Monetary Transmission through the Rental Sector

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Motivation

In 2023 rising interest rates were frequently cited as a driver of increasing housing rents

Bloomberg.com
UK Rents to Rise 25% by 2026 as Landlords Pass On Mortgage Costs
Britain's tenants are feeling much more pressure from soaring interest rates than the rest of the housing market.

Evening Standard
Rental crisis looms as landlords face 'hike rents or sell up' dilemma
The UK rental market could be facing a crisis, the Bank of England warned, as landlords facing surging mortgage rates may have to choose...

The Telegraph
Landlord mortgage crisis on track to trigger the sale of 735,000 rental homes
Landlords risk being forced to sell more than 700,000 properties because of rising interest rates, economists have warned, as Jeremy Hunt...

Motivation

▶ Rising interest rates should increase rental yields but what adjusts? House prices or rents?

$$p_r = \frac{u_h}{u_c} \tag{1}$$

$$p_h = p_r + \frac{1}{1+r'}p_{h'} \tag{2}$$

▶ The evidence base (theoretical and empirical) is relatively thin for how monetary policy affects housing rents. ▶ Lit Review

▶ Housing is seen as a quantitatively important channel of monetary transmission (Slacalek et al. (2020)) but is often neglected/unquantified in models of monetary policy.

Key Questions & Preliminary Answers

1. Empirically how do rental prices (and house prices) respond to monetary policy innovations in the UK?
   * Rising interest rates tend to put upward pressure on rental prices in the first 12 months.
   * House price slowly fall and by a lot.
2. Can the empirical evidence be rationalised and quantified in a model of monetary policy (HANK model)?
   * Yes but house price expectation formation seem key.
3. *Future: What is the implications of having financially constrained landlords?*

Empirical setup

$$y_{t+h} = \alpha_h + \theta_{r,h}\Delta i_t + \gamma_h X_{t-1} + \epsilon_{t+h} \tag{3}$$

▶ Local Projections approach on UK data using high frequency shocks as in Braun et al. (2023).

▶ Instrument the 1 year government yield i using sterling futures contracts.

▶ Shocks further cleaned for information effects as in Bauer and Swanson (2023)

▶ Sample 2005m1-2019m12 due to availability of ONS Rental index

▶ Controls include lags of endogenous variable and in line with Cesa-Bianchi et al. (2020): GDP, Corporate spreads,Exchange rate, FTSE all share and CPI excl ooh (12 lags). ▶ SVAR IRFs

Housing Rents and House Prices

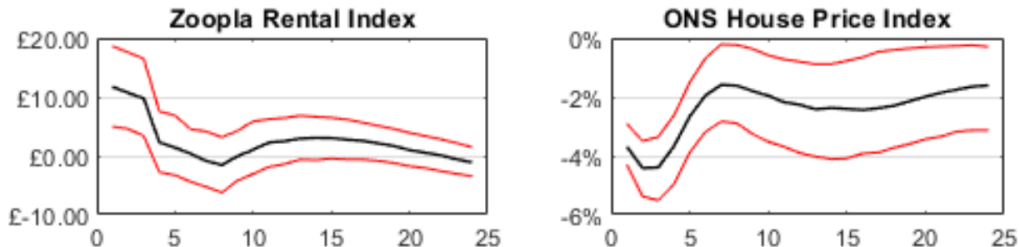**Figure** Response to a 1 PP Monetary Policy shock
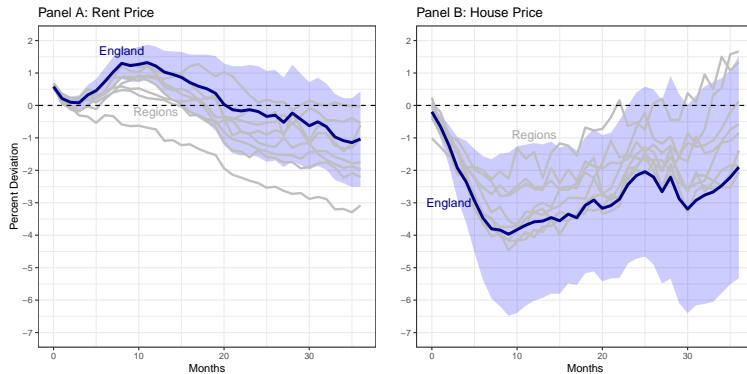
Note: 1 standard deviation Newey-West HAC confidence interval shaded in blue.

# Housing Rents and House Prices (Lazarowicz and Richard, 2023)

Figure Response to a 1 PP Monetary Policy shock

Note: Based on Proxy SVAR with a constructed Zoopla Rental Index, ONS HPI, Two year gilt rate, Brent Crude, CPI, Two year mortgage rate. Sample 2012-2020. Red lines indicate 1 standard deviation bands based on a MBB.

Tenant Demand & Landlord Supply

Figure Response to a 1 PP Monetary Policy shock
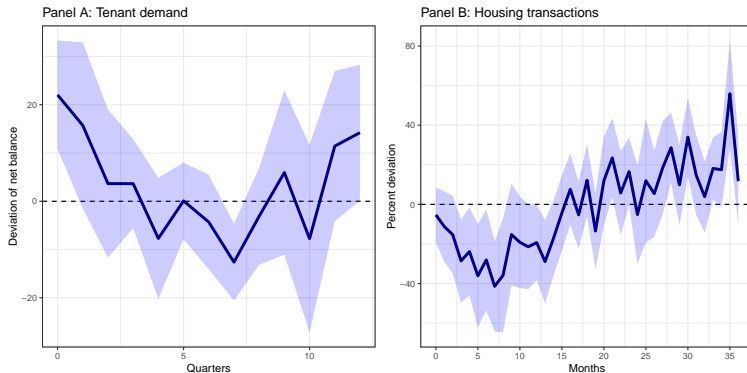
Note: 1 standard deviation Newey-West HAC confidence interval shaded in blue. Tenant demand is net balance from RICs survey.

Consistency with Theory / Relative Contributions

$$\frac{dp_h}{d\epsilon_r} = \underbrace{\frac{dp_r}{d\epsilon_r}}_{Rent} - \underbrace{\frac{dr'}{d\epsilon_r}p_h\frac{1}{(1+r')^2}}_{Discounting} + \underbrace{\frac{1}{1+r'}\frac{dp_{h'}}{d\epsilon_r}}_{E[p_h]} + Wedge \qquad (4)$$
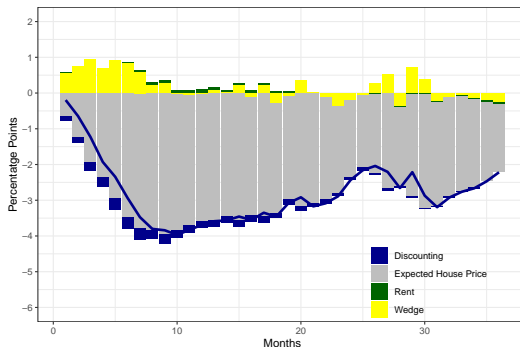

Figure House Price IRF decomposition

Note: Decomposition based on formula $p_h = p_r + \frac{1}{1+r'}p_{h'}$ using IRFs for (p_r, r, p_h).

Model Outline

- ▶ HANK model with:
    - ∗ Sticky wages and prices
    - ∗ No capital.
    - ∗ Taylor rule following central bank.
    - ∗ Government issue debt based on debt stability rule and adjustable labour tax.
- ▶ Households are/can:
    - ∗ Save in a risk free asset. ▶ HH prob
    - ∗ Are subject to idiosyncratic income risk.
    - ∗ Rent a flat or owner occupy (flat or house). [Get additive utility boost from owner occupying.]
    - ∗ Owner occupiers can purchase further flat to rent out.
    - ∗ Households can borrow against housing up to a LTI and LTV constraint. ▶ BC's
    - ∗ Housing transactions incur fixed costs (financial and utility).
- ▶ Model calibrated to typical values in related literature where possible e.g. Auclert et al. (2021).
- ▶ Housing values taken to hit key UK moments 2005-2019.
- ▶ Model solved using linear SSJ method (Auclert et al. (2021)) augmented with Iskhakov et al. (2017) upper envelope solution for discrete choices.

Model Outline: Calibration

Parameter	Value	Comment; Rel. parameter
Frisch	0.5	Auclert et al. (2021)
EIS	0.5	Auclert et al. (2021)
90-10 ratio /1 year Inc. Var	5.25 / 0.2	Income process; $\rho_z = 0.936$, $\sigma_z = 0.678$
Ann. liquid savings to GDP	0.7	β
Share of Renters	0.26	Home ownership utility; ν_h
Share of Landlords	0.08	Rental price markup; μ_r
Ann. Prob of owner to renter	0.0067	Moving utility cost
Ann. landlord exit prob	0.10	Landlord trans. utility cost
Borrowing wedge $\bar{r}(ann)$	0.015	(avg 05-19 of 2yr 75pct)
Transaction cost	$0.02 p_{h,ss}$	Halifax
$\frac{p_{h,ss}}{\bar{y}}$	7	Avg 05-19; $\bar{H}$
Loan to value max κ_h	0.90	PSD 90 pctile. FTB
Loan to income max κ_y	4.5	PSD 90 pctile. FTB
Price Philips Curve κ_p	0.01	Auclert et al. (2021)
Wage Philips Curve κ_w	0.01	Auclert et al. (2021)
Fiscal rules (debt stab.)	0.1	Auclert et al. (2020)
Steady state markup	1.2	Auclert et al. (2021)
Taylor rule ϕ_π / ϕ_y	1.5 / 0	Auclert et al. (2021)

Model Outline: Housing market

▶ Key market clearing conditions on housing:
  * Fixed supply of housing that is insufficient for everyone to own a house.
  * Landlords must meet rental demand (i.e. rental market clears within household sector).
    ✢ Because landlords can only own 1 extra house I fill in wedge between landlords and renters with government supplied housing *HA* (but they passively charge private sector price)

$$\bar{H} = \psi_F(H_r + H_{oof}) + H_{oo} + H_{ll} \tag{5}$$

$$0 = H_{ll} + \bar{H}A - H_r \tag{6}$$

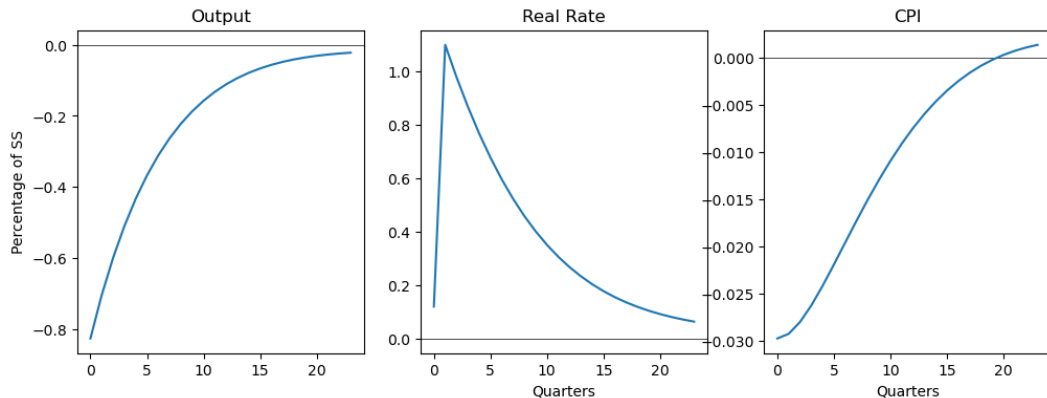$$1 = H_{ll} + H_r + H_{oof} + H_{oo} \tag{7}$$

Standard IRFs

Figure Response to a 1 PP Monetary Policy Shock

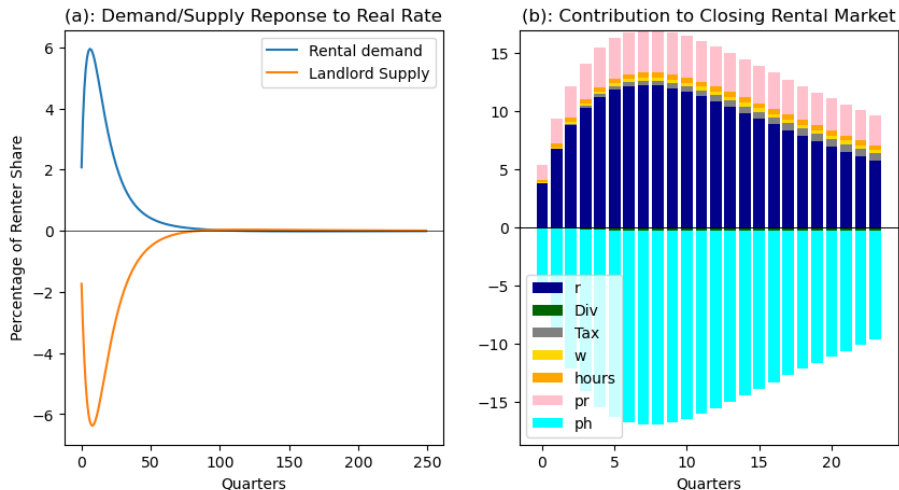# Housing dynamics: Landlord Supply and Tenant Demand

Figure Response to a 1 PP Monetary Policy Shock

Housing dynamics: Housing Sector IRFs

Figure Response to a 1 PP Monetary Policy Shock

Housing dynamics: Housing Sector IRFs

(sticky expectations for house prices as in Auclert et al. (2020))
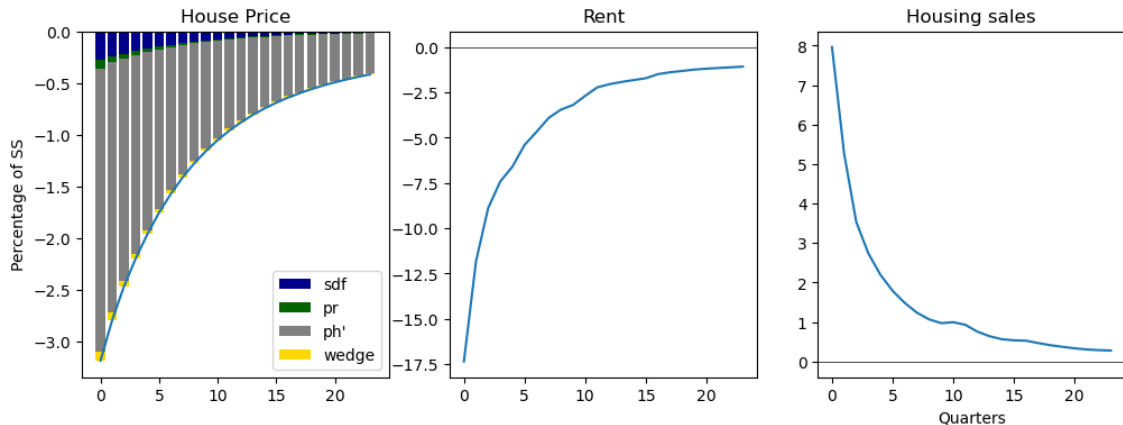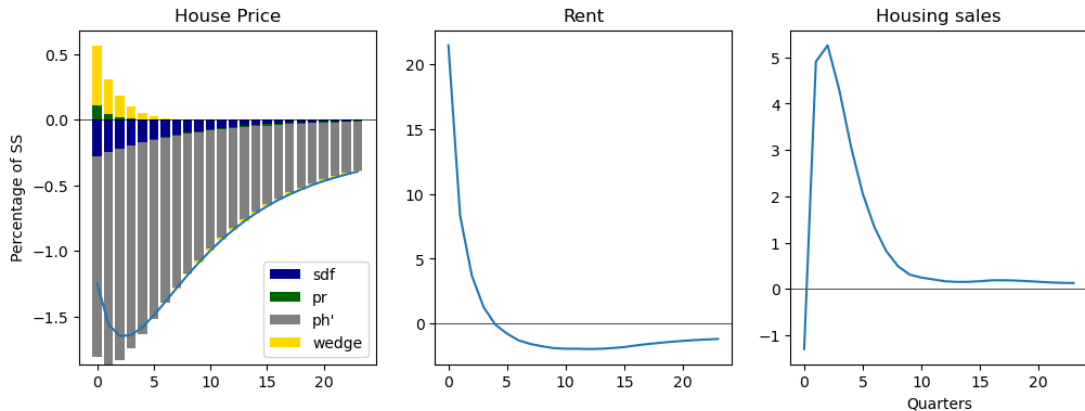

Figure Response to a 1 PP Monetary Policy Shock

Housing dynamics: Housing Sector IRFs

(sticky expectations for all prices as in Auclert et al. (2020))
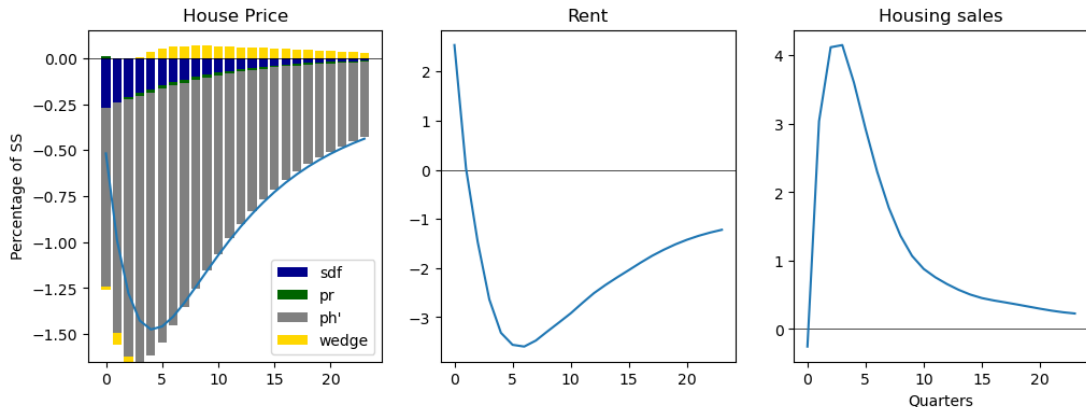
Figure Response to a 1 PP Monetary Policy Shock

Conclusions and Next Steps

► Rising interest rates tend to put upward pressure on rental prices in the first 12 months. House price slowly fall.

► Role of expectations important in order to rationalise in rich HANK model with fixed housing supply.

Next steps/WIP

► Understand better and decompose role of expectations.

► Explore alternative expectations processes e.g. Extrapolative.

► Formal IRF matching exercises.

► Compare to model with commercial rental sector as marginal supplier.

Related literature

- ▶ Dias and Duarte (2019) (US) and Koeniger et al. (2022) (EA) conduct similar empirical work in other areas documenting the response of rents and house prices to monetary policy
- ▶ Their is a significant literature documenting monetary policy transmission through housing e.g. Iacoviello (2005).
- ▶ The HANK literature documents the importance of channels in monetary policy transmission e.g. Kaplan et al. (2018)
- ▶ And some of the HANK literature is now starting to model housing and MP transmission e.g. Kinnerud (2021), Hedlund et al. (2017), Eichenbaum et al. (2022)

▶ back

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Household problem

The households state space is defined by (d,a,z) where d is a housing transition (e.g. rent to own), *a* is their liquid asset position and *z* is their productivity. In each period household proceed through three stages:

1. Aggregate and idiosyncratic shocks are realised
2. They choose which housing transition to make.
3. Households consume and save based on transition specific cash on hand and borrowing constraints.

Value Functions

1. Households receives a idiosyncratic productivity shocks $z \longrightarrow z'$

$$V^{(1)}(d, z, a) = \mathbf{E}[V^{(2)}(d, a, z'|z)] \tag{8}$$

2. Household probabilisticaly transition between tenures based on the following formula (logit choice)

$$V^{(2)}(d, z', a) = \sum_{d'} Prob(d'|d, z', a)\left(V^{(3)}(d', a, z') - \chi(d')\right) \tag{9}$$

$$Prob(d'|d, z', a) = \frac{\exp(\frac{V^{(3)}(d', a, z') - \chi(d')}{\epsilon_z})}{\sum_{d'} \exp(\frac{V^{(3)}(d', a, z') - \chi(d')}{\epsilon_z})} \tag{10}$$

Some transitions may incur a utility cost $\chi(d')$ e.g. moving costs or transitions that lead to default. These utility costs also prevent transitions that would cause negative consumption if borrowing constraints are enforced.

▶ back

Value Functions

3. Households make consumption savings decision based on transition and transition specific borrowing constraints and transition costs *F*.

$$V^{(3)}(d', a - C(d, d'), z') = \max_{a'} u(c, h, d') + \beta \mathbf{E}[V^{(1)}(d', z', a')] \tag{11}$$

$$u(c, h, d) = \frac{c^{1-\sigma}}{1-\sigma} - \phi_h \frac{h^{1+\psi_h}}{1+\psi_h} + \mathbf{1}_{oof} \eta_{oof} + \mathbf{1}_{oo} \eta_{oo} \tag{12}$$

▶ Households have an additive utility in flat owning and house owning. They don't directly control their labour supply because of sticky wages.

▶ This step gets solved using the endogenous grid point method augmented with an upper envelope step (e.g. Ishkakov et al (2017)) to deal with kinks iniduced by the discrete choice.

Transitions, Budget Constraints and Borrowing Constraints

rent - rent: $c + a' = a(1 + r(a)) + y(z) - p_r, \quad a' \geq 0$

rent - own flat: $c + a' = a(1 + r(a)) + y(z) - p_h \psi_F - F, \quad a' \geq max(-\kappa_y y, -\kappa_h p_h \psi_F)$

own flat - own flat: $c + a' = a(1 + r(a)) + y(z), \quad a' \geq min(a, max(-\kappa_y y, -\kappa_h p_h \psi_F))$

own flat - rent: $c + a' = a(1 + r(a)) + y(z) + p_h \psi_F - F - p_r, \quad a' \geq 0$

own flat - own: $c + a' = a(1 + r(a)) + y(z) + p_h \psi_F - p_h - 2F, \quad a' \geq max(-\kappa_y y, -\kappa_h p_h)$

own - own: $c + a' = a(1 + r(a)) + y(z), \quad a' \geq min(a, max(-\kappa_y y, -\kappa_h p_h))$

own - rent: $c + a' = a(1 + r(a)) + y(z) + p_h - F - p_r, \quad a' \geq 0$

own - own flat: $c + a' = a(1 + r(a)) + y(z) - p_h \psi_F + p_h - 2F, \quad a' \geq max(-\kappa_y y, -\kappa_h p_h * \psi_F)$

own - landlord: $c + a' = a(1 + r(a)) + y(z) - p_h \psi_F - F + p_r, \quad a' \geq max(-\kappa_y y - \psi_F * \kappa_h * p_h, -(1 + \psi_F)\kappa_h p_h)$

landlord - own: $c + a' = a(1 + r(a)) + y(z) + p_h \psi_F - F, \quad a' \geq max(-\kappa_y y, -\kappa_h p_h)$

landlord - landlord: $c + a' = a(1 + r(a)) + y(z) + p_r, \quad a' \geq min(a, max(-\kappa_y y - \psi_F * \kappa_h * p_h, -(1 + \psi_F)\kappa_h p_h))$

F is a fixed transaction cost. $y(z)$ is after tax income from labour and dividend.

Monetary SVAR

Impulse response to monetary shock. Proxy-SVAR approach. ▸ back