares (2SLS) local projection framework, allowing the resulting IRFs to be interpreted as the responses of housing variables to an unexpected monetary policy tightening. Although estimated within the same 2SLS formula, it is helpful to interpret the approach in two stages.

In the first stage (equation (2)), the UKMPD MPC shock series is used to isolate the exogenous component of the first difference of Bank Rate $\Delta \mathbf{i}_t$. This yields the exogenous component $\widehat{\Delta \mathbf{i}_t}$ which is then implemented in equation 3 to allow for the IRFs to be plotted using the package “lpirfs” in RStudio.

$$(2) \quad \Delta \mathbf{i}_t = \alpha + \partial shock_t + v_t$$

$$(3) \quad y_{t+h} = \alpha_h + \beta_h \widehat{\Delta \mathbf{i}_t} + \gamma_h x_t + v_{t+h}$$

y_{t+h} denotes the outcome variable at time $t + h$. The coefficient β_h captures the impulse response for each horizon h to an exogenous rise in Bank Rate occurring at time t . α_h is the intercept, v_{t+h} the error term, and $\gamma_h x_t$ represents the controls as set out in section 3.

Lag augmentation is also applied, as several housing variables exhibit unit root behaviour (section 3.2). As shown by Montiel Olea and Plagborg-Møller (2021), including additional lags of the outcome variable as controls improves inference in local projection models, including the presence of unit roots. This approach is preferred as it allows the outcome variables to remain in log-levels, so IRFs can be read directly in percentage points from the baseline.

The precise number of additional lags required under lag augmentation cannot be determined exactly, so it is chosen based on existing empirical studies and VAR lag order selection using Akaike Information Criterion (AIC). In studies using monthly data, 12 lags of the dependent variable are fairly common, for example Albuquerque et al. (2025) use 12 lags of dependent variables in their monthly proxy-SVAR. The AIC-based selection also supports this choice, as set out in Figure 6. Therefore, in all baseline specifications, the control vector includes 12 lags of the dependent variable, three lags of real GDP and 3 lags of Bank Rate to account for broader macroeconomic conditions, policy persistence and improve inference. Dummy variables are included within controls for the COVID-19 period and calendar months.

LP residuals are known to exhibit serial correlation, so the LPs are estimated using heteroskedasticity and autocorrelation consistent (HAC) Newey-West standard errors, in line with Jorda (2005). While lag augmentation helps absorb serial correlation, HAC standard errors are retained as a conservative approach to inference.

Figure 6: AIC lag selection

Variable	AIC Lag suggestion
Real House Prices	10
Real Rent Prices	12
2y Fixed Mortgages	5

4.2 Instrument validity testing

To ensure the validity of the high-frequency shock as an instrument, three conditions must hold in the LP-IV framework (Stock and Watson, 2018): (i) relevance, (ii) contemporaneous exogeneity, and (iii) lead-lag exogeneity.

(i) Relevance requires the instrument to be sufficiently correlated with changes in the policy rate. This is assessed by estimating the first-stage F-statistic from equation (3). Following Staiger and Stock (1997), values below 10 indicate weak-instrument concerns. A HAC-robust Wald F-test with not including any dependent variable lags yields an F-statistic of 14. Re-estimating to include 12 lags for each outcome variable produces similarly strong and relevant results (Figure 7).

Figure 7: First stage F-statistics

Variable	F-stat
2y Fixed Mortgage	15
Real house prices	28
Real rent prices	20

(ii) Contemporaneous exogeneity requires that the instrument affects the outcome only through changes in the policy rate and is uncorrelated with other contemporaneous shocks. The use of high-frequency shocks around MPC announcements supports this assumption, therefore the condition is likely satisfied.

(iii) Lead-lag exogeneity requires the instrument to be uncorrelated with structural shocks at all leads and lags, other than the contemporaneous one. For each outcome a joint Wald test is applied to four leads of the shock (Pustejovsky, 2026), conditional on controls. The null is that future shocks do not predict current ones, with a P-value greater than 10. A four-month lead horizon is used as it corresponds to one quarter, whilst a six-month horizon is reported for robustness. As shown in figure 8, the null is not rejected for house prices or mortgage rates, but for rents it is rejected. This likely reflects the properties of the rent series but does mean the result should be interpreted with caution. Additionally, the results are sensitive to the choice of lead length, which likely reflects the persistence and slow adjustment of housing variables alongside small sample variability, rather than anticipation effects.

Figure 8: Joint Wald test on lead co-efficients.

Variable	P-Value (4 horizons)	P Value (6 Horizons)	Reject null?
House Prices	0.27	0.11	No
Rents	0.004	0.00	Yes
2y Fixed Mortgage	0.1	0.11	No

5. Results

5.1 Headline results and discussion

This section presents the headline IRFs for mortgage rates, house prices and rent prices, estimated using the 2SLS formula (3) (section 4). The IRFs are reported with 68% and 95% confidence intervals and can be interpreted as the response up to 24 months after a 25bp contractionary shock to Bank Rate, which is representative of a typical UK policy move. Detailed horizon beta coefficients, standard errors and significance can be found in the Appendix as Figure 2. Robustness checks are reported in section 5.2.

In summary, the point estimates suggest a weak but gradual increase of the two-year fixed mortgage rates, alongside a delayed decline in house prices and increase in rents, though effects estimated with uncertainty. The findings are broadly consistent with the hypothesis and align with parts of the theoretical and empirical literature, discussed in detail below.

Figure 9: Two-year fixed mortgage rates

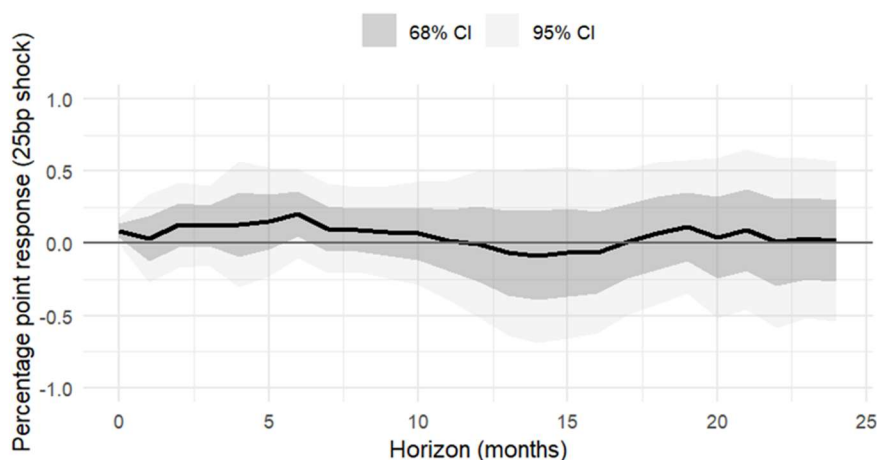


Figure 9 displays the IRF of the two-year fixed mortgage rate. The point estimates suggest that mortgage rates rise gradually to reach a peak around 6 months, before easing back towards zero at longer horizons. However, the response is relatively small, and the confidence intervals cover zero across nearly all horizons. This provides limited evidence of a strong or fast first-stage pass-through from Bank Rate, and the response is weaker than hypothesised in H1.

The weak response and delayed increase could be explained by the fact that the two-year fixed mortgage rate is priced from the two-year swap and gilt curve, reflecting the expected average path of Bank Rate over the next two years, rather than its current level. Therefore, the magnitude of the response depends on how much the surprise shifts expectations over the next few years. This aligns with the empirical literature reviewed on fixed rate mortgages. De Stefani and Mano (2025) similarly use local projections to find that fixed rate mortgages weaken monetary transmission in comparison to variable rate mortgages. Whilst they report estimates that show a faster initial response, the peak is reached at a similar time horizon and magnitude to this study. Differences may reflect their cross-country setting, alternative sample period, and the presence of wide confidence bands. The UK-focused study by Albuquerque et al. (2025) that estimates the response of five-year fixed mortgage spread over a similar time period further supports this conclusion. They estimate a proxy-SVAR, and the point estimates show an upwards trend up to six months before retracing, but with similarly statistically imprecise response with confidence bands containing zero throughout. This comparison suggests there is not a large difference between the response of two year and five-year fixed mortgages.

Interestingly, the robustness analysis in section 5.2 finds that pass-through is greater in magnitude and precision in the pre-Covid subsample, suggesting that the strength and precision of transmission may vary across regimes and volatility.

Figure 10: House prices

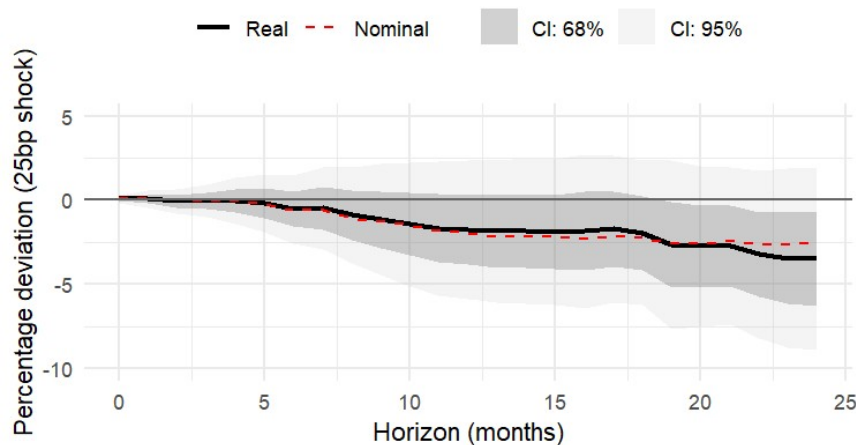


Figure 10 shows the response of real house prices, with nominal shown as the dashed red line for comparability. The point estimates suggest that house prices remain stable for approximately five months, before declining. The point estimate reaches approximately 1.7% below baseline by month 12 and continues to decline to approximately 3.5% by month 24, though confidence bands remain wide, and the response is not statistically significant at the 95% level. The response becomes statistically significant at the 68% confidence level from around 18 months. The similar response of real and nominal house price responses indicate that the observed decline is not driven by inflation dynamics.

The delayed response is consistent with the lagged adjustment predicted by theory and aligns with the hypothesis of a lagged decline in house prices (H2). House prices are affected by multiple transmission channels, such as the wealth and credit channels that operate gradually and can amplify effects at longer horizons.

When comparing to the empirical studies, the decline observed broadly aligns with UK evidence, however there are differences in the shape and magnitude of estimates. For example, Albuquerque et al., (2025) report a similarly delayed and gradual decline in aggregate real and nominal house prices following a contractionary shock using a proxy-SVAR framework and the same high-frequency UK monetary policy surprise series. However, they find that house prices reach a trough of approximately 1.5% following a 25bp shock at around 16 months, before beginning to rise, and documenting a curved shape. In contrast this study finds that house prices continue to fall and reach the lowest and 68% significant point at the furthest horizon. However, the well-known property of local

projections that variance grows with the forecast horizon (Jordà, 2005), hence confidence bands are at their widest at month 24, so the point estimates at the longest horizons are less precise and could be closer to zero. It also may be the case that after 24 months prices start to rise.

Figure 11: Rent prices

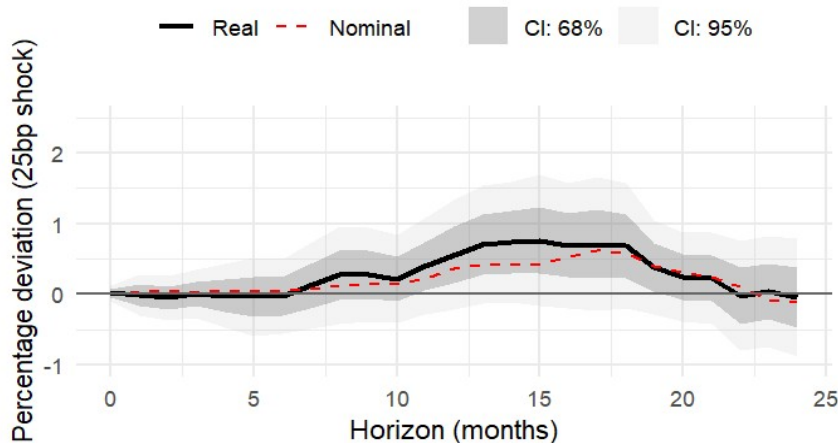


Figure 11 displays the response of real rent prices, with nominal shown as the red line for comparability. In contrast to house prices, real rents exhibit a positive response to a contractionary shock to Bank Rate. The point estimates suggest that rents remain broadly unchanged for the first six months, before showing a hump shaped response. They gradually rise and reach a peak of approximately 0.6% after around 15 months, before declining back close to zero by around month 22. The estimates are statistically significant at the 68% confidence level between months 11 and 19, although remain statistically insignificant at the 95% level throughout. This pattern aligns with what was hypothesised with a positive lagged response of rents (H3). Nominal rents follow a close trajectory to real rents over the horizons, diverging marginally around medium-term horizons, suggesting the observed rent increase is not primarily driven by inflation dynamics.

The lagged increase in rents could be explained by potential supply and demand dynamics in the housing market. On the demand side, higher mortgage or general borrowing costs can price households out of homeownership, and towards rent prices, which could place upward pressure on prices. On the supply side, landlords facing higher mortgage payments may raise rental prices to cover costs. Both of these mechanisms operate at a lagged response.

Comparing to the existing empirical studies, the timing and humped shaped of the results is consistent with some UK studies. Albuquerque et al., (2025) use the same aggregate rent

series between 1997-2023 using a proxy-SVAR to find that real rent prices follow a similar trend and begin rising from around month five before gradually returning near zero. However, the point estimates vary in magnitude, with this study reporting a peak of 0.6%, whilst they report a peak of approximately 0.4%, though both estimates have high uncertainty so may not be statistically distinguishable given the width of the confidence bands. Additionally, they find that nominal house prices do not move in tandem, remaining close to zero before falling from horizon 15.

Other studies report a different shaped response of rent prices. Lazarowicz and Richard (2023) who also estimate using the same rental index in a proxy-SVAR similarly report an increase following 5 months but find that it continues to gradually rise and does not retrace at all, reaching a peak of approximately 0.2%. The differences may be due to methodological and time period used in the sample.

Overall transmission

Taken together, the shape and point estimates of the IRFs provide evidence on how monetary policy transmits through the housing sector. A key finding is that the response of two-year fixed mortgage rate is weaker than expected, whilst house prices show a persistent decline. This suggests that the cash-flow channel alone cannot account for the house price response, with it likely that other transmission channels operate alongside it, such as intertemporal substitution, wealth and credit. This interpretation comes with a caveat as the study uses a single mortgage product as its rate indicator. Other mortgage products, such as variable-rate mortgages may transmit Bank Rate changes more quickly (De Stefani and Mano, 2025) and are still a product taken by UK households. Therefore, the cash-flow transmission channel may have a stronger impact in practice than the two-year fixed mortgage product implies.

Another key finding is that rent prices increase whilst house prices fall, which could be due to by potential supply and demand dynamics in the housing market. Tighter monetary policy shifts demand away from homeownership and towards renting and landlords may pass on higher financing costs, particularly those approaching remortgage when Bank Rates are high. Most landlords hold buy-to-let mortgages, making them particularly exposed to higher interest rates at times of remortgage (Zemaityte et al., 2023).

5.2 Robustness tests

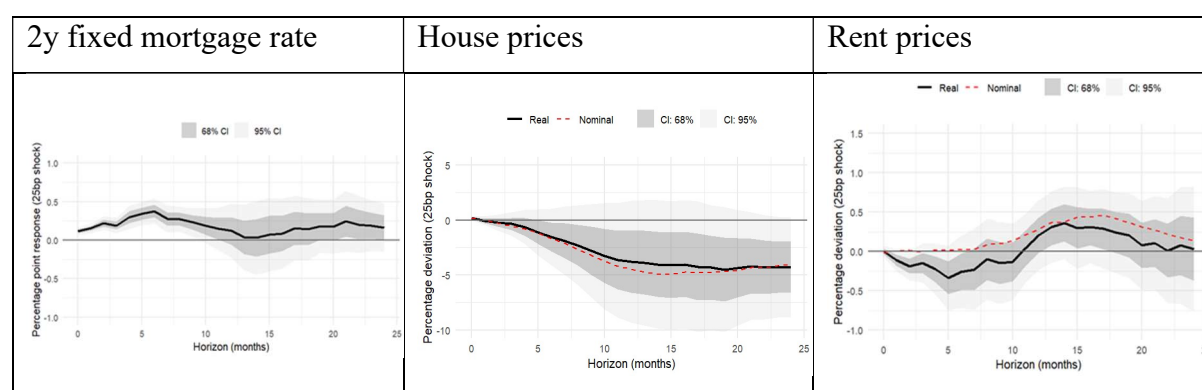
5.2.1 Controls and lag structure

Results are robust to variations in lag lengths of the dependent variable. Alternative lag lengths of 6 and 18 are plotted against the baseline 12 lags of the outcome variable, and show similar shape and timing, with house prices shown as Figure 3 in the Appendix. Similarly, the removal of GDP does not skew results, which suggests that the identified effects primarily capture the transmission of unexpected monetary policy shocks rather than broader economic activity, with house prices reported in Figure 4 in the Appendix.

5.2.2 Sample-period sensitivity and data structural breaks

To assess whether the results are driven by the post-Covid elevated volatility, the IRFs are re-estimated on a restricted 2005-2019 sample. The estimated IRFs show similar signs, shapes and direction to the headline results across outcomes. However, confidence intervals are narrower, and estimates are more precise, particularly for mortgage rates and rents (Figure 12). This likely reflects the unusual post-2020 period and suggests that monetary policy transmission may operate differently across regime shift or volatility. Two-year fixed mortgage rates show a statistically significant increase at the 68 per cent confidence level in the first few months following the shock, suggesting that pass-through to fixed rates may be more clearly identified in more stable monetary policy environments.

Figure 12: Restricted sample: 2005-2019



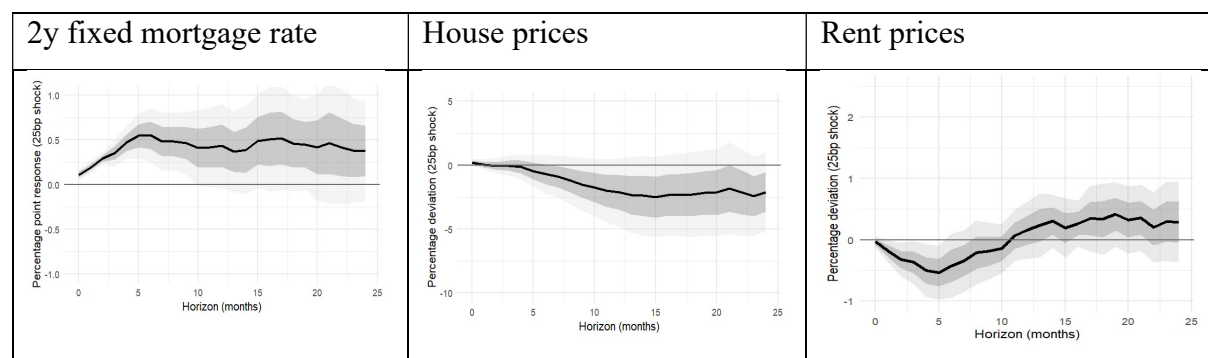
The rent price series and the two-year fixed mortgage rate series are subject to known methodological breaks. For rents, IRFs are estimated over a 2005-2015 subsample and yields responses that are similar in shape and timing to the 2005-2019 sample, confirming robustness to the methodology change. Mortgage rate series exhibit an additional break after

2019 and restricting the sample produces a similar response pattern, but with greater precision, which could point to the COVID-era period rather than data construction.

5.2.3 Alternative Instrument

The choice of monetary policy surprises can impact the estimated effect of monetary policy (Ramey, 2016). To assess the sensitivity of this choice, the analysis is replicated using an alternative high frequency monthly shock series of Cesa-Bianchi et al., (2020), constructed from intraday movements in financial instruments around MPC announcements. As this series is only available up to 2015, estimates are compared with those obtained using the UKMPD shock series over the same restricted sample period. The resulting IRFs are similar to the baseline.

Figure 13: Alternative instrument test



6. Limitations

As with all research, it is important to acknowledge the limitations. First, the IRF point estimates should be interpreted with care, with greater emphasis on the shape and direction than precise magnitudes. The 95% confidence intervals contain zero across all three outcomes, and the 68% bands exclude zero over narrow ranges. This is partly a methodological feature of LPs as they produce less precise estimates than SVARs in trade off for lower bias. The lag-augmented approach applied likely amplifies this by trading degrees of freedom for valid inference under non-stationary. Whilst this is a useful approach as you can estimate using non-stationary data, it would be useful to estimate a SVAR on the same dataset as a benchmark to directly compare estimates and confidence intervals and determine the trade-offs.

Second, LPs trace dynamic responses but do not identify the underlying transmission channels so the relative contributions cannot be estimated within this framework. Therefore, an extension would be to estimate a structural model, such as a HANK model to decompose channel specific mechanisms. Region heterogeneity is a further extension, as national IRFs may mask variation driven by local supply and demand or income. Additionally, it would be useful to identify the impact following expansionary monetary policy, given there is limited literature on this.

Finally, there are several data-related limitations that should be considered. The rent price series and the two-year fixed mortgage rate series are subject to methodological and measurement changes over the sample. In particular, the mortgage rate series is reported as an end-of-month rate prior to 2019 and as a monthly average thereafter, while the monetary policy shock series is aggregated from higher frequency data. This temporal misalignment may contribute to imprecise estimation, as end-of-month observations occur after the MPC decision and may already reflect priced-in effects. Additionally, the lead-lag robustness tests for rents fail to reject the null, so these estimates should be interpreted with greater caution.

7. Conclusion and policy relevance

This study examines how contractionary monetary policy transmits to the housing market in Great Britain by analysing the responses of two-year fixed mortgage rates, real house prices, and real rent prices between 2005 and 2024 to an unexpected contractionary shock to Bank Rate. Using an IV-LP approach, identified with high-frequency monetary policy surprises, the analysis traces the transmission over 24 months. It extends the existing UK literature by incorporating more of the recent tightening cycle, adding findings on rents and fixed mortgage rates, and applying a methodological approach that has not been applied extensively on UK house data.

The primary aim was to assess the cash-flow transmission channel operating through mortgage rates to influence housing demand and prices. The results suggest that pass-through via the two-year fixed mortgage rate is limited and delayed than expected, possibly due to the fact fixed rates are priced from expected future policy paths rather than the current Bank Rate. Real house prices decline persistently with a lag, suggesting that housing market adjustment is likely contributed to by other transmission channels alongside cash-flow, such as intertemporal substitution and wealth. In contrast, real rents rise gradually before reverting,

consistent with demand reallocation toward renting alongside cost pass-through from landlords potentially approaching re-mortgage. Taken together, the findings suggest that monetary tightening transmits through the UK housing sector via multiple channels, with the rental market appearing potentially disproportionately affected.

Methodologically, the lag-augmented IV-LP approach is well suited to non-stationary housing data as you can estimate in log-levels with valid inference. However, robustness is at the cost of wider confidence intervals, making precise estimation difficult. Nevertheless, the approach remains informative about the direction and timing of monetary transmission. These conclusions can help guide future research on this topic, particularly in the choice of methodology.

The findings are relevant for policymakers as they provide recent evidence on how monetary policy operates in practice, supporting the forecasting of key housing variables and informing future policy decisions. The differing responses of house prices and rents suggest that housing tenure is an important dimension of transmission, as welfare effects may be unevenly distributed between homeowners and renters. If renters face higher prices during monetary tightening, this may represent an unintended consequence, implying that targeted support policies could be warranted. Furthermore, the finding that estimates are more precise in the pre-COVID period suggests that volatility and regime change may influence how monetary policy transmits to the real economy, with implications for policy design in uncertain environments. Given that some estimates are imprecise, further work would help solidify these conclusions.

Bibliography

Abramson, B., Han, L., and De Llanos, P., (2025) Monetary Policy and Rents. Available at SSRN: <https://ssrn.com/abstract=5353365>

Albuquerque, D., and Lenney, J., (2023). Is UK monetary policy driving private housing rents? [online] Bank Underground. Available at: <https://bankunderground.co.uk/2023/12/20/is-uk-monetary-policy-driving-private-housing-rents/>.

Albuquerque, D., Lazarowicz, T., and Lenney, J., (2025). Monetary transmission through the housing sector. Available at: <https://www.bankofengland.co.uk/working-paper/2025/monetary-transmission-through-the-housing-sector>.

Bank of England (2023). How are households adjusting to rising mortgage costs? [www.bankofengland.co.uk](https://www.bankofengland.co.uk/bank-overground/2023/how-are-households-adjusting-to-rising-mortgage-costs). Available at: <https://www.bankofengland.co.uk/bank-overground/2023/how-are-households-adjusting-to-rising-mortgage-costs>.

Bank of England (2023) How do higher interest rates help to lower inflation?, www.bankofengland.co.uk. Available at: <https://www.bankofengland.co.uk/explainers/how-do-higher-interest-rates-help-to-lower-inflation>.

Bank of England (2026). Bank Rate maintained at 3.75% - April 2026 Monetary Policy Summary and Minutes. Available at: <https://www.bankofengland.co.uk/monetary-policy-summary-and-minutes/2026/april-2026>.

Bank of England (BoE) Database (2026). Official Bank Rate History. Bank of England. Available at: <https://www.bankofengland.co.uk/boeapps/database/Bank-Rate.asp>.

Barasinska, N, Haenle, P, Koban, A, Schmidt A., (2019). Stress testing the German mortgage market. [online] Available at: <https://www.bundesbank.de/en/publications/research/discussion-papers/stress-testing-the-german-mortgage-market-797522>

Bernanke, B.S. and Gertler, M. (1995). Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives*, 9(4), pp.27–48. Available at: <https://www.aeaweb.org/articles?id=10.1257/jep.9.4.27>.

Bernanke, B. S., & Kuttner, K. N. (2005). What Explains the Stock Markets Reaction to Federal Reserve Policy *The Journal of Finance*, 60, 1221-1257. - References - Scientific Research Publishing (2024) Scirp.org. Available at: <https://www.scirp.org/reference/referencespapers?referenceid=3811704> (Accessed: 5 May 2026).

BoE (2013). The Bank of England’s forecasting platform: COMPASS, MAPS, EASE and the suite of models. Available at: <https://www.bankofengland.co.uk/working-paper/2013/the-boes-forecasting-platform-compass-maps-ease-and-the-suite-of-models>.

Braun, R., Miranda-Agrippino, S. and Saha, T. (2024). Measuring monetary policy in the UK: the UK Monetary Policy Event-Study Database. Available at: <https://www.bankofengland.co.uk/working-paper/2023/measuring-monetary-policy-in-the-uk-ukmpd>.

Burr, N. and Willems, T. (2024). About a rate of (general) interest: how monetary policy transmits. www.bankofengland.co.uk. Available at: <https://www.bankofengland.co.uk/quarterly-bulletin/2024/2024/about-a-rate-of-general-interest-how-monetary-policy-transmits>.

Calza, A., Monacelli, T. and Stracca, L. (2013). Housing Finance and Monetary Policy. *Journal of the European Economic Association*, 11, pp.101–122. Available at: <https://www.jstor.org/stable/23355061>.

- Castellanos, J. (2025). Local Projections vs. VARs for structural parameter estimation. [online] Bank of England working papers. Available at: <https://ideas.repec.org/p/boe/boeewp/1116.html>
- Cesa-Bianchi, A., Thwaites, G. and Vicondoa, A. (2020). Monetary policy transmission in the United Kingdom: A high frequency identification approach. *European Economic Review*, 123, p.103375. doi: <https://doi.org/10.1016/j.eurocorev.2020.103375>.
- De Stefani, A., and Mano, R. (2025) "Long-Term Debt and Short-Term Rates: Fixed-Rate Mortgages and Monetary Transmission", IMF Working Papers 2025, 024, <https://doi.org/10.5089/9798400296086.001>
- Dias, D.A. and Duarte, J.B. (2019). Monetary policy, housing rents, and inflation dynamics. *Journal of Applied Econometrics*, 34(5), pp.673–687. doi: <https://doi.org/10.1002/jae.2679>.
- Ehrenbergerova, D., Bajzik, J. and Havranek, T. (2022). When Does Monetary Policy Sway House Prices? A Meta-Analysis. *IMF Economic Review*. doi: <https://doi.org/10.1057/s41308-022-00185-5>.
- English Housing Survey, (2024). English Housing Survey 2024 to 2025: headline findings on demographics and household resilience. [online] GOV.UK. Available at: <https://www.gov.uk/government/collections/english-housing-survey-2024-to-2025-headline-findings-on-demographics-and-household-resilience>.
- Fitch. (2020). Unique Features of Mortgage Markets: Germany. Available at: <https://www.fitchratings.com/research/structured-finance/covered-bonds/unique-features-of-mortgage-markets-germany-04-06-2020>
- Gertler, M. and Karadi, P. (2015). Monetary Policy Surprises, Credit Costs, and Economic Activity. *American Economic Journal: Macroeconomics*, 7(1), pp.44–76. doi:<https://doi.org/10.1257/mac.20130329>.
- Heffernan, S.A. (1997). Modelling British Interest Rate Adjustment: An Error Correction Approach. *Economica*, 64(254), pp.211–231. doi: <https://doi.org/10.2307/2554789>.
- Hofmann, B., and Mizen, P., (2004). Interest Rate Pass-Through and Monetary Transmission: Evidence from Individual Financial Institutions' Retail Rates. *Economica*, 71, 99-123. Available: [PDF] Interest Rate Pass-Through and Monetary Transmission: Evidence from Individual Financial Institutions' Retail Rates | Semantic Scholar
- Iacoviello, M. and Minetti, R. (2008). The credit channel of monetary policy: Evidence from the housing market. *Journal of Macroeconomics*, 30(1), pp.69–96. Available at: https://econpapers.repec.org/article/eeejmacro/v_3a30_3ay_3a2008_3ai_3a1_3ap_3a69-96.htm
- Jordà, Ò. (2005). Estimation and Inference of Impulse Responses by Local Projections. *American Economic Review*, 95(1), pp.161–182. doi: <https://doi.org/10.1257/0002828053828518>.

- Kiyotaki, N. and Moore, J. (1997). Credit Cycles. *Journal of Political Economy*, 105(2), pp.211–248. doi: <https://doi.org/10.1086/262072>.
- Kuttner, K.N. (2001) ‘Monetary policy surprises and interest rates: Evidence from the Fed funds futures market’, *Journal of Monetary Economics*, 47(3), pp. 523–544.
- Lazarowicz, T., and Richard., M. (2023) Winners and Losers from Monetary Policy: Evidence from the UK Rental Market. Available at: https://morganemrichard.github.io/morganerichard.com/Thomas_Lazarowicz_Morgane_Richard_paper.pdf
- Meltzer, A.H. (1995). Monetary, Credit and (Other) Transmission Processes: A Monetarist Perspective. *Journal of Economic Perspectives*, 9(4), pp.49–72. doi: <https://doi.org/10.1257/jep.9.4.49>.
- Mishkin, F.S. (1995). Symposium on the Monetary Transmission Mechanism. *Journal of Economic Perspectives*, 9(4), pp.3–10. doi: <https://doi.org/10.1257/jep.9.4.3>.
- Montiel Olea, J.L. and Plagborg-Møller, M. (2021). Local Projection Inference Is Simpler and More Robust Than You Think. *Econometrica*, 89(4), pp.1789–1823. Doi: <https://doi.org/10.3982/ecta18756>.
- ONS (2022). Household total wealth in Great Britain. [ons.gov.uk](https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/totalwealthingreatbritain/april2020tomarch2022). Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/totalwealthingreatbritain/april2020tomarch2022>.
- Plagborg-Møller, M. and Wolf, C.K. (2021). Local Projections and VARs Estimate the Same Impulse Responses. *Econometrica*, 89(2), pp.955–980. doi: <https://doi.org/10.3982/ecta17813>.
- Private Finance. (2024). Will my mortgage rate drop if the base rate falls? [online] Available at: <https://www.privatefinance.co.uk/mortgage-rate-drop-if-base-rate-falls/>
- Pustejovsky, J. (2026). 1.1 Testing treatment effects. [online] Available at: <https://cran.r-project.org/web/packages/clubSandwich/vignettes/Wald-tests-in-clubSandwich.html>.
- Ramey, V. (2016). Macroeconomic Shocks and Their Propagation. doi: <https://doi.org/10.3386/w21978>.
- Sims, C.A. (1980). Macroeconomics and reality. *Econometrica*, 48(1), p.1. doi: <https://doi.org/10.2307/1912017>.
- Smith, J. (2023). Watch: Focus shifts to rate cuts as the Bank of England breaks its cycle. ING THINK. Available at: <https://think.ing.com/articles/watch-focus-shifts-to-rate-cuts-as-bank-of-england-breaks-the-cycle/>
- Smith, J. (2023). Watch: Focus shifts to rate cuts as the Bank of England breaks its cycle. ING THINK. Available at: <https://think.ing.com/articles/watch-focus-shifts-to-rate-cuts-as-bank-of-england-breaks-the-cycle/>

Staiger, D. and Stock, J.H. (1997) 'Instrumental Variables Regression with Weak Instruments', *Econometrica*, 65(3), p. 557. Available at: <https://doi.org/10.2307/2171753>.

Stock, J.H. and Watson, M.W. (2018). Identification and Estimation of Dynamic Causal Effects in Macroeconomics Using External Instruments. *The Economic Journal*, 128(610), pp.917–948. doi: <https://doi.org/10.1111/eoj.12593>.

Uswitch, (2024). UK Mortgage Statistics 2024. Uswitch. Available at: <https://www.uswitch.com/mortgages/mortgage-statistics/>.

Zemaityte, G., Hughes, E., Blood, K. (2023). The buy-to-let sector and financial stability. www.bankofengland.co.uk. Available at: <https://www.bankofengland.co.uk/quarterly-bulletin/2023/2023/the-buy-to-let-sector->

Data

2y Fixed-Mortgage Rate: Bankofengland.co.uk. (2026). *IUMB34 | Bank of England | Database*. Available at: <https://www.bankofengland.co.uk/boeapps/database/fromshowcolumns.asp?Travel=NixAZxSUx&FromSeries=1&ToSeries=50&DAT=RNG&FD=1&FM=Jan&FY=2020&TD=1&TM=Jan&TY=2040&FNY=Y&CSVF=TT&html.x=66&html.y=26&SeriesCodes=IUMB34&UsingCodes=Y&Filter=N&title=IUMB34&VPD=Y> [Accessed 5 May 2026].
Bank Rate: Bank of England (2026). *Official Bank Rate History*. [online] Bank of England. Available at: <https://www.bankofengland.co.uk/boeapps/database/Bank-Rate.asp>.

House Prices: UK House Price Index: monthly price statistics - Office for National Statistics (no date) www.ons.gov.uk. Available at: <https://www.ons.gov.uk/economy/inflationandpriceindices/datasets/ukhousepriceindexmonthlypricestatistics>.

Real GDP: ONS (2025) Gross Domestic Product (GDP) - Office for National Statistics, ons.gov.uk. Available at: <https://www.ons.gov.uk/economy/grossdomesticproductgdp>.

Rent Prices: ONS (2026) Private rent and house prices, UK, ons.gov.uk. Office for National Statistics. Available at: <https://www.ons.gov.uk/economy/inflationandpriceindices/bulletins/privaterentandhousepricesuk/february2026>.

CPI Index (2015): ons.gov.uk. (2015). CPIH INDEX 00: ALL ITEMS 2015=100 - Office for National Statistics. [online] Available at: <https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/1522/mm23>.

UKMPD Shock series: Braun, R., Miranda-Agrippino, S. and Saha, T. (2024). Measuring monetary policy in the UK: the UK Monetary Policy Event-Study Database. Available at: <https://www.bankofengland.co.uk/working-paper/2023/measuring-monetary-policy-in-the-uk-ukmpd>.

Alternative shock series: Cesa-Bianchi, A., Thwaites, G. and Vicondoa, A. (2020). Monetary policy transmission in the United Kingdom: A high frequency identification approach. *European Economic Review*, 123, p.103375. doi: <https://doi.org/10.1016/j.eurocorev.2020.103375>.

9. Appendix

Figure 1: Bai-Perron break test

Variable	Breaks
Real House Prices	“2010-09-30”, “2015-05-31”, “2021-01-31”
Real Rent Prices	“2009-09-30”, “2015-06-30”, “2020-05-31”
Mortgage	“2008-12-31”, “2016-02-30”, “2021-03-30”

Figure 2: Headline IRF tables:

Mortgage rates

Horizon	Beta coefficient	Standard errors	Significant at 5%	Significant at 32%
0	0.087415594	0.048370645	Yes	No
1	0.033085893	0.156985022	No	No
2	0.12675351	0.14966775	No	No
3	0.122349239	0.140016392	No	No
4	0.131001859	0.222113728	No	No
5	0.149242995	0.191629761	No	No
6	0.205823885	0.157272682	Yes	No
7	0.10112276	0.157476657	No	No
8	0.094889857	0.149249953	No	No
9	0.075646979	0.163061034	No	No
10	0.069917002	0.182183797	No	No
11	0.019903397	0.210766759	No	No
12	-0.00461609	0.259284703	No	No

13	-0.06721439	0.292175076	No	No
14	-0.082851287	0.307564908	No	No
15	-0.064927238	0.303981647	No	No
16	-0.064684246	0.283722606	No	No
17	0.012372542	0.258332733	No	No
18	0.070215018	0.2513148	No	No
19	0.114569573	0.236425064	No	No
20	0.039539577	0.282870847	No	No
21	0.094501867	0.282665971	No	No
22	0.008652768	0.302314919	No	No
23	0.034833396	0.28239377	No	No
24	0.015338062	0.283337406	No	No

House prices

Horizon	Beta coefficient	Standard errors	Significant at 5%	Significant at 32%
0	0.098163611	0.122812295	No	No
1	0.069602099	0.261836433	No	No
2	-0.050237931	0.367760005	No	No
3	-0.037405859	0.476670333	No	No
4	-0.05480188	0.700595359	No	No
5	-0.187754237	0.875407629	No	No
6	-0.534314026	1.029421222	No	No
7	-0.472783675	1.245412374	No	No
8	-0.89218207	1.448703556	No	No
9	-1.155348606	1.681924221	No	No
10	-1.42887145	1.864207318	No	No
11	-1.655653516	2.027446624	No	No
12	-1.748739456	2.085089402	No	No
13	-1.851738852	2.145706404	No	No
14	-1.820106643	2.213080006	No	No
15	-1.891053539	2.214078287	No	No
16	-1.824847949	2.329123861	No	No

17	-1.707792144	2.233829088	No	No
18	-1.93731077	2.195111853	No	No
19	-2.650102263	2.564390088	Yes	No
20	-2.738496084	2.419123774	Yes	No
21	-2.703984155	2.374961579	Yes	No
22	-3.216213235	2.528041812	Yes	No
23	-3.433262089	2.713224022	Yes	No
24	-3.475583661	2.772880786	Yes	No

Rent prices

Horizon	Beta coefficient	Standard errors	Significant at 5%	Significant at 32%
0	u	0.05457576	No	No
1	-0.012353118	0.14661173	No	No
2	-0.047487851	0.16051961	No	No
3	0.007467976	0.172680187	No	No
4	-0.019919758	0.228286287	No	No
5	-0.034775994	0.28465059	No	No
6	-0.028011023	0.26753087	No	No
7	0.120519571	0.311775194	No	No
8	0.272178651	0.354813716	No	No
9	0.282553194	0.340991009	No	No
10	0.215173402	0.319855727	No	No
11	0.40082607	0.345423687	Yes	No
12	0.559832298	0.397754311	Yes	No
13	0.704089379	0.424141421	Yes	No
14	0.740487818	0.438083987	Yes	No
15	0.764173175	0.4749072	Yes	No
16	0.695030564	0.452343086	Yes	No
17	0.71340794	0.483033791	Yes	No
18	0.686393221	0.45153483	Yes	No
19	0.385435838	0.340744729	Yes	No
20	0.248328595	0.32464308	No	No

21	0.227406115	0.328066704	No	No
22	-0.024180154	0.3980862	No	No
23	0.041815954	0.398826889	No	No
24	-0.049875452	0.425552978	No	No

Figure 3: Alternative lags: Real house prices

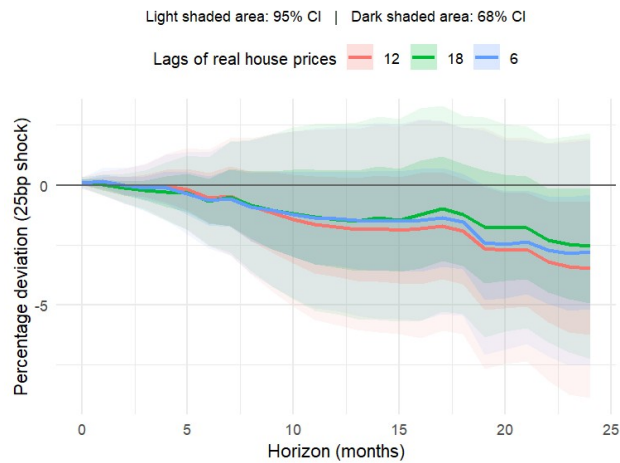
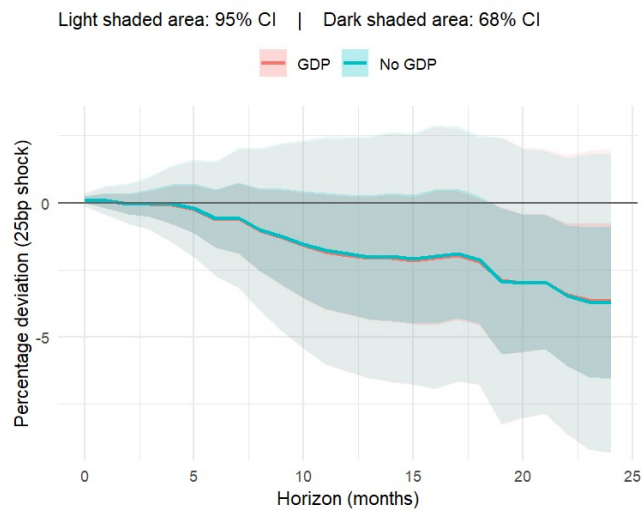


Figure 4: GDP: Real house prices



8.