The Value of Mortgage Repayment Flexibility
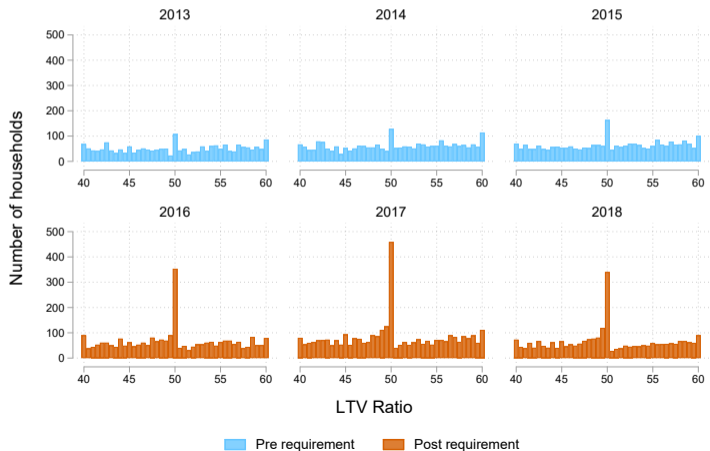
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Claes Bäckman

Patrick Moran

Peter van Santen

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Introduction and research question

Motivation

Mortgage amortization schedules are among the largest savings plans in the world

- $250-300 billion in 2016 in US; pension plans $398 billion (Bernstein & Koudijs, 2021)
- Amortization payments $\approx$ 60 percent of first year mortgage payments

Rational borrowers can undo any mandatory savings by borrowing more Svensson (2016)

- Bernstein & Koudijs (2021) finds that households instead save more in response to higher amortization payments

Research question: Do amortization payments affect borrowing decisions?
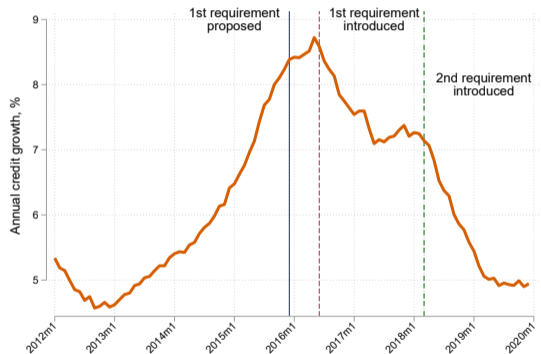
Roadmap

Swedish mortgage contracts prior to 2016

Background

- Adjustable rates or short fixed rate periods

- Linear repayment instead of annuity contracts

- Maturities 40-50 years

- LTV-cap at 85%

- Payment to Income (PTI) constraint

- Full recourse with lifetime garnishing

The amortization requirement

Background

Swedish FSA (Finansinspektionen) introduced the amortization requirement to reduce debt levels over time

- House prices grew 31 percent between 2011 and 2015 [House price growth]
- Credit grew at 8 percent a year in 2015
- Amortization requirement went into effect for new mortgages in June, 2016

The amortization requirement

Design

Recommendation 2011-2013 ⋯ Recommendation 2014-2015 - - - Requirement 2016-2017 ▬▬
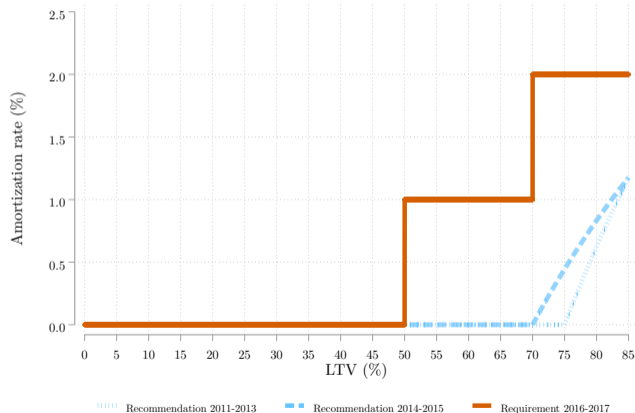
Mandatory amortization depends on loan-to-value (LTV) ratio:

- 1 percent of entire mortgage if LTV > 50%
- 2 percent of entire mortgage if LTV > 70%
- (From 1st of March 2018: additional 1 percent if debt-to-income > 4.5)

Roadmap

Intuition behind empirical methodology

Methodology

We use the discontinuous jump in average payments at the requirement threshold(s) to identify the trade-off between borrowing and amortizing

- You can trade lower borrowing for lower payments by placing yourself at the threshold
- Example: House 500,000; mortgage 350,000: LTV = 70% → Amortization (1%) ≈ 300/month
- Borrow 10,000 more: LTV = 72% → Amortization (2%) = 600/month
- Unconstrained borrower might well choose the lower loan to free up 300 per month
- → Value of repayment flexibility

Bunching estimate

Methodology

We use years prior to the requirement to
estimate the counter-factual LTV
distribution (g_{pre}) and compare it to the
empirical (post-requirement) distribution

- Bunching estimate: The relative
  increase in percentage of households
  placing themselves at the threshold
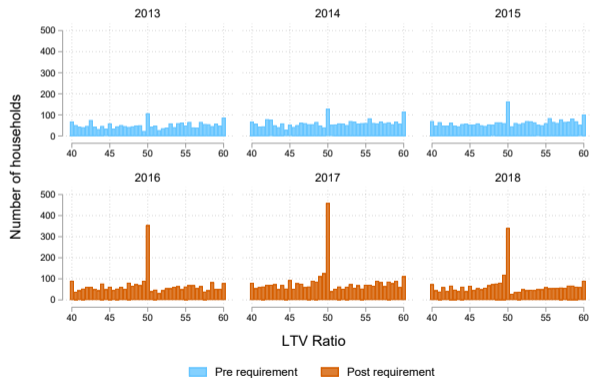
From bunching to LTV response

Methodology

Number of households bunching at the threshold $\overline{LTV}$:

$$B = \int_{\overline{LTV}}^{\overline{LTV}+\Delta LTV} g_{pre}(LTV)dLTV \approx g_{pre}(\overline{LTV})\Delta LTV$$

Marginal buncher would have borrowed $\overline{LTV} + \Delta LTV$ had there been no notch

Counter-factual distribution $\widehat{g_{pre}(\overline{LTV})}$ estimated using pre-requirement years

Estimated borrowing response:
$$\widehat{\Delta LTV} = \frac{\overbrace{\widehat{B} = \sum_{j=L}^{R}(n_j^{post} - n_j^{pre})}^{\text{Bunched loans}}}{\underbrace{\widehat{g_{pre}(\overline{LTV})}}_{\text{Counter-factual distribution}}}$$

Data

Methodology

- Microdata reported by 8 largest banks in Sweden from Swedish FSA's "Mortgage survey" *(Bolåneundersökningen)*, 2011 - 2018
    - Survey covers all newly issued mortgage loans within a two-week window during the period August - October
    - 15,000 - 30,000 households per year

- Variables:
    - Loan-level: amount, interest rate, amortization, collateral
    - Household-level: size, age, income, location, total debt (secured, unsecured)

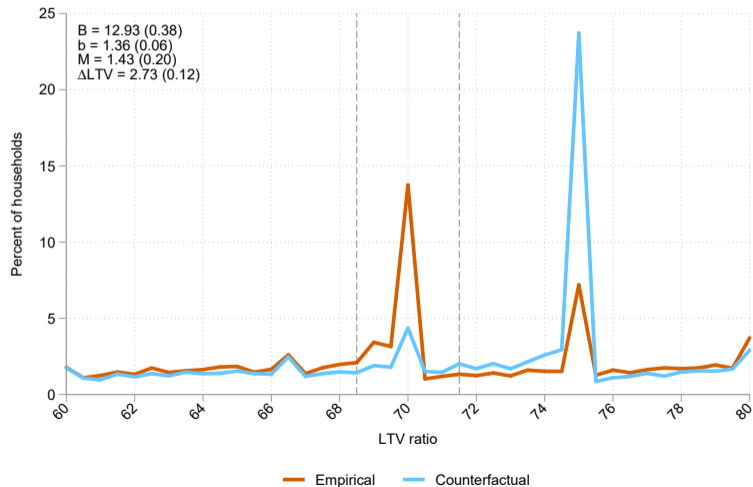# Roadmap

Bunching at lower threshold

Results
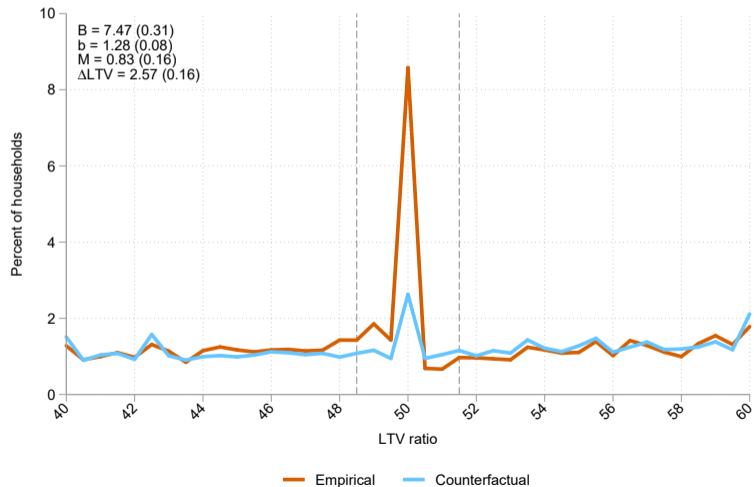
Bunching at upper threshold

Results

Elasticity for the marginal buncher

Elasticity

$$e^{\alpha} = \frac{\overbrace{\Delta LTV}^{\text{From bunching}}}{\underbrace{\alpha^*(\overline{LTV} + \Delta LTV) - \alpha}_{\text{Change in marginal amortization rate}}}$$

We convert the average amortization rate (1 or 2 percent) to the marginal amortization rate

($\approx$ 20 percent)

- Intuition: the change in amortization rate from moving just below the threshold $\overline{LTV}$ to the LTV for marginal buncher

Resulting elasticity

Elasticity

Resulting elasticity:

- Lower threshold: Reduction in LTV per unit of amortization of 0.25
- Upper threshold: Reduction in LTV per unit of amortization of 0.14

Implication: Moving from an interest-only mortgage to annuity schedule with a 3 percent interest rate reduces borrowing by between 5.6 and 10 percent

Roadmap

Effect of payment-to-income constraint

Credit supply

Negative counterfactual discretionary spending:
% of borrowers at notch

Percent (y-axis)

Discretionary spending (x-axis)

Actual   Counterfactual
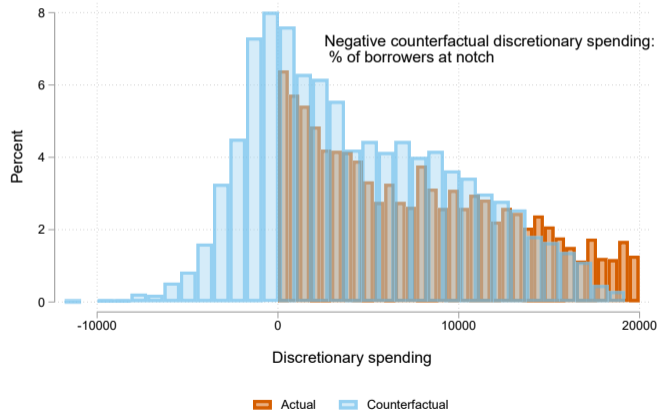
Borrowers lower amortization payments to comply with PTI constraints

- 26.3% of borrowers close to the threshold are unable to borrow more due to credit constraints

Importantly, this still leaves three quarters of borrowers who do not face binding constraints

Roadmap

Other reasons to bunch

Threats to identification

Maybe borrowers bunch for other reasons, not the amortization requirement?

- Interest rates around the thresholds are flat `Interest rates`
- Amortization rates higher above threshold only after requirement is in effect `Amortization rates`
- Borrowing more in response to requirement (Svensson, 2016) would not lead to bunching from above
- We also argue against bank incentives, potential manipulation of collateral assessments, and salience

Estimation of counter-factual distribution

Threats to identification

Placebo test: estimate bunching using only pre-requirement data `Placebo tests`

Standard approach of fitting a flexible polynomial gives very similar results `Polynomial approach`

- But find it difficult to capture round-number bunching

Conclusion

Summary: We provide evidence that borrowers avoid making amortization payments

- Borrowing reduced directly in response to the amortization requirement

Not simply a story about credit constraints

- Borrowing reduced even for households with low leverage
- A majority of borrowers do not face binding payment constraints

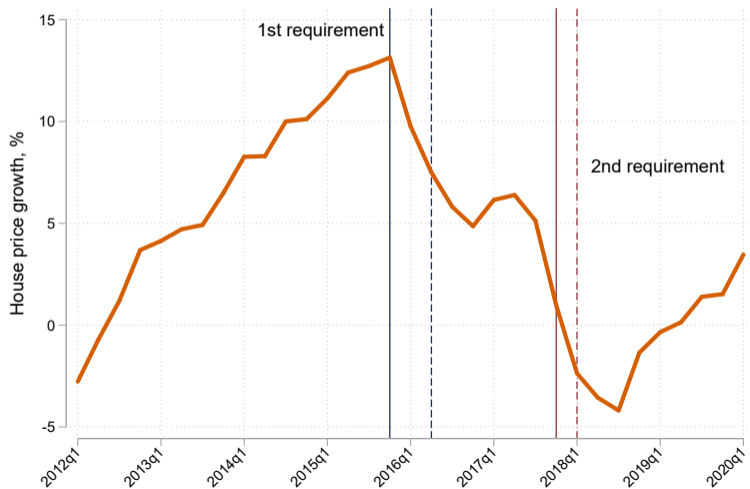$\rightarrow$ Going forward we want to better understand amortization payments in theory

Thank you!

Website: https://sites.google.com/view/claesbackman/home

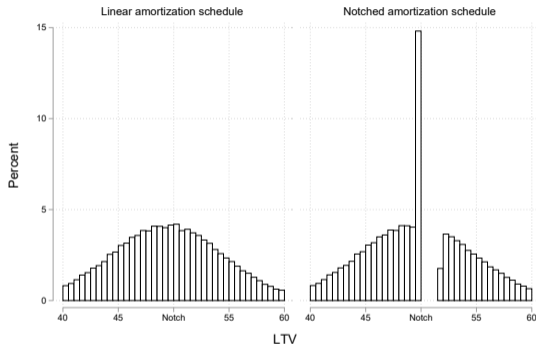Email claes.backman@econ.au.dk
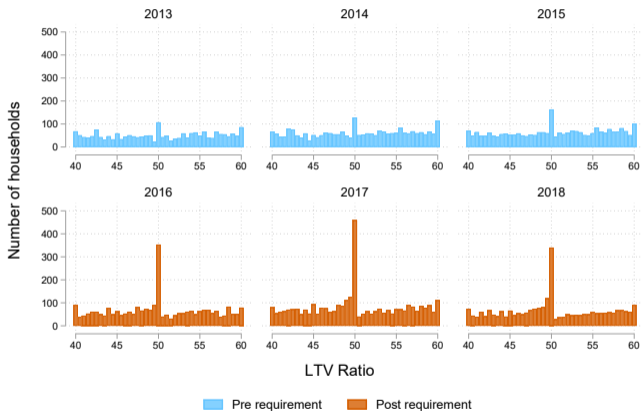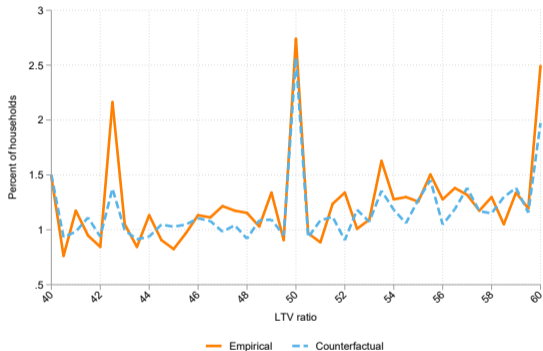
House price growth in Sweden

Background

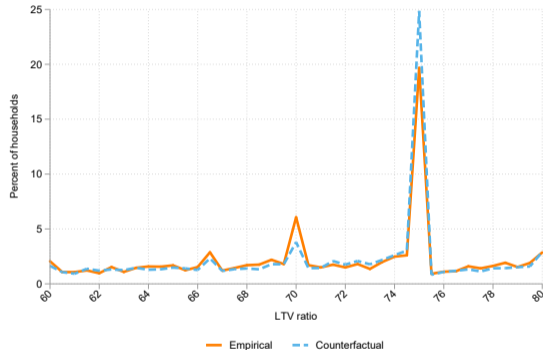# Simulated densities with and without a requirement in a simple model

Linear schedule: $\alpha = \alpha_0$

Notched schedule: $\alpha = \alpha_0 + \mathbb{1}(LTV > \overline{LTV})\Delta\alpha$

Back
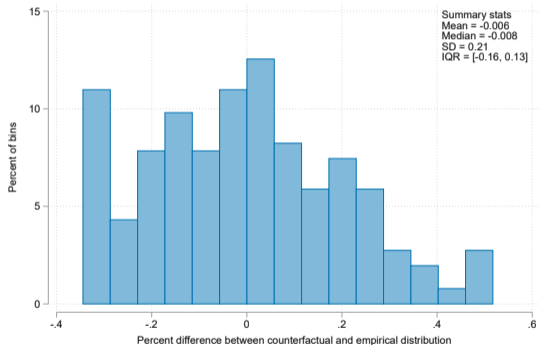
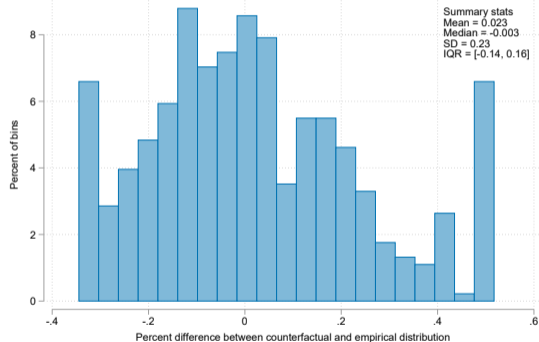# Empirical and Counter-factual distribution in 2014

Lower threshold

Upper threshold

Back

Ratio between counter-factual and empirical distribution in placebo years
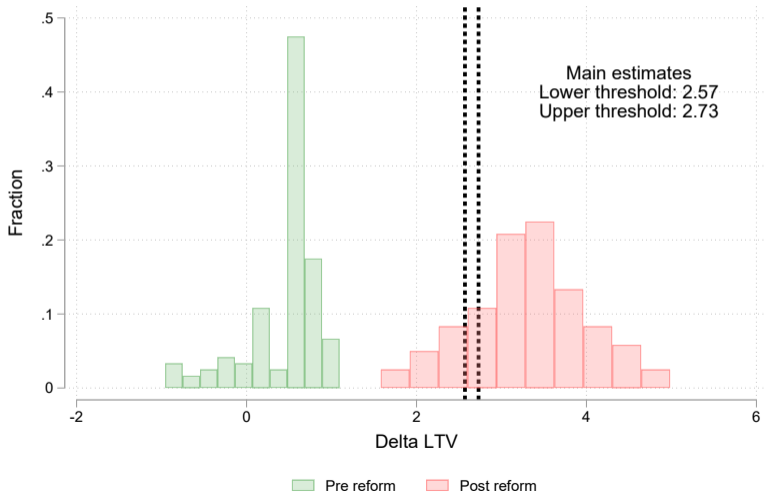

Lower threshold

Upper threshold

Back

Estimates of ΔLTV using polynomial approach
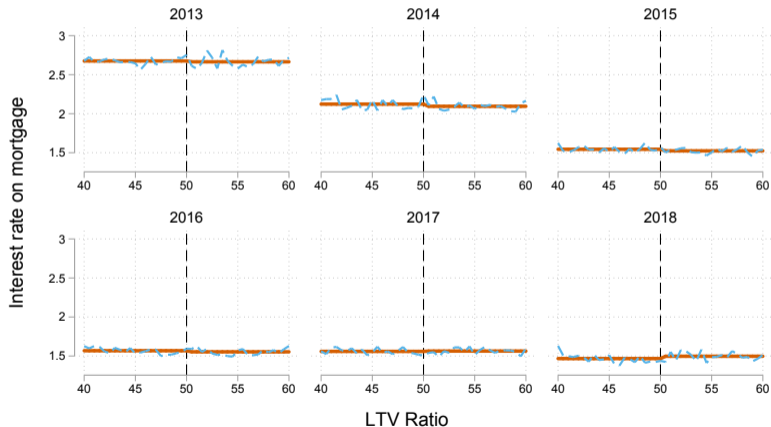
Threats to identification Back

Main estimates
Lower threshold: 2.57
Upper threshold: 2.73

Interest rates by LTV ratio over time

Lower threshold Back

Reduction in discretionary income

Credit demand

Percent reduction discretionary spending

Reduction in discretionary spending:
Over 30 percent reduction: 59.5 %
Over 50 percent reduction: 39.4 %
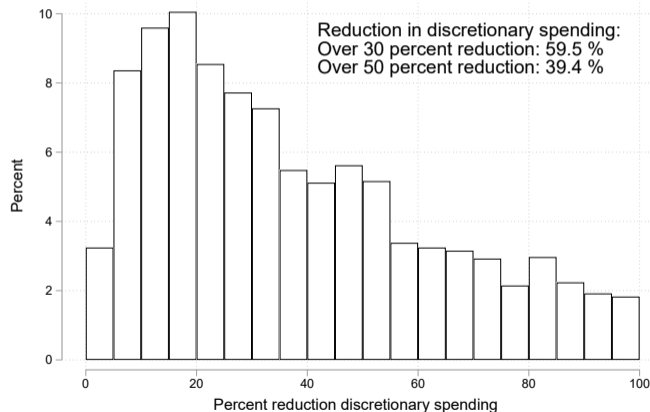
Higher amortization would entail a
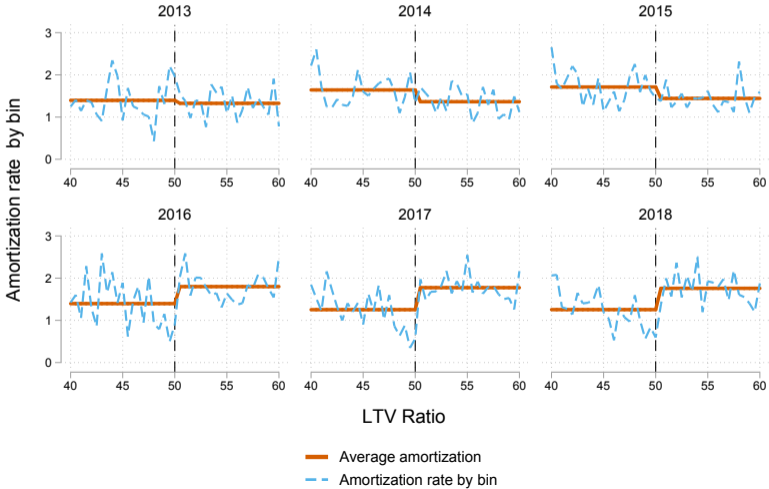large reduction in discretionary
income for many households

39.4 percent of borrowers would have
a reduction of more than 50 percent

- Anecdotally, this also seems to
  explain reluctance to amortize

Amortization rates by LTV ratio over time

References

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