# Household Debt and Monetary Policy: Revealing the Cash Flow Channel

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# Summary

- Main question: how much of monetary policy transmission into consumption is due to changes in current cash flows?
  - Contrast with intertemporal substitution channel.
- Approach: use cross-sectional wealth and consumption data to isolate variation in mortgage indexation.
  - Also use variation in debt-to-income (DTI) ratio.
  - Redo estimates using IV, identified monetary policy shocks for robustness.
- Main findings: strong transmission through cash flow channel.
  - Consumption response increasing in indexation, DTI ratio.
  - Large implied MPCs out of cash flows.
- My take: careful empirical exercise using great data.
  - But may not have completely isolated cash flow channel due to principal repayment decision.

# Simple Model (Exogenous Payment)

- Consider simplified deterministic model with CRRA utility.
  - Only control variable is bond $b_{i,t}$, exogenous process for debt $d_{i,t}$.
- Constraints:

$$c_{i,t} \leq y_{i,t} + b_{i,t-1} - R_t^{-1} b_{i,t} - r_{i,t}^d d_{i,t-1} + \Delta d_{i,t}$$
$$b_{i,t} \geq 0.$$

- Assuming CRRA preferences (EIS $\sigma$):

$$\Delta \log c_{i,t+1} \geq \sigma \log \beta + \sigma \log R_t.$$

- Interior solution: $c_{i,t}$ moves with $R_t$ due to intertemporal substitution.
  - Mortgage payment only influences $c_{i,t}$ via permanent income/wealth.
- Corner solution: $c_{i,t} = y_{i,t} + b_{i,t-1} - r_{i,t}^d d_{i,t-1} + \Delta d_{i,t}$.
  - $c_{i,t}$ moves with payment (cash-flow channel), no direct effect of $R_t$.

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# Empirical Approach

- Authors limit variation to mortgage indexation $r^d_{i,t}(R_t)$, control for interest rate, individual, time fixed effects.
  - Should kill variation in intertemporal substitution for households at interior solution.
- Also controls for correlation between $y_{i,t}$ and $R_t$, as long as not too much selection in mortgage indexation choice.
  - Should also control for many other effects in richer model (house prices, credit constraints, fiscal response, etc).
- Cash-flow channel should survive, impact on $\Delta \log c_{i,t}$ approx. proportional to $DTI_{i,t-1}\Delta r^d_{i,t}$.

# Simple Model (Endogenous Payment)

- Complication emerges when borrower can choose how much principal to repay.
- HH chooses mortgage payment $x_{i,t}$ (newly issued debt $\Delta d^+_{i,t}$ exogenous):

$$\begin{aligned} c_{i,t} &\leq y_{i,t} + b_{i,t-1} - R_t^{-1} b_{i,t} - x_{i,t} + \Delta d^+_{i,t} \\ b_{i,t} &\geq 0 \\ x_{i,t} &\geq (r^d_{i,t} + \nu_i) d_{i,t-1} \\ d_{i,t} &= R^d_{i,t} d_{i,t-1} - x_{i,t} + \Delta d^+_{i,t}. \end{aligned}$$

- Optimality condition for $x_{i,t}$:

$$\Delta \log c_{i,t+1} \geq \sigma \log \beta + \sigma \log R^d_{i,t}.$$

- Challenge: isolating difference in $R^d_{i,t}$ due to indexation *cannot* kill intertemporal substitution effect for interior debt solution.

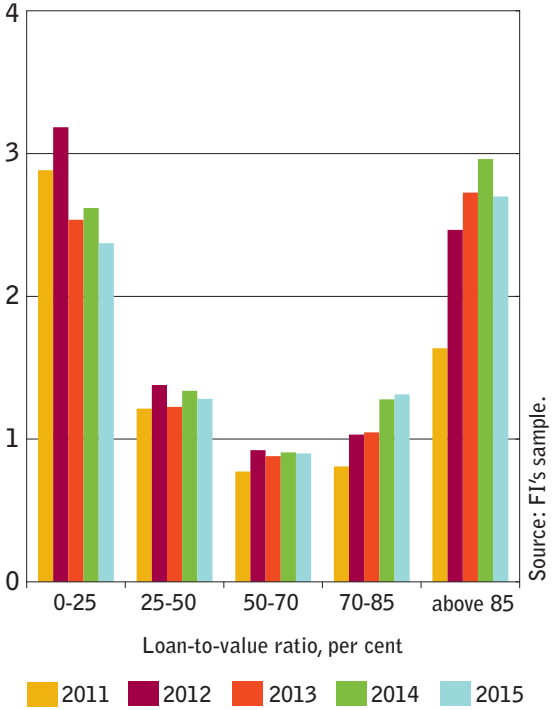
# Recovering Cash Flow Channel

- Intuition: ability to pay principal on mortgage like special bond that only you can invest in.
- Interior solutions particularly likely with Swedish data because no-amortization loans are common (56% of loans in 2011 – but falling!).
- To re-isolate cash flow channel, drop individuals who make more than the minimum payment (reverse of Vissing-Jorgenson, 2002).
  - Should be possible given data.
  - However, may introduce new selection issues (e.g., amortization type).

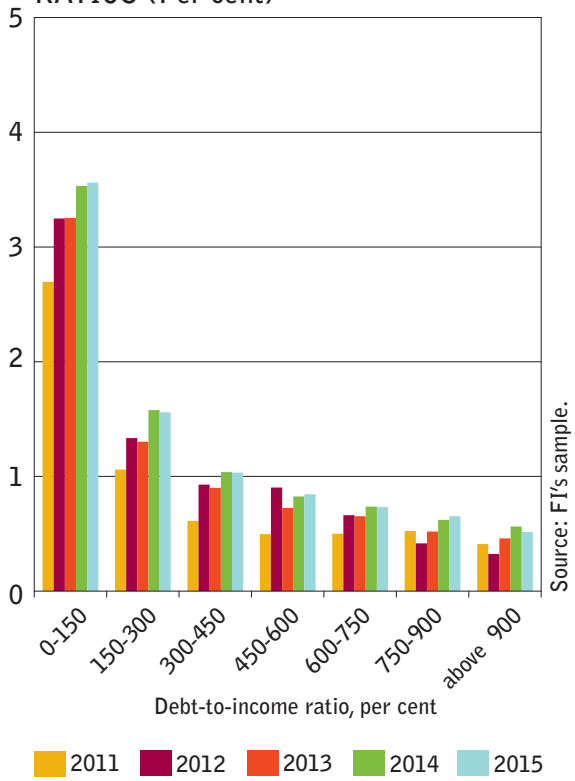
# Amortization

- Appear to be population differences across amortization types.

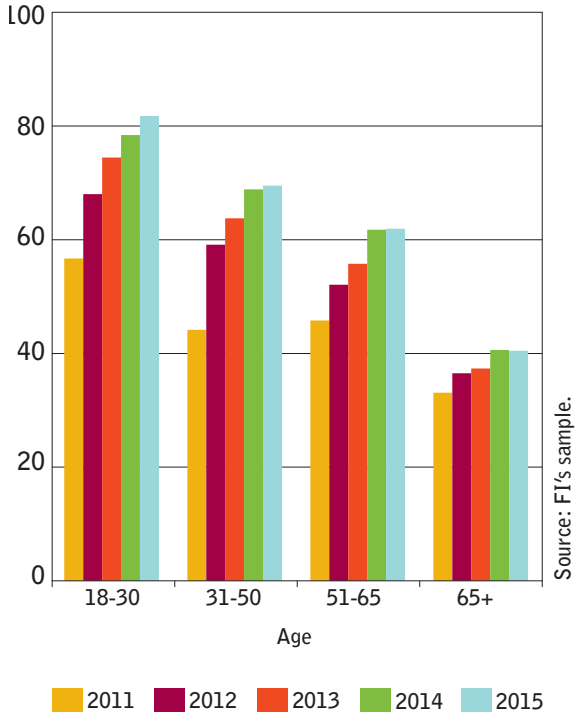
13. AMORTISATION AS A SHARE OF THE LOAN AMOUNT FOR DIFFERENT LOAN-TO-VALUE RATIOS (Per cent)




14. AMORTISATION AS A SHARE OF THE LOAN AMOUNT FOR DIFFERENT DEBT-TO-INCOME RATIOS (Per cent)




15. AMORTISING HOUSEHOLDS FOR VARIOUS AGE GROUPS (Share of households, per cent)



# Conclusion

- Nice empirical exercise estimating consumption response to mortgage interest rate change.
  - But cash flow channel may not yet be fully isolated.
- Possible fix:
  - Identify households that are corner vs. interior on principal payments.
  - Challenge: avoid selection issues.
- Otherwise, just need to be careful interpreting results.
  - Perfect to analyze effect of mortgage indexation on monetary policy.
  - Trickier for other policies (e.g., debt forgiveness, maturity extension).
- Silver lining: restricting sample to households with interior solution could yield great estimates of EIS.
  - Isolates intertemporal substitution channel from other GE effects.