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ECONOMIC RESEARCH

The impact of mortgage regulation on homeownership and household leverage:

Evidence from Finland's loan-to-value ratio reform

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VATT day
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Introduction

Following the financial crisis, many countries implemented macroprudential policy, to promote the stability of the financial system by reducing the buildup of debt and risk.

Measures targeted at housing market contribute by:

- restraining household leverage
- improving households' ability to service debt and face adverse shocks

Most work has studied the consequences for *aggregate* debt and default risk.

In this project, we use register data to examine how *individual* households respond, shedding more light on the behavioral margins through which debt is reduced.

Our aim is to provide more insight on the effectiveness and distributional consequences of mortgage regulation.

Research questions

- Part I:
  - What share of potential buyers reduce borrowing? (Intensive Margin)
  - What share of potential buyers no longer borrow? (Extensive Margin)
  - Do low-income households respond differently?

- Part II :
  - How do buying and borrowing patterns change?
    - Cheaper housing (smaller size, different location, quality...)
    - More savings

Introduction of the loan-to-value (LTV) ratio limit

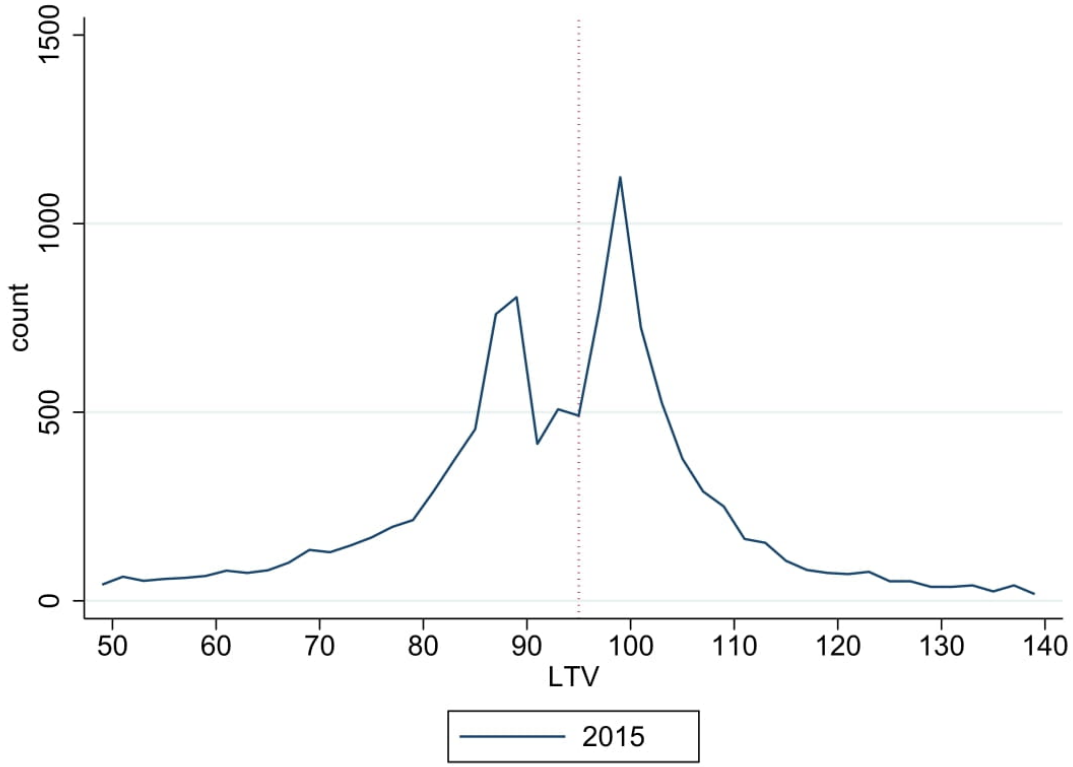
$$LTV = \frac{value\ of\ the\ loan}{value\ of\ collateral}$$

Introduction of the loan-to-value ratio limit:

- Credit Institutions Act (August 15th, 2014).
- Implemented July 1st, 2016.
- LTV ratio limit of 95% for first-time buyers (90% for others).

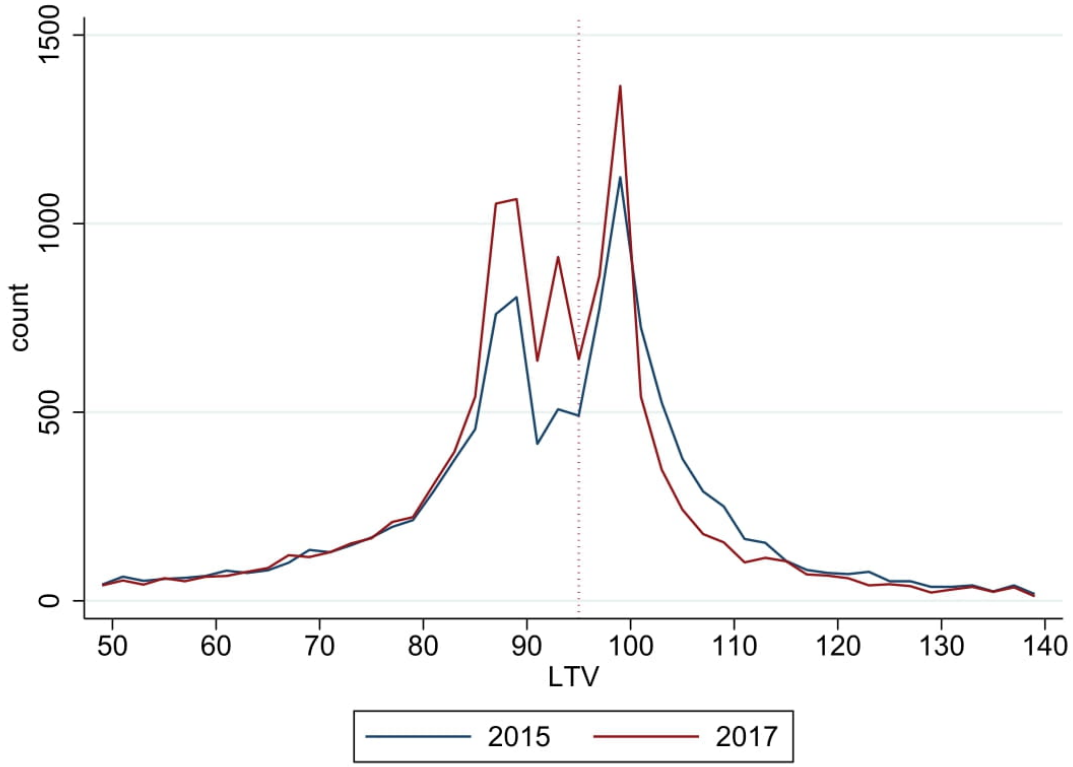
First-time buyers' LTV ratio distribution

Before the reform...



First-time buyers' LTV ratio distribution

... and after the reform



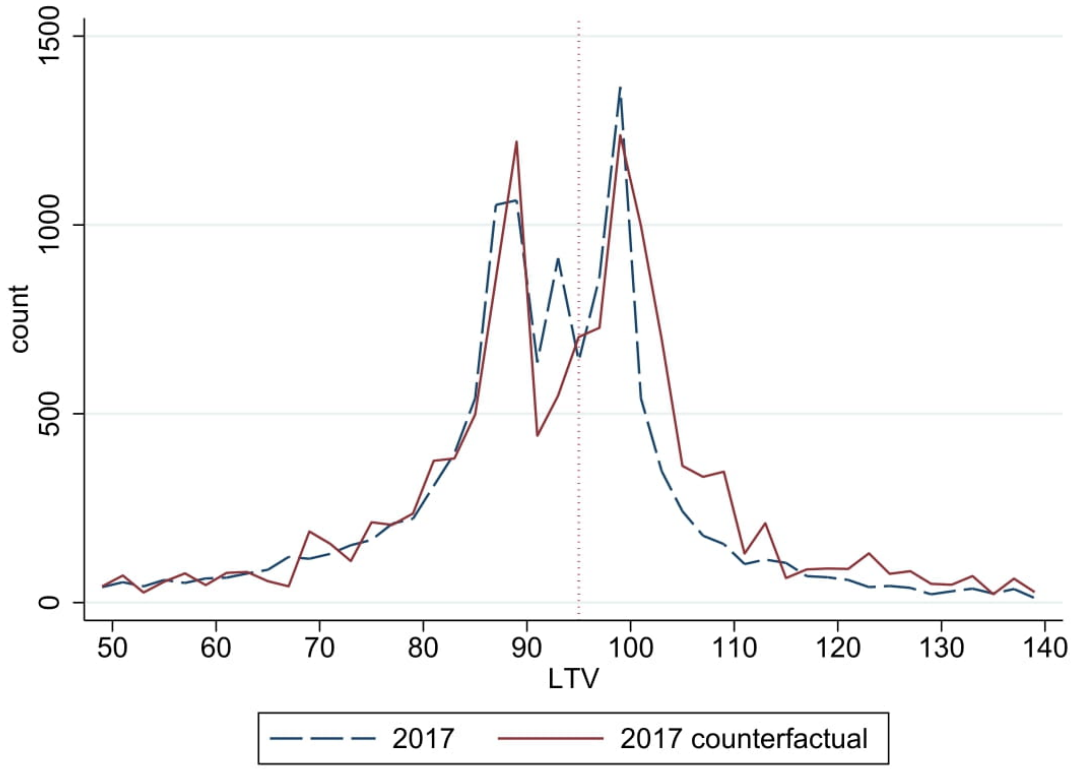
Part I – bunching analysis

Estimating the intensive and extensive margin effects of the LTV limit through bunching analysis

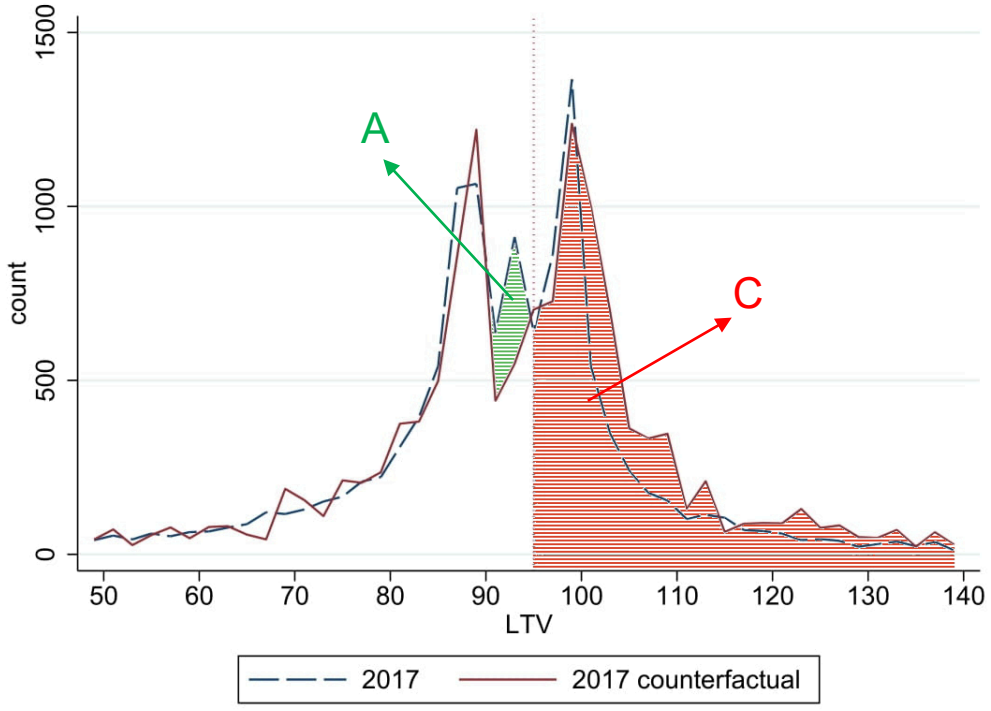
- **Goal:** we want to determine:
  - what share of potential buyers reduce borrowing = intensive margin
  - what share of potential buyers no longer borrow = extensive margin
- **Problem:** we don't observe who would have borrowed in absence of the reform and what LTV ratios would have looked like
- **Solution:** we can construct a "counterfactual" LTV distribution using
  - The pre-reform distribution of LTV ratios (2015)
  - The pre-reform trend in LTV ratios $(2014 - 2015)$
  - The post-reform mass of unaffected borrowers $(LTV < 90)$

Estimating the intensive and extensive margin effects of the LTV limit through bunching analysis

The 2017 loan-to-value ratio distribution
and its counterfactual

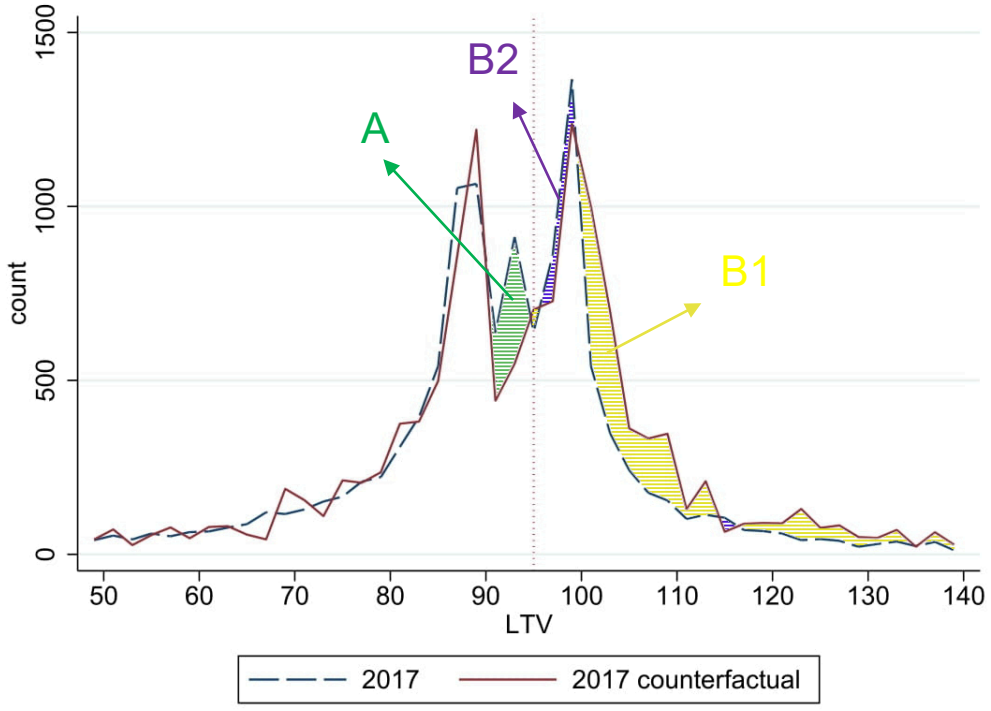


Estimating the intensive and extensive margin effects of the LTV limit through bunching analysis



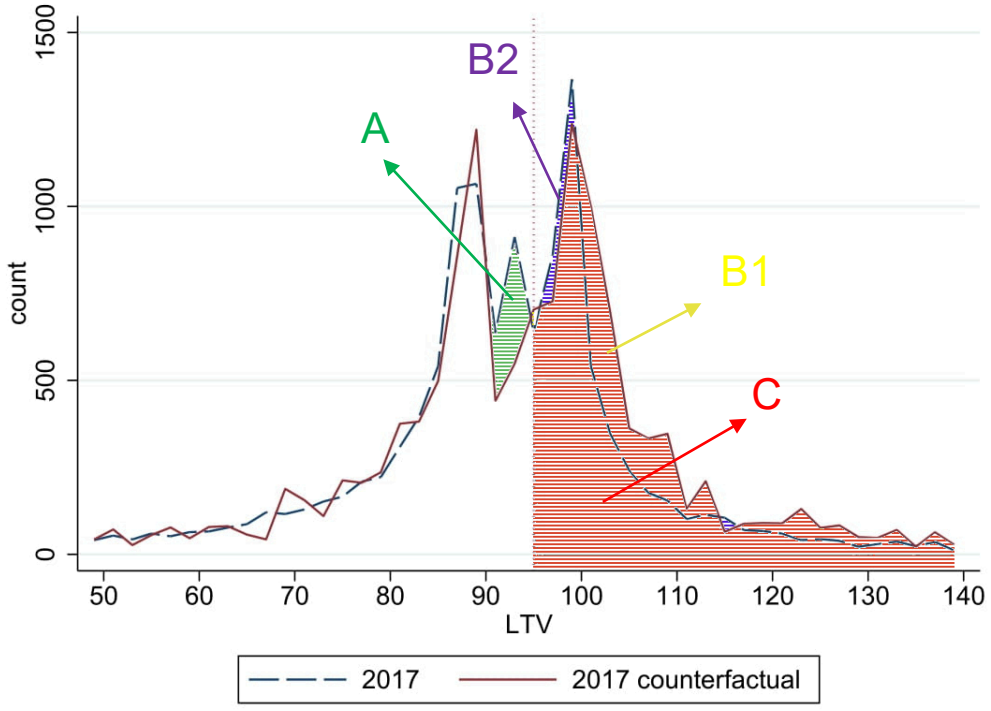
- $Intensive\ margin\ effect = \frac{A}{C} = 8\%$
- The LTV limit led 8% of affected borrowers to reduce their LTV ratio below 95

Estimating the intensive and extensive margin effects of the LTV limit through bunching analysis



- $Extensive\ margin\ effect\ = \frac{B_1 - B_2 - A}{C}$

Estimating the intensive and extensive margin effects of the LTV limit through bunching analysis

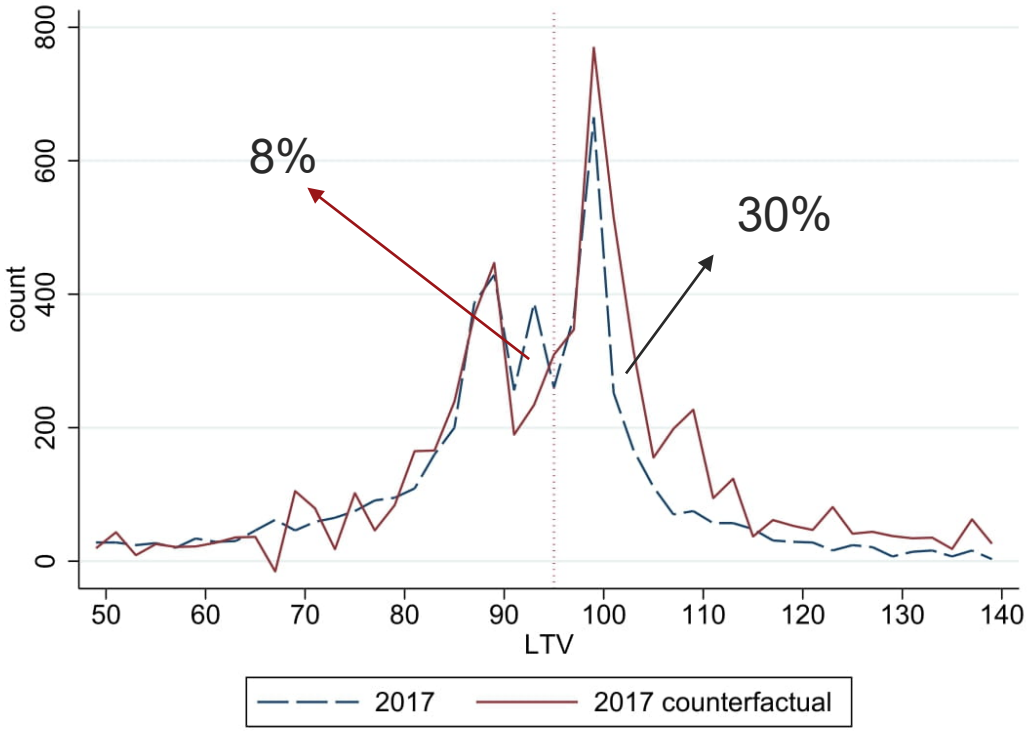


- $Extensive\ margin\ effect = \frac{B_1 - B_2 - A}{C} = 16\%$
- The LTV limit led 16% of affected borrowers to no longer borrow

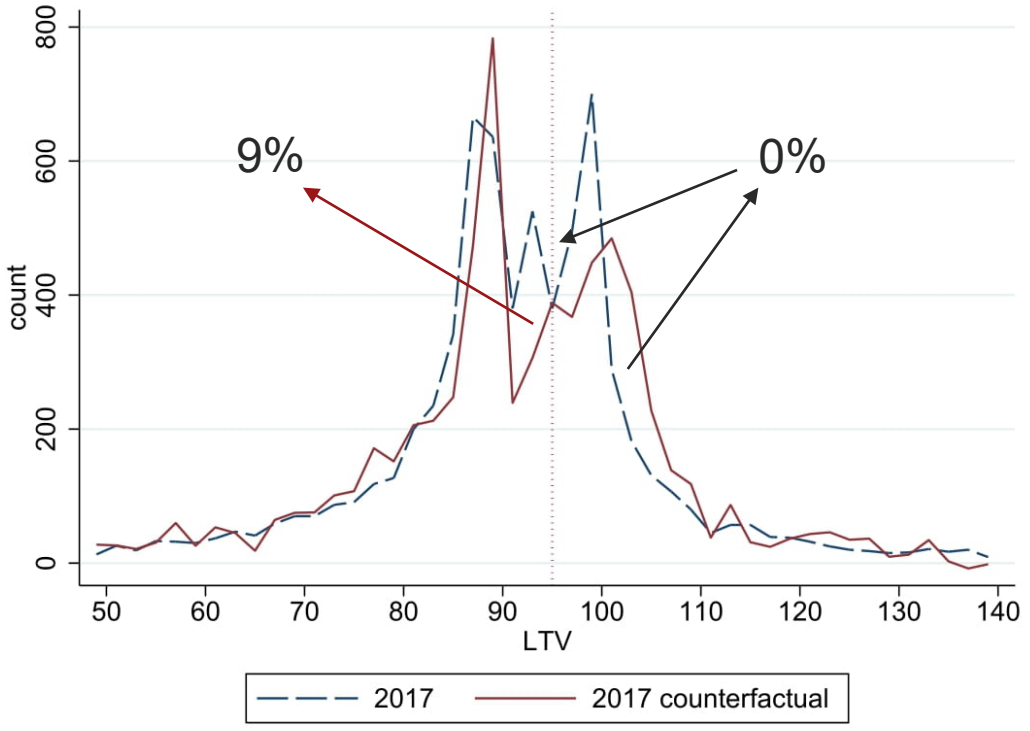
Estimating the intensive and extensive margin effects of the LTV limit through bunching analysis

Analysis by income group

Below median income group



Above median income group



Part II – difference-in-differences analysis

Estimating how borrowing patterns change through difference-in-differences analysis

- **Goal:** we want to examine how borrowing patterns of affected households change
- Affected households are those who would have borrowed at LTV>95 and vice versa.
- **Problem:** we don't know what LTVs would have looked like in absence of the reform and therefore who would be affected.
- **Solution:** we can use register data to predict which households were likely to have high LTVs and therefore, likely to be affected by the reform.
- To determine the impact on borrowing patterns, we compare the change in behavior of households *likely* to be affected by the reform to that of those *unlikely* to be affected.

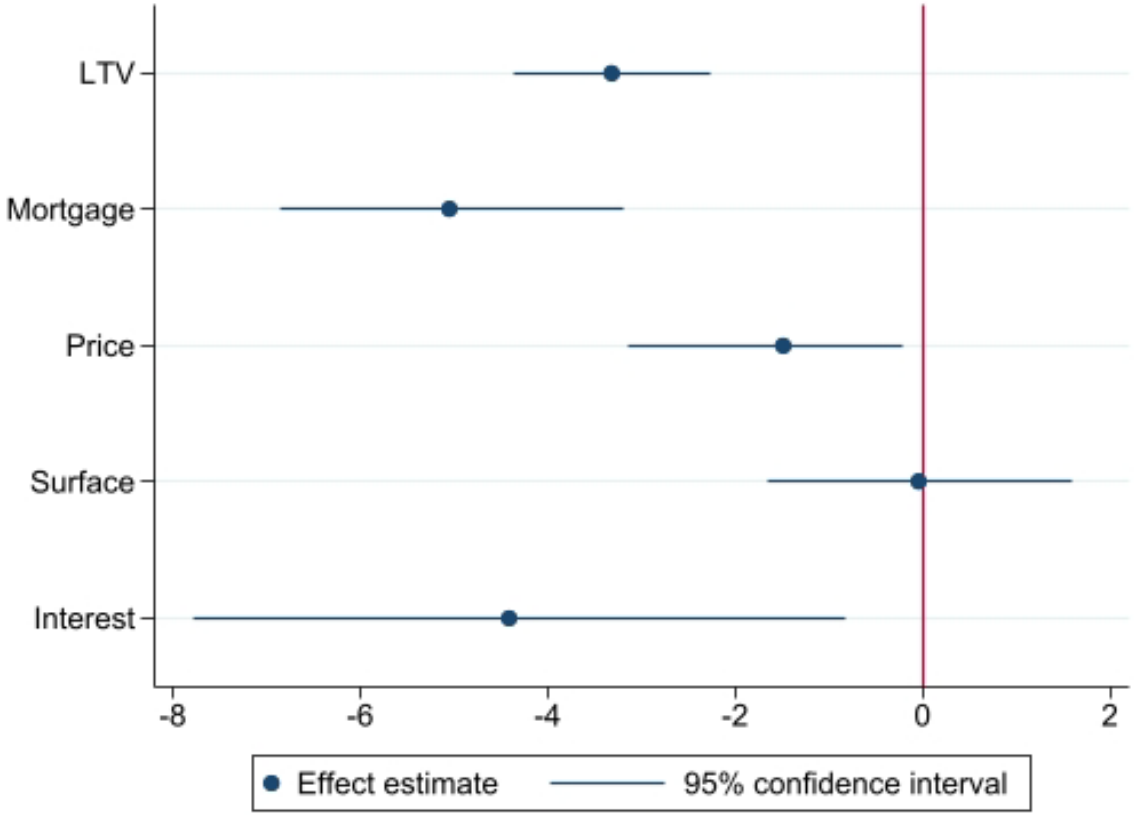
Estimating how borrowing patterns change through difference-in-differences analysis

Table 1. Example of LTV DiD estimation

	Before	After	Difference	
High predicted LTV	99	95	-4	
Low predicted LTV	91	90	-1	
		Difference-in-differences:	**-3**	$\approx -3\%$

Estimating how borrowing patterns change through difference-in-differences analysis

DiD effect estimates in % by outcome



Conclusion

Conclusion

- The **LTV limit reduced household leverage** both at the intensive and the extensive margin:
  - LTV ratios are reduced by 3% on average among affected borrowers
  - Transition into homeownership is halted for 16% of affected households
- We raise some **concern about the effectiveness** of the LTV limit as the IM effect is partly due to lower liquidity
- We raise some **concern about distributional consequences** of the LTV limit as the EM effect is driven by low-income households (10% of FTBs)
- Caveat: only observe short-run effects

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Thank you!

Questions and comments welcome

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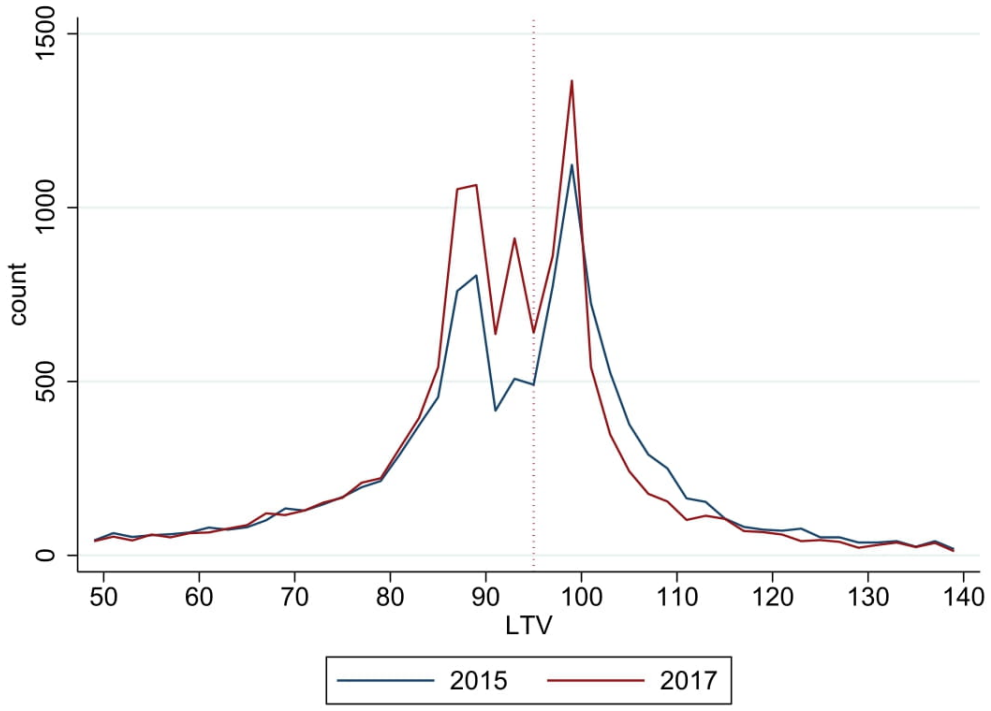
Check out our new VATT Working Paper!

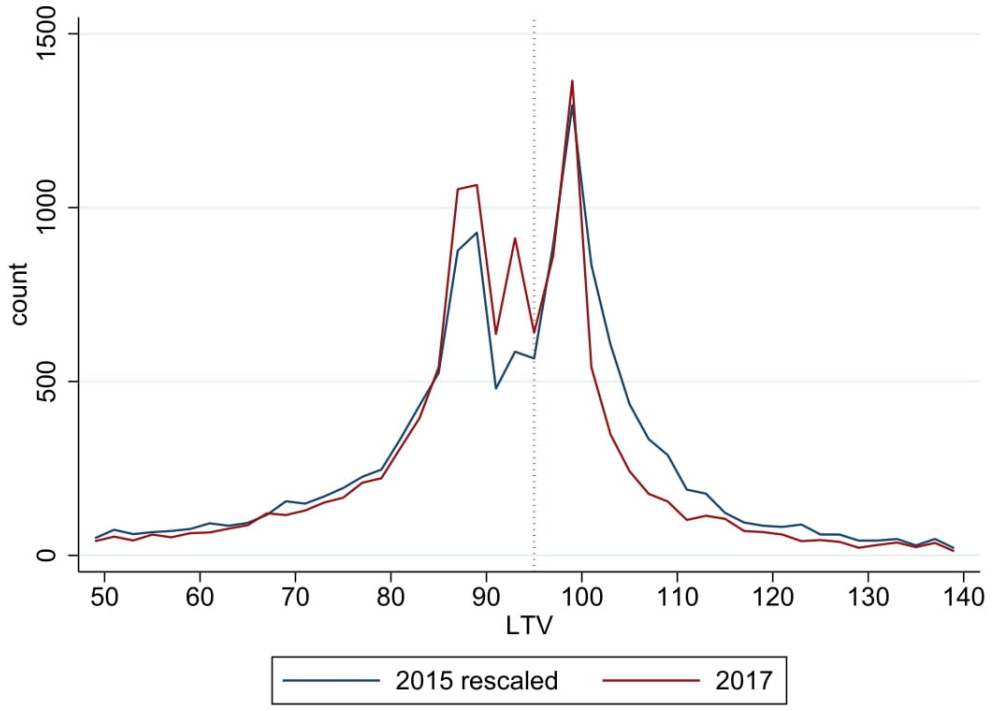
Methodological appendix

Constructing the counterfactual LTV distribution

2015 vs 2017

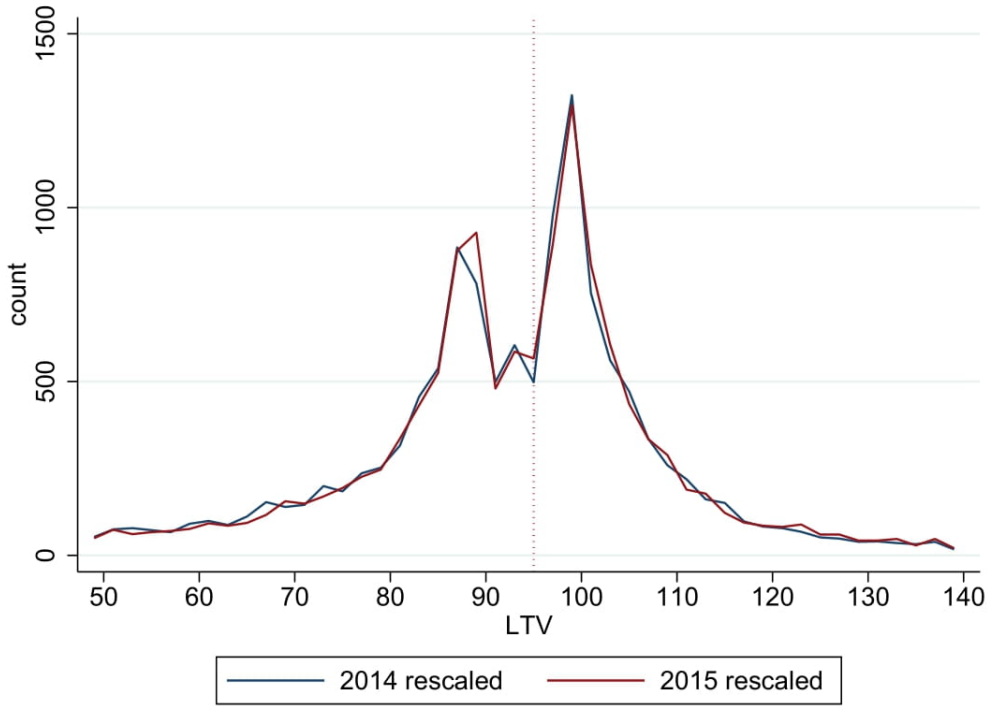


2015 rescaled to match the number of 2017 borrowers with LTV < 90



Constructing the counterfactual LTV distribution

2014 and 2015 rescaled, difference captures time trend



Time trend added to 2015 baseline, twice, to make the 2017 counterfactual