Housing Market Spillovers: Evidence from an Estimated DSGE Model

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Summary - what do they do?

- Estimate DSGE model using Bayesian methods to explore the housing - monetary policy nexus

Starts from standard NK model. Adds:

- A second sector, "residential construction"
- Collateral constraint on borrowing for households
- Two types of households: borrowers and lenders

Key results

1. Model fits data well - standard deviations and contemporaneous correlations.
2. Trends in house prices and residential investment explained by relative productivity trend in construction sector
3. Over the business cycle 3 factors explain housing sector:
   - Housing demand shocks (1/4)
   - Housing supply shocks (1/4)
   - Monetary factors, 20%
4. Spillovers from housing to macro:
   - MPC out of housing wealth: 0.10 $\Rightarrow$ 0.12, due to collateral constraint
   - 4% (early period) to 12% (recent period) of variance in consumption growth due to collateral effects

Great paper

- ...so good that we actually used it!
- This paper is state of the art - unrivaled empirically relevant analysis of housing and monetary policy

Outline of my comments

- Is the model assumptions more suitable to another country than U.S.?
  - Mortgage contracts
  - Cross-correlations
- Interpretation of key results
  - Are spillovers substantial?
  - Trend in house prices - land or technology?
- Model details and estimation issues

Mortgage contracts

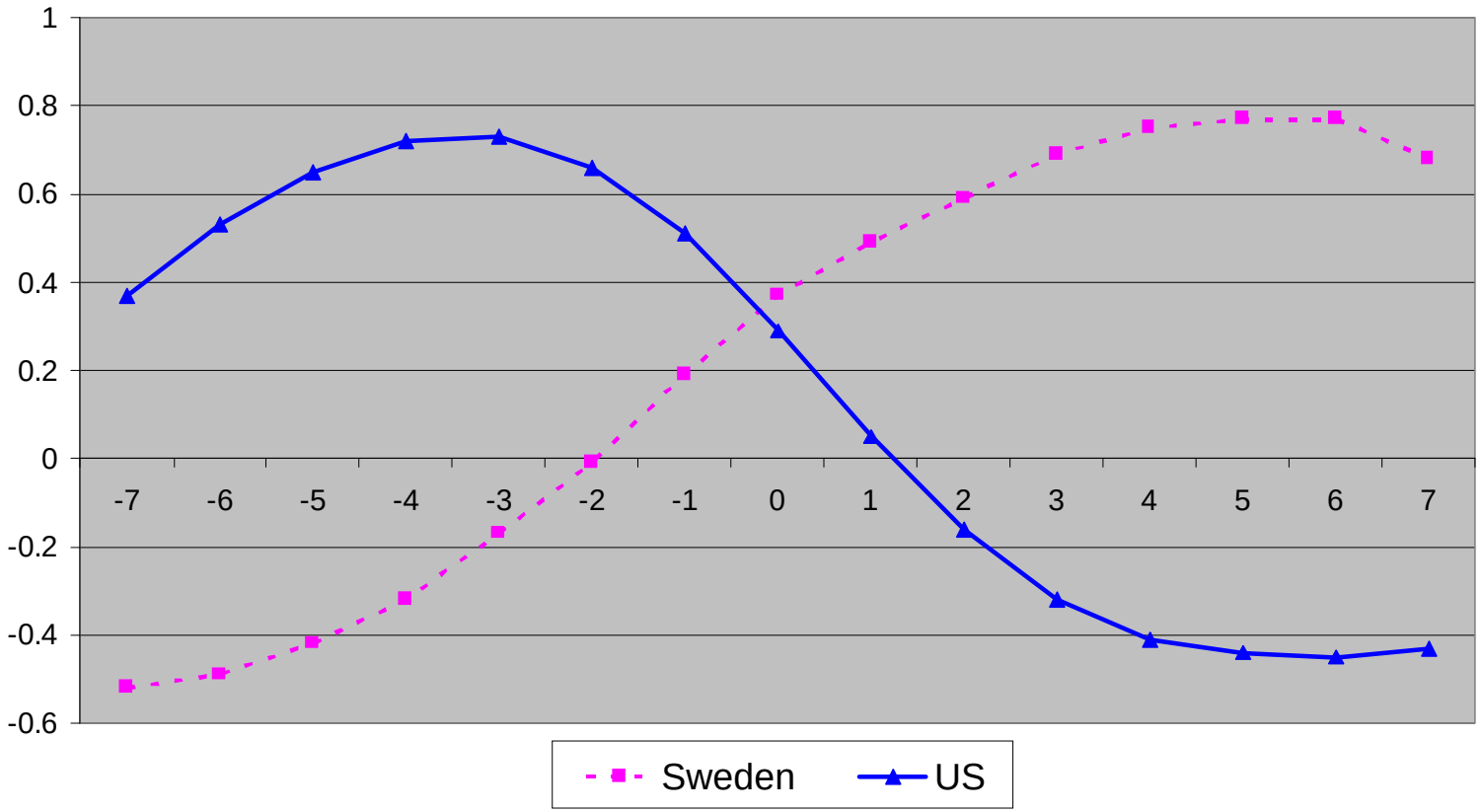
1-quarter loan contracts. Two problems:

- Interest rate changes period by period (ok for ARMs)
- Collateral constraint applies period-by-period

Residential investment leads business cycle

- Stylized fact that residential investment leads business cycle (Fisher, Leamer)
  - True for U.S. data,
  - Instead lags in Sweden, Italy, Germany, Norway
  - Contemporaneous in U.K. and Canada (and in **model**)

Cross-correlations IH(t+j),IK(t)



Spillovers

Need for clarification:

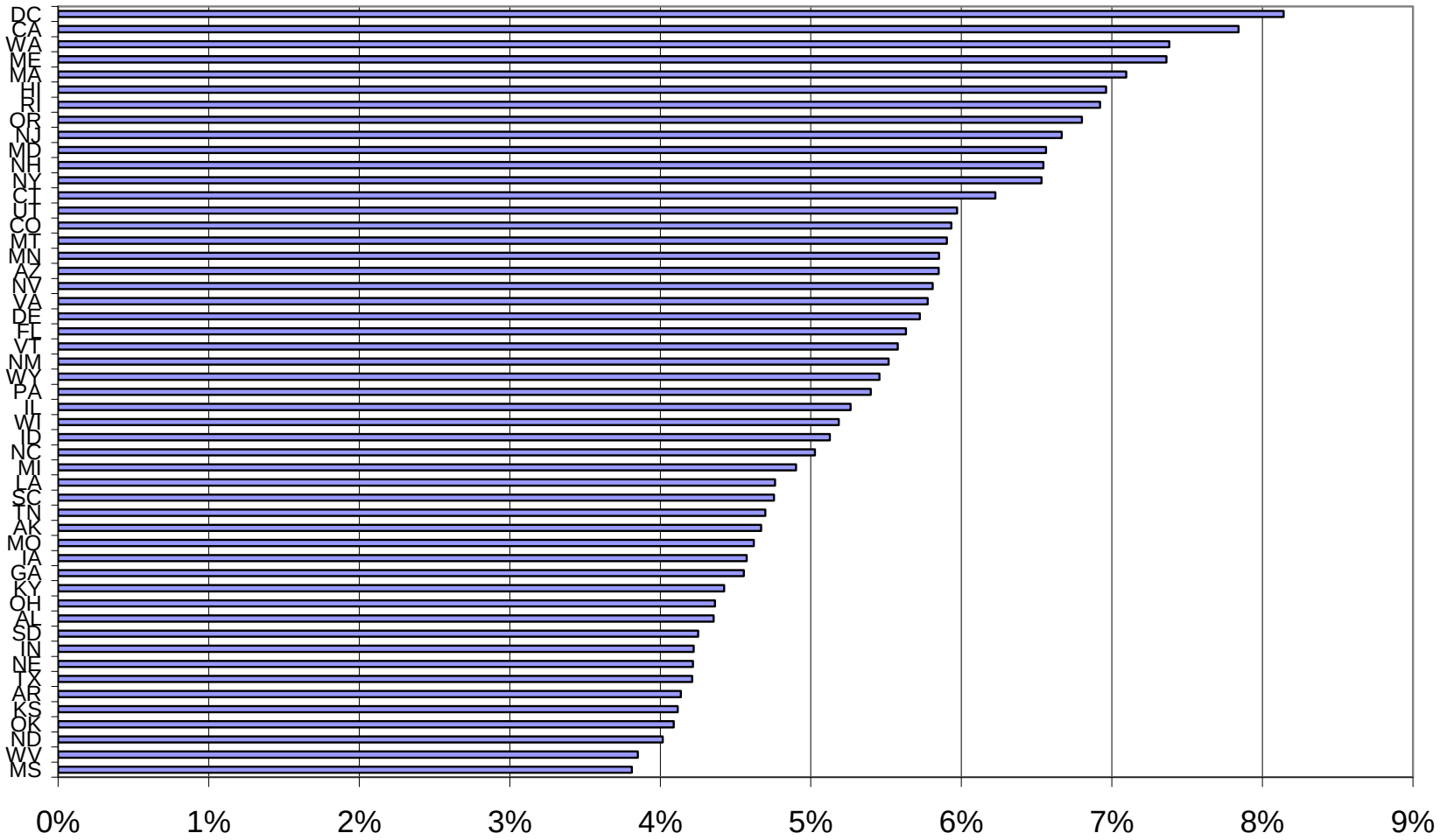
- Variance decomposition:
  - shocks to housing sector has approximately no macro effects ($\leq$1% on C)
- BUT, IRFs illustrate that collateral constraint amplifies effect of monetary policy on consumption (only)
  - Note that amplification gets **stronger** for higher loan-to-value ratio (late subsample)

Trend in house prices

- By **assumption** productivity "explains" trend in house prices ($\Uparrow$) and residential investment over GDP ($\Downarrow$)
- A clear alternative is increasing scarcity of land (Davis and Heathcote (JME, 07))
- If it literally is (relative) productivity of construction then house prices would have the same trend in each U.S. state (or region, MSA...)

If productivity is only loosely interpreted (to include land scarcity), does analysis still hold?

Average annual growth rate, house prices, US states, 1975:1-2008:2



Model details and estimation

- Dynamics not rich enough: Max effect on both IH, IK on shock impact
  - Could be solved with decision / planning lags, and investment adjustment costs
- Let data speak on fraction of hhs that are constrained!
  - Use loose prior, not $\beta(0.65; 0.05)$
    or
  - compare data likelihood of model without collateral constraints
- Evidence that elasticity between housing and non-durables substantially below 1
- Realistic that construction wages chosen less than every 10th quarter ($\theta_{wh} = 0.91$)?

Concluding remarks

- Great paper! Big step towards empirically relevant model allowing for a role of housing for monetary policy
- Land vs. technology
- Challenge: Understand what determines loan-to-value ratio, and if it has increased permanently

Just in case...

Correlation of residential investment with output gap (Swe)