Effects of Macroprudential Policies on Bank Lending and Credit Risks

Identification and measurement of macroprudential policies effect,
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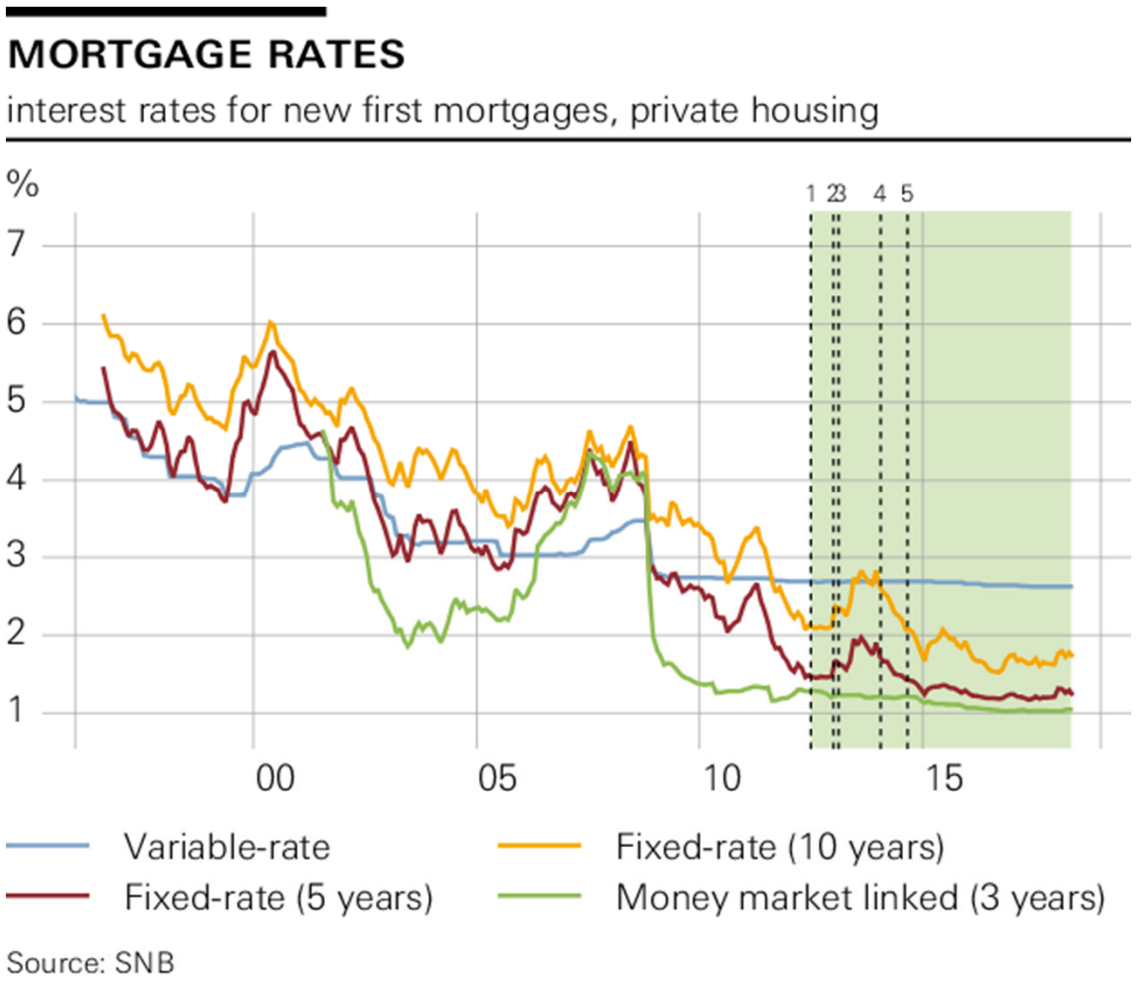
– The views expressed in this presentation are my own and do not necessarily reflect the views of the SNB.

Introduction

- Effects of different macroprudential measures (CCyB, LTV cap) on bank lending and credit risks
- Exploit bank heterogeneity and use a conditional Differences-in-Differences estimator
- Findings:
  - Both measures did reduce LTVs risks (affecting different parts of LTV distribution)
  - Some banks affected by the CCyB reduced mortgage growth,
  - No spill-overs: LTI risks or any other credit lending

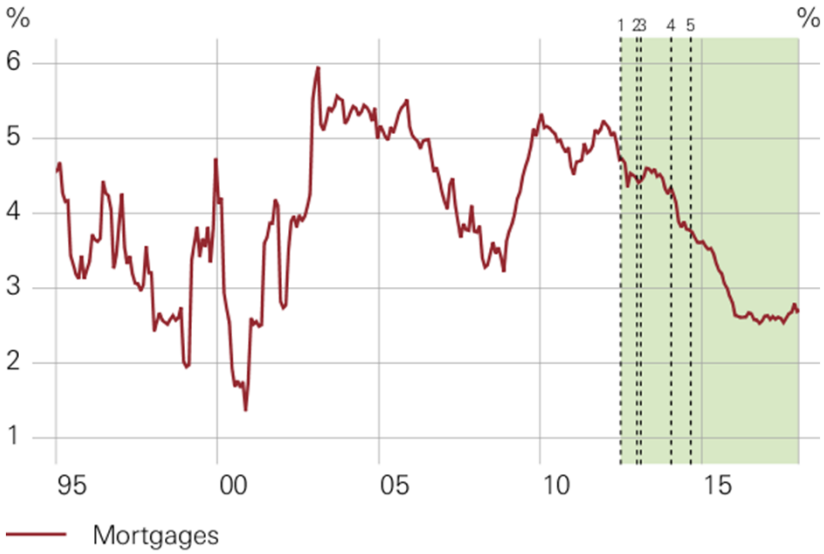
Low interest rates since autumn 2008 …



Build-up of risks to financial stability

MORTGAGE VOLUMES

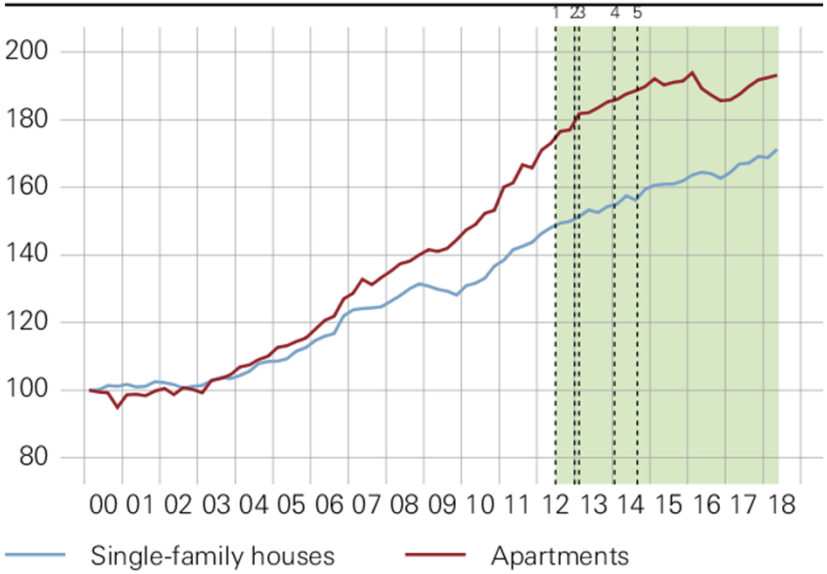
Annual growth rates, in nominal terms



Source: SNB

TRANSACTION PRICES RESIDENTIAL REAL ESTATE

In nominal terms, Q1/2000 = 100



Source: Wüest Partner

Mortgages

Economic environment

- SNB lowered its policy rate in autumn 2008
  - Fighting against deflationary pressure and appreciation of the Swiss Franc in an economic fragile situation, the SNB did not raise interest rates in the last years.
    - Minimum exchange rate (September 2011- January 2015)
    - Negative interest rates since then

- Build-up of risks to financial stability
  - Prolonged phase of exceptionally low interest rates
  - Increase in mortgage growth and in real estate price growth

What are the effects of macroprudential measures - Motivation and research question

- Evaluation of effects is **important**
  - Informative for Swiss policymakers when reassessing their policy
  - Informative for policymakers in other countries when implementing macroprudential tools

- Evaluation of effects is **complex**
  - Overlap in timing
  - Similiar effects of the different measures expected
  - Macroeconomic conditions and other regulatory requirements change

- What is the **treatment effect** due to the respective policy measure for the banks most likely to be affected?

Macroprudential policy measures

- Loan-To-Value (**LTV**) cap
  - Down-payment of at least 10% hard equity (only cash, no pension funds)
  - Implemented within the Self-Regulation of the Swiss Bankers' Association
  - If LTV>90%, 100% risk-weight for entire new mortgage loan

- activation and increase of countercyclical capital buffer (**CCyB**)
  - Temporary capital requirement when imbalances in the credit market develop
  - **Sectoral:** Applied to exposures in residential mortgage sector
    - 2013: 1% of residential mortgage related risk weighted assets (RWA)
    - 2014: 2% of residential mortgage related RWA
    - 2020: deactivation in order to support banks in their key role as lenders in the coronavirus crisis

  - Intended effects:
    - To increase the resilience of the banking sector (main objective)
    - To lean against the build-up of excessive credit growth (second objective)

What does the literature say?

- My analysis on **LTV caps** is most similiar to Acharya et al. (2019):
  - Findings: no effect on *aggregate* LTV/LTI distribution or mortgage growth, but reallocation of credit to achieve the same risk exposure under new constraints

- Evidence on the effects of the **CCyB** in Switzerland is mixed
  - **Basten (2019), Basten and Koch (2015)**:
    - Findings: Small effects on mortgage rates, but not on LTVs
  - **Auer and Ongena (2016)**
    - Findings: banks report corporate loans more often and increase their interest rates

Contribution of this paper

- Disentangle the effects of CCyB activation and LTV cap
  - Distinguish which banks were affected by which measures
  - LTV cap went effective in July 2012 (with a five months transition phase, CCB activation was announced in January 2013)

- Broader range of data
  - outcome variables: credit risk parameters, mortgage and other credit growth (which are relevant from a financial stability perspective)
  - 25 largest mortgages banks (covering 90% of the mortgage market)
  - Longer time horizon and supervisory information

- Measure the CCyB treatment group in a careful manner
  - put the additional capital requirement due to the CCyB in perspective to the bank's excess capital

$$(CCyB\ required\ capital)/(actual\ capital - target\ capital)$$

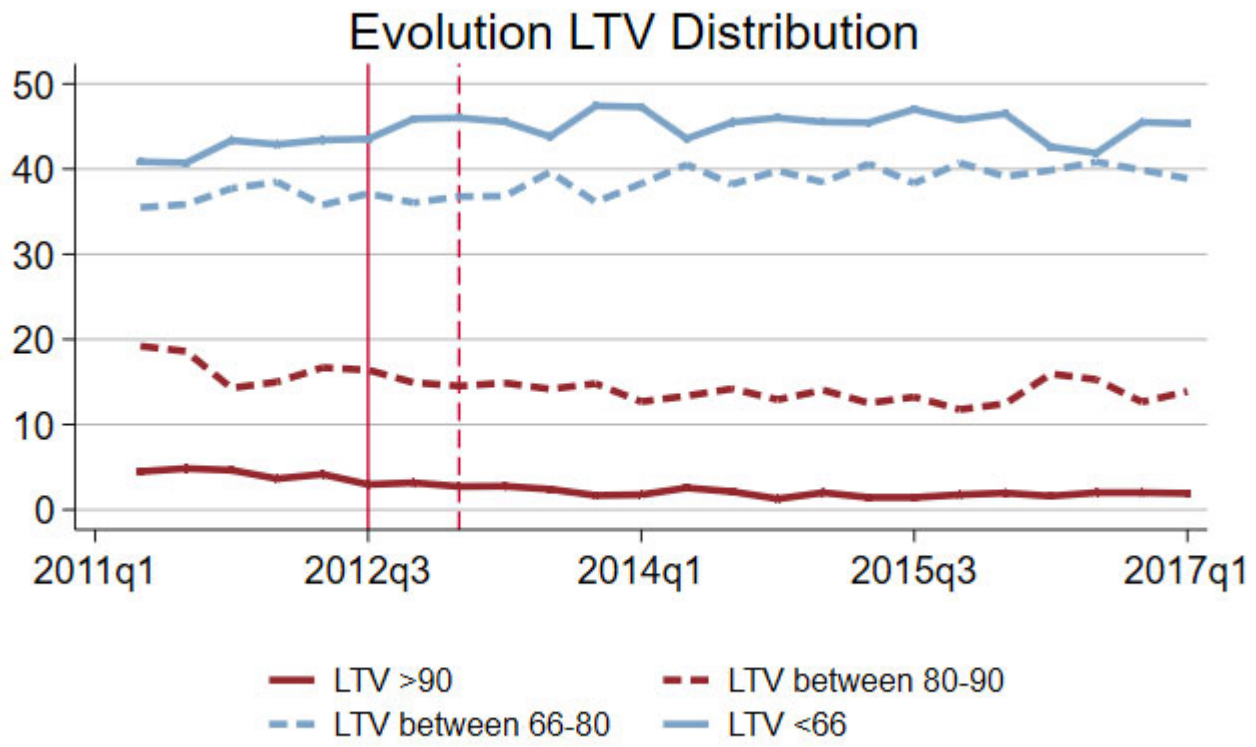
Micro data

- Sample
  - 25 largest mortgage banks in Switzerland
  - 2011Q2-2017Q1 for credit risks on new mortgages
  - 2008Q4-2017Q1 for credit growth rates

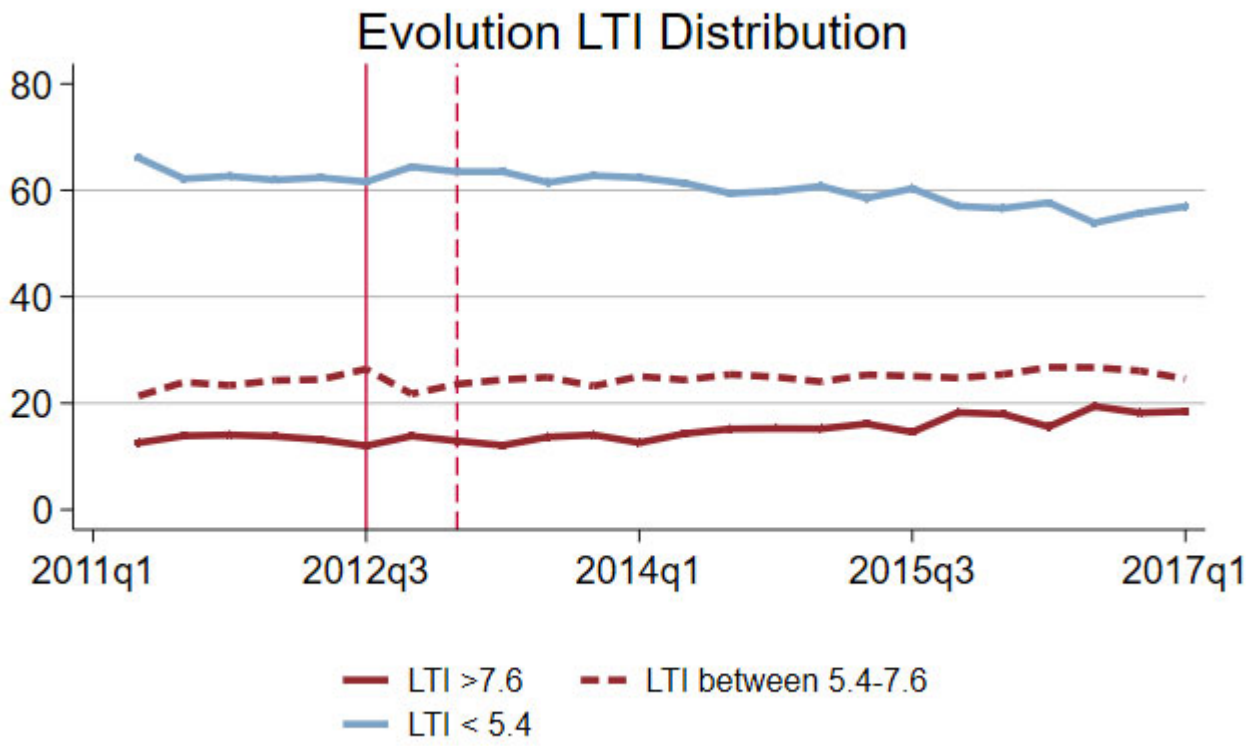
- Source
  - Mortgage survey on new lending
  - Supervisory reports
  - Bank balance sheet data

- Outcomes
  - Share of new mortgages with high LTV or LTI ratios
  - Credit growth rates

Descriptives I: LTV



Descriptives II: LTI distribution



Definition of treatment groups

- LTV cap
  - 12 banks with a high share of new mortgages with LTV>90% before 2012Q3
  - LTV treatment intensity: prdetermined share with LTV>90%

- CCyB activation
  - 4 banks whose CCB intensity is above the 80th percentile
  - CCyB treatment intensity = CCyB required capital/(actual-target capital) measured end 2012

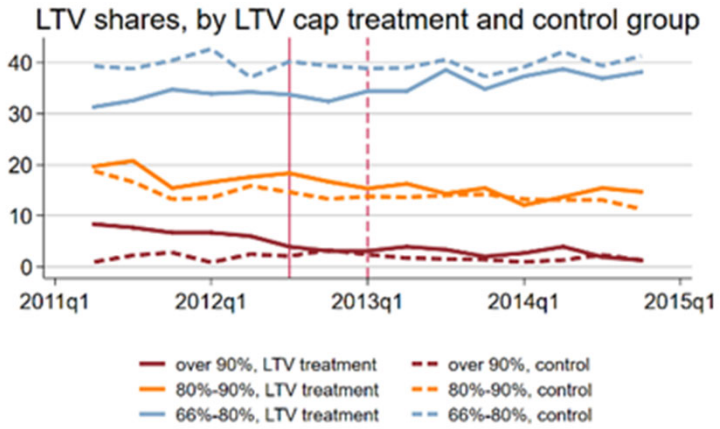
Estimation approach: Difference-in-Differences

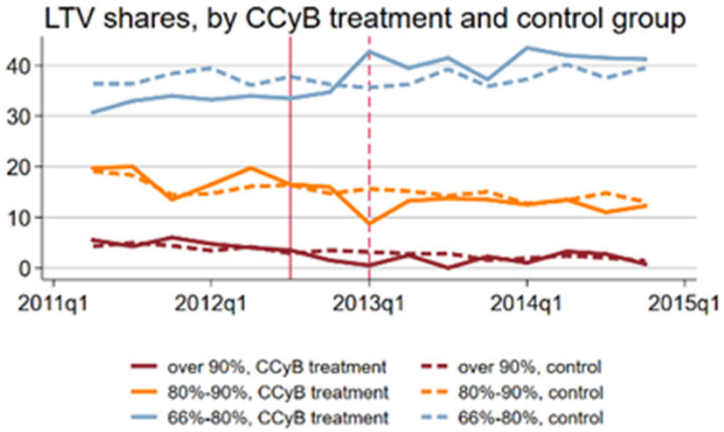
- compare the average outcomes of two groups before and after the policy intervention
  - Common trend assumption (conditional on X),
  - no anticipation assumption

$$y_{it} = \beta_1 LTV * T_{2012} \quad + \beta_2 CCB * T_{2013} \quad + \gamma B + \delta T + \epsilon_{it}$$

Inference: wild cluster bootstrap because of a small number of banks

Common time trend assumption: unconditional means





Main results

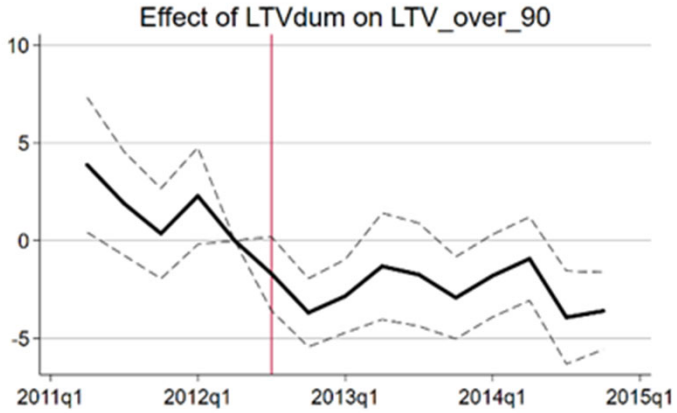
	with LTV				with LTI			Mortgage growth			Other credit
	>90%	80%-90%	66%-80%	<66%	>7.6	5.4-7.6	<5.4	total	private	firms	firms
LTV*T_{2012Q3}	-4.37***	-0.27	2.35	2.28	-0.69	-1.61	2.29	-0.79	-0.59	-0.81	0.12
	(0.00)	(0.89)	(0.24)	(0.13)	(0.72)	(0.37)	(0.49)	(0.28)	(0.48)	(0.59)	(0.97)
CCyB* T_{2013Q1}	-0.44	-3.50**	8.88***	-4.95*	-3.54	-0.08	3.61	-2.04***	-2.53**	-1.29	1.64
	(0.45)	(0.04)	(0.00)	(0.08)	(0.32)	(0.86)	(0.32)	(0.00)	(0.02)	(0.13)	(0.33)
Observations	600	600	600	600	575	575	575	850	850	850	850
R-squared	0.55	0.57	0.44	0.67	0.61	0.53	0.71	0.60	0.62	0.50	0.38

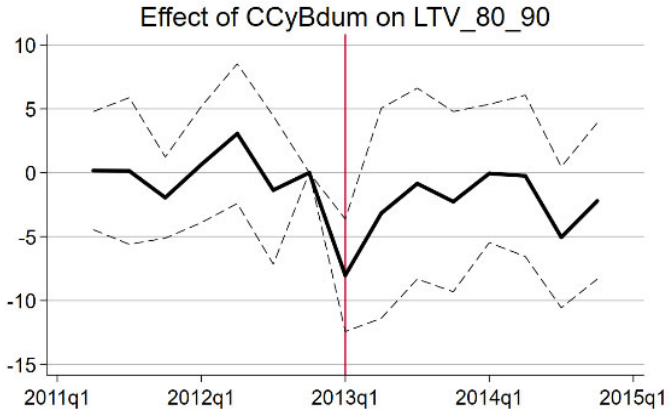
Summary main findings

- LTV cap
  - Reduction of LTV risks: reduced share of new mortgage with LTV > 90%
  - No effect on mortgage growth (substitution to cheaper houses and/or sufficient hard equity for down-payment)
  - No spill-over effects found

- CCB activation
  - Reduction of LTV risks: reduced share of new mortgages with LTV >80% at the expense of an increase of LTV between 66 and 80%
  - Mixed evidence on mortgage growth
  - No spill-over effects found

Marginal effects of LTV (left) and CCyB activation on LTV distribution





Robustness I: treatment intensity

Similar effects and increased significance

Table 5: treatment intensity (LTV continuous and CCyB continuous)

	with LTV				with LTI			mortgage			Other credit
	>90%	80%-90%	66%-80%	<66%	>7.6	5.4-7.6	<5.4	total	private	firms	firms
$LTVconT_{2012Q3}$	-0.72***	-0.15	0.50	0.38	-0.38	-0.37	0.60	-0.16	-0.23	-0.00	0.15
	(0.00)	(0.72)	(0.24)	(0.11)	(0.28)	(0.37)	(0.24)	(0.29)	(0.16)	(0.98)	(0.47)
$CCyBconT_{2013Q1}$	-0.36***	-1.69***	2.13***	-0[08	-0.05	-0.97	1.22	-0.40	-0.43	-0.30	0.12
	(0.00)	(0.00)	(0.00)	(0.74)	(0.92)	(0.33)	(0.36)	(0.14)	(0.41)	(0.19)	(0.63)
Observations	600	600	600	600	575	575	575	850	850	850	850
R-squared	0.56	0.58	0.41	0.66	0.61	0.54	0.71	0.58	0.61	0.50	0.38

Robustness II: effect heterogeneity

Bank with highest CCyB treatment intensity did not adjust mortgage growth rates

Table 6: Effect heterogeneity for the bank with the highest treatment intensity

	with LTV				with LTI			mortgage			Other credit
	>90%	80%-90%	66%-80%	<66%	>7.6	5.4-7.6	<5.4	total	private	firms	firms
LTV^*T_{2012Q3}	-4.37***	-0.07	2.41	2.04	-0.88	-1.30	2.18	-0.84	-0.66	-0.83	0.18
	(0.00)	(0.90)	(0.24)	(0.15)	(0.67)	(0.45)	(0.54)	(0.27)	(0.49)	(0.60)	(0.94)
$CCyB^*\ T_{2013Q1}$	-0.45	-2.22*	9.24***	-6.56***	-4.73	1.81	2.91	-2.39***	-3.00**	-1.47*	2.06
	(0.51)	(0.07)	(0.00)	(0.00)	(0.30)	(0.36)	(0.51)	(0.03)	(0.01)	(0.09)	(0.36)
$B^*\ T_{2013Q1}$	0.06	-5.28***	-1.48	6.70***	4.91	-7.81***	2.90	1.44***	1.95***	0.75	-1.73
	(0.86)	(0.00)	(0.46)	(0.00)	(0.27)	(0.02)	(0.52)	(0.00)	(0.00)	(0.19)	(0.47)
Observations	600	600	600	600	575	575	575	850	850	850	850
R-squared	0.55	0.58	0.44	0.67	0.61	0.54	0.71	0.60	0.62	0.50	0.38

Robustness III: wider CCyB treatment definition

CCyB reduced significance

Table 7: CCyB treatment with 6 instead of 4 banks

	with LTV				with LTI			mort-gage			Other credit
	>90%	80%-90%	66%-80%	<66%	>7.6	5.4-7.6	<5.4	total	private	firms	firms
$LTV*T_{2012Q3}$	-4.42***	0.20	1.75	2.47	-0.49	-1.51	2.00	-0.68	-0.39	-0.83	-0.17
	(0.00)	(0.9)	(0.37)	(0.13)	(0.81)	(0.42)	(0.57)	(0.43)	(0.68)	(0.62)	(0.91)
$CCyB*T_{2013Q1}$	-0.04	-3.30*	6.49***	-3.15	-2.43	-0.35	2.77	-1.41*	-1.92**	-0.59	1.77
	(0.63)	(0.09)	(0.00)	(0.14)	(0.34)	(0.86)	(0.37)	(0.09)	(0.04)	(0.59)	(0.28
Observations	600	600	600	600	575	575	575	850	850	850	850
R-squared	0.55	0.57	0.42	0.66	0.61	0.53	0.71	0.59	0.63	0.51	0.38

Robustness IV: covariates

LTV cap: similar
CCyB: LTV similar, mortgage growth insignificant

Table 8 other covariates instead of bank and time dummies

	with LTV				with LTI			mort-gage			Other credit
	>90%	80%-90%	66%-80%	<66%	>7.6	5.4-7.6	<5.4	total	private	firms	firms
LTV*T_{2012Q3}	-4.37***	-0.27	2.35	2.28	-0.70	-1.65	2.35	-0.79	-0.59	-0.81	0.12
	(0.00)	(0.82)	(0.24)	(0.13)	(0.71)	(0.35)	(0.47)	(0.28)	(0.48)	(0.60)	(0.95)
CCyB* T_{2013Q1}	-0.44	-3.50*	8.88***	-4.95**	-3.54	-0.09	3.63	-2.04***	-2.53**	-1.29	1.64
	(0.45)	(0.06)	(0.00)	(0.02)	(0.32)	(0.82)	(0.32)	(0.00)	(0.02)	(0.13)	(0.33)
Observations	600	600	600	600	575	575	575	850	850	850	850
R-squared	0.41	0.18	0.37	0.34	0.36	0.19	0.32	0.37	0.44	0.31	0.24

Notes: See note below Table 2. Instead of bank and time dummy fixed effects, other covariates are used.

Robustness V: short vs long-term effects

Table 9: Short-, medium and long-term effects

	with LTV				with LTI			Mortgage growth			Other credit
	>90%	80%-90%	66%-80%	<66%	>7.6	5.4-7.6	<5.4	total	private	firms	firms
$LTV*T_{short}$	-4.03***	0.07	0.98	2.97	-1.18	-0.70	1.88	-0.89	-0.74	-0.10	0.63
	(0.01)	(0.97)	(0.62)	(0.14)	(0.67)	(0.70)	(0.66)	(0.26)	(0.37)	(0.98)	(0.74)
$LTV*T_{medium}$	-4.36***	-0.32	2.12	2.56	-0.88	-1.89	2.78	-0.82	-0.68	-0.62	1.41
	(0.01)	(0.88)	(0.32)	(0.13)	(0.71)	(0.31)	(0.43)	(0.30)	(0.46)	(0.66)	(0.43)
$LTV*T_{long}$	-4.70***	-0.53	3.81*	1.42	-0.07	-2.18	2.25	-0.67	-0.37	-1.59	-1.45
	(0.01)	(0.81)	(0.09)	(0.38)	(0.93)	(0.32)	(0.52)	(0.44)	(0.70)	(0.38)	(0.39)
$CCyB*T_{short}$	-0.18	-2.97	7.24***	-4.09**	-3.70	1.28	2.43	-2.76***	-3.06***	-2.82**	-1.63
	(0.71)	(0.18)	(0.01)	(0.04)	(0.32)	(0.56)	(0.40)	(0.00)	(0.01)	(0.02)	(0.20)
$CCyB*T_{medium}$	-0.21	-3.51**	8.76***	-5.04**	-1.80	-0.27	2.06	-1.68***	-2.30**	-0.41	1.67
	(0.77)	(0.04)	(0.01)	(0.03)	(0.59)	(0.89)	(0.58)	(0.00)	(0.04)	(0.73)	(0.28)
$CCyB*T_{long}$	-0.86	-3.96**	10.36***	-5.54**	-5.64	-1.08	6.72	-1.63*	-2.21**	-0.33	5.68
	(0.24)	(0.05)	(0.01)	(0.05)	(0.19)	(0.69)	(0.23)	(0.09)	(0.04)	(0.75)	(0.22)
Observations	600	600	600	600	575	575	575	850	850	850	850
R-squared	0.55	0.57	0.45	0.67	0.61	0.54	0.71	0.60	0.62	0.50	0.40

Robustness VI: placebo treatment

CCB: no effect on mortgage growth in pre-treatment perdiod

Table 10 placebo treatment effects in the pretreatment sample

	total	households	firms
CCyB* T_{2009Q4}	0.47	0.89	2.02
	(0.32)	(0.63)	(0.46)
CCyB* T_{2010Q1}	0.13	-0.24	2.56
	(0.68)	(0.88)	(0.34)
CCyB* T_{2010Q2}	-0.26	-0.92	2.41
	(0.50)	(0.34)	(0.39)
CCyB* T_{2010Q3}	-0.79	-0.77	1.00
	(0.20)	(0.41)	(0.74)
CCyB* T_{2010Q4}	-1.20*	-0.79	-0.51
	(0.10)	(0.36)	(0.78)

Summary robustness checks

- Effect of LTV cap on share of new mortgages with LTV >90%: stable
- Effect of CCyB activation on LTV distribution: shift from over 80% bucket to under 80% bucket: stable
- Effect of CCyB activation on mortgage growth: less stable due to effect hetreogeneity of banks

Conclusions

- From a financial stability perspective: encouraging
  - Both measures reduced LTV risks, without unintended consequences

- Microeconometric evidence is first condition for effectiveness in the banking system, but only identifies effects that are different between bank groups
    - On aggregate: reduction in LTV risks and mortgage growth
    - On aggregate: increase in LTI risks (not caused, but also not prevented by measures)

- Beyond the scope: effect on resilience, effectiveness in supporting credit when released

Thank you for your attention!

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