# Macroprudential Policy Interactions in a Sectoral DSGE Model with Staggered Interest Rates
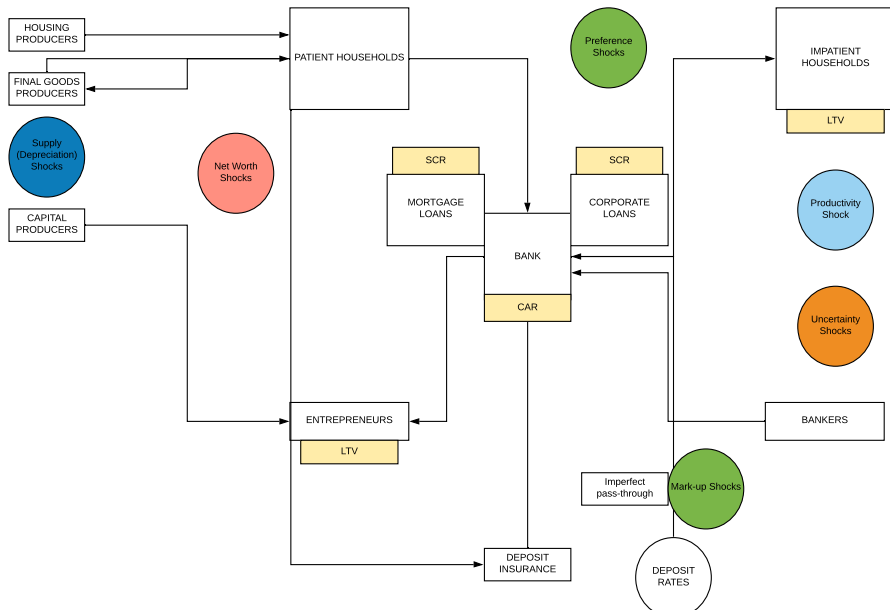
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# Overview

- Model summary

- Estimation highlights

- Macroprudential Policy (CAR, SCR, LTV & CCyB)

- Interest rate pass-through & Macroprudential policy

# Model Overview

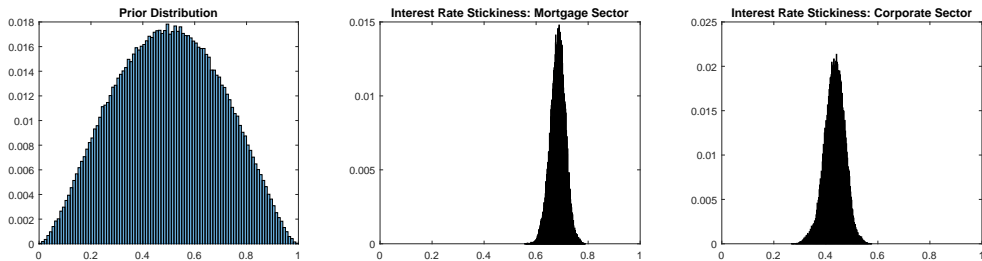## Estimation-I

- Quarterly data for the U.K. economy over 1998Q1-2016Q4.

- 10 observables in:

  - Interest rates (Official bank rate, mortgage & corporate rates)

  - Real growth rates (output, investment, consumption and wages)

  - Credit growth rates (mortgage & corporate sectors)

  - House price growth

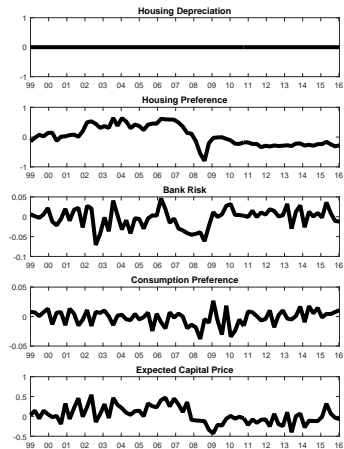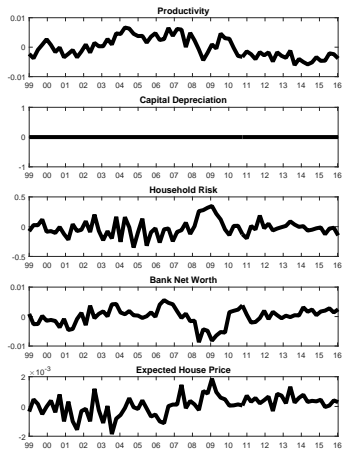- Model (partially) estimated using Bayesian likelihood methods.

# Estimation-II

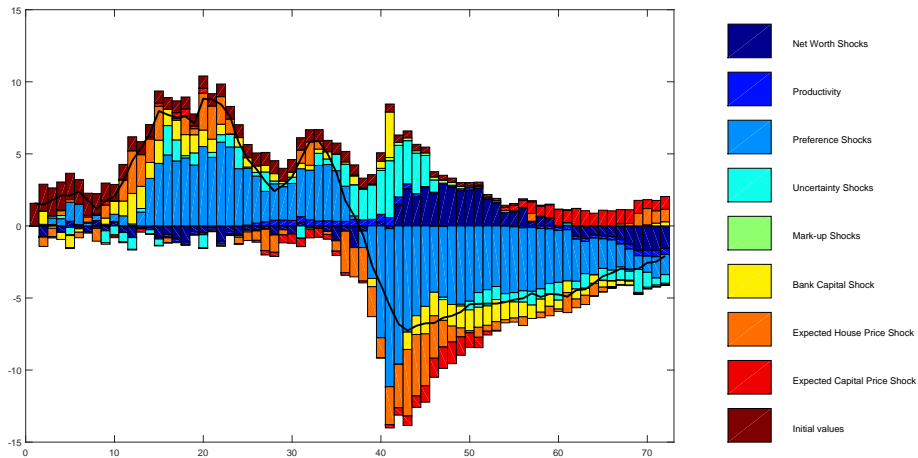Figure: Example: estimated interest-rate pass through



- Average Bank Rate pass-through is [4.73, 5.93] months on corporate rates and [8.21, 11.1] months on mortgage rates.
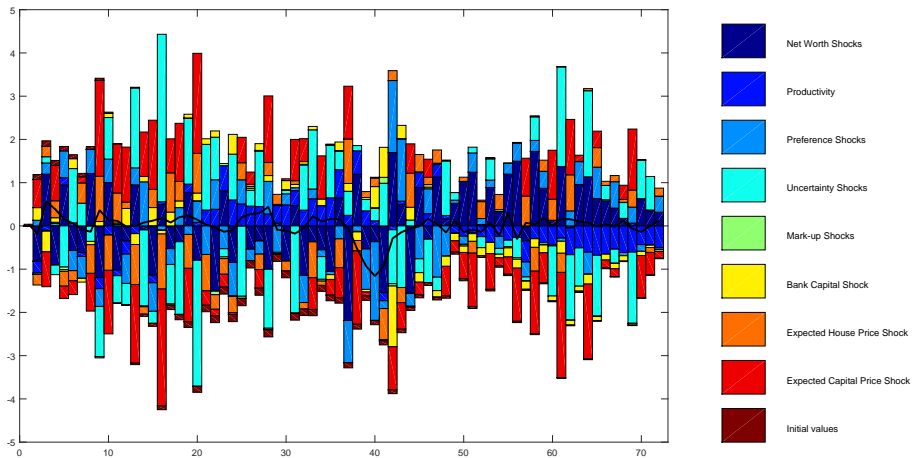
# Estimated shocks over 1998Q1-2016Q4.

- Sequence of shocks over the estimation sample.

# Historical Variance Decomposition: Household Lending Growth



Legend:
- Net Worth Shocks
- Productivity
- Preference Shocks
- Uncertainty Shocks
- Mark-up Shocks
- Bank Capital Shock
- Expected House Price Shock
- Expected Capital Price Shock
- Initial values

# Historical Variance Decompositions: Output Growth



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- Net Worth Shocks
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# Some key unobservables estimated by the model

▶ Household defaults are dominant during the crisis period.

▶ Welfare of both household types have an upward trend before the crisis, and downward afterwards.
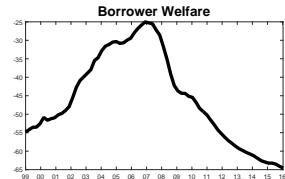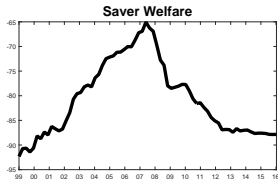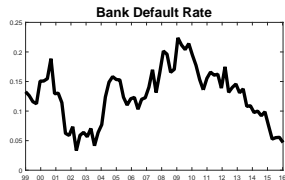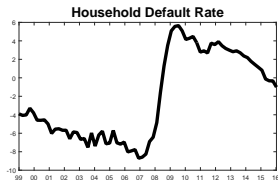
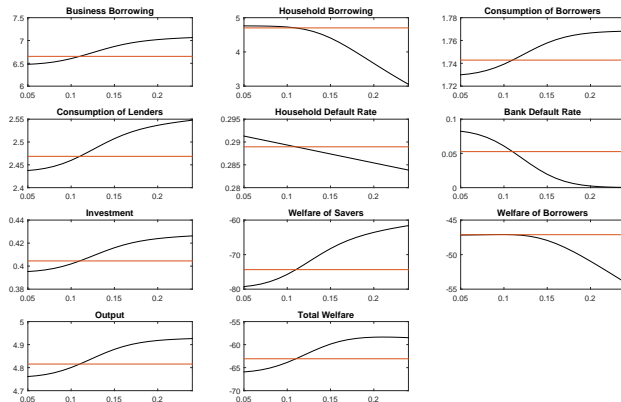# Macroprudential Policy

- Available tools in the model:
  - Minimum and sectoral capital requirements (Benchmark: 11 % CAR, no SCR)
  - LTV limit on businesses and households (Benchmark: 86 %)
  - CCyB (Benchmark: 0)

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- Steady-state welfare analysis

- Counterfactuals

- Interest rate stickiness & Macroprudential tools interaction

## Example: Sectoral Capital Requirements on Mortgage Lending and Key Variables in Steady-state

## Optimal Policies

- Ad-hoc mean-variance objective: $E[W_t] - \omega\sqrt{Var[W_t]}$

## Optimal Policies

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Table: Optimal macroprudential parameters, one at a time. Results with $\omega = 0.1$. Benchmark values are: 11 % for CAR, 86 % for LTV limit, no SCR.

| Parameter | Optimal Value | Welfare Improvement |
|---|---|---|
| LTV Limit | 86.6 % | 0.001 % |
| SCR-Mortgage | 17.6 % (11 % CAR, 6.6 % add-on) | 4.26 % |
| SCR-Corporate | 16.7 % (11 % CAR, 5.7 % add-on) | 3.22 % |
| CAR | 14.5 % | 3.82 % |

# Optimal Policies

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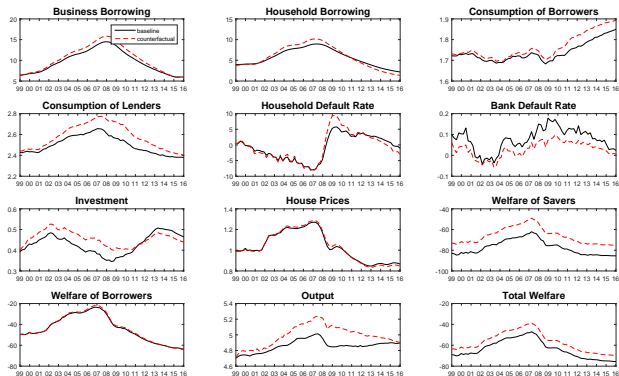| Parameter | Optimal Value | Welfare Improvement |
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Table: Optimal joint SCRs and LTV

| Parameter | |
|---|---|
| LTV | 94.06 % |
| SCR-Mortgage | 15.88 % |
| SCR-Corporate % | 12.5 % |
| Welfare Improvement | 4.8 % |

- **Larger improvement with lower SCRs when macroprudential tools are coordinated.**
- LTV limit can be relaxed if SCRs are sufficiently high.
- CCyB is not as effective as CAR & SCRs.

# Counterfactual with optimized policies

Figure: Counterfactual I with optimized values: $\phi_H = 15.8\%$, $\phi_F = 12.5\%$, $\epsilon_H = 94\%$.

# Counterfactual with CCyB