

Banking Dynamics, Market Discipline and Capital Regulations

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MOTIVATION

- Counter-Cyclical Capital Buffer (**CCyB**): a time-varying capital requirement in Basel III
 - ▷ Address the pro-cyclicality of constant capital requirement and smooth bank credit supply over time
 - ▷ In Canada, Pillar-2 implementation of time-varying capital regulation, introduced in 2018 at **1.5 pp**
- *Market discipline* viewed important force that reinforces capital regulations in Basel III
 - ▷ promoted through disclosure requirements under Pillar 3
 - ▷ facilitate the pricing of *individual* bank risk to limit “over-borrowing” from the wholesale market.

QUESTIONS AND FINDINGS

1. What is the impact of CCyB through a Great Financial Crisis-like episode:
 - Average impact on bank credit supply and the prob of default?
 - ▷ *Smooths credit supply and the probability of bank default*
 - ▷ *Quantitatively, small impacts when releasing 1.5% buffer; larger impacts of releasing 5% buffer*
 - Differential policy impacts across banks with different capital ratios?
 - ▷ *The impact varies across banks: larger impacts on low capitalized banks*
2. How does market discipline change the way banks react to CCyB? Heterogeneity?
 - ▷ *Raises capital ratios in normal times (precautionary motive), softening the impact of crisis*
 - ▷ *Raises the roll-over risk; even large and well-capitalized banks could be vulnerable to crisis*

CONTRIBUTION OF OUR PAPER

Analyzes interaction between a counter-cyclical capital regulation and market discipline

- dynamic model of banking industry with heterogeneous banks
- implications for
 - ▷ precautionary motives and dynamic risks associated with wholesale funding
 - ▷ buffer size

Many other papers related to CCyB in the literature:

Theory: Kashyap and Stein (2004), Repullo (2013), Repullo and Suarez (2013), Martinez-Miera and Suarez (2014), Benes and Kumhof (2015), Davydiuk (2019), Gertler, Kiyotaki and Prestipino (2020), Schroth (2021), Van der Ghote (2021), Corbae and D'Erasmus (2021)

Empirical: Jiménez, Ongena, Peydró and Saurina (2017), Auer and Ongena (2019), Chen, Sivec and Volk (2019), Avezum, Oliveira and Serra (2021), Behncke (2022), Van Oordt (2022)

MODEL FEATURES

A heterogeneous-bank model with

Timing of events

- ▷ stochastic aggregate state – normal and crisis
- ▷ bank-specific loan failure rate shocks – higher average failure rates in crisis
- ▷ endogenous bank default generates risk premium on bank's wholesale funding (WSF):

$$\text{Discount price of WSF} = \frac{1 - \text{Prob}(\text{default}_{t+1})}{1+r_f} \Rightarrow \text{market discipline}$$

Pricing

- ▷ exogenous deposits \Rightarrow inefficiency from moral hazard due to limited liability
- ▷ the balance sheet:

| ASSET | LIABILITY & EQUITY |
|-------------------------|--------------------|
| Long-Term Illiquid Loan | Insured Deposit |
| | Wholesale Funding |
| | Equity |

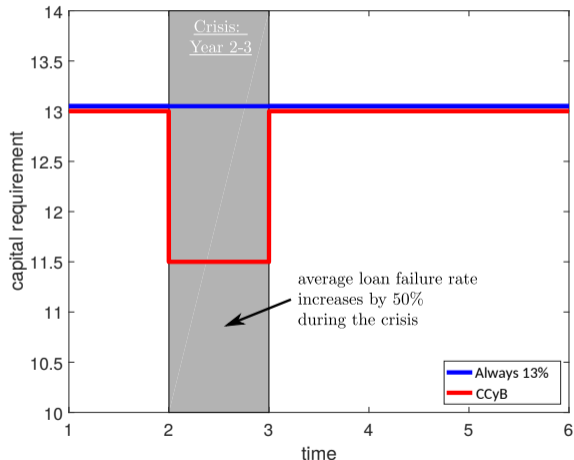
- ▷ banks must satisfy capital requirements, including CCyB

STATIONARY STATE AND IRF ANALYSIS

1. Calibrate to 2017 with 1.5-pp CCyB as a stationary economy in the normal time
⇒ starting point of simulation Distributions

2. Simulate aggregate dynamics and analyze Impulse-Response Functions (IRFs)

- CCyB not released
- CCyB released
- Three bank groups in capital ratio
 - ▷ Top decile
 - ▷ All banks
 - ▷ Bottom decile

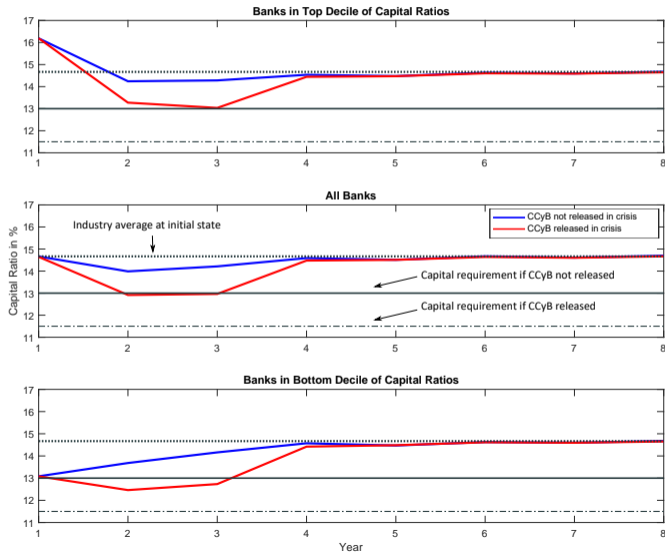


STATIONARY ECONOMY PRIOR TO THE CRISIS

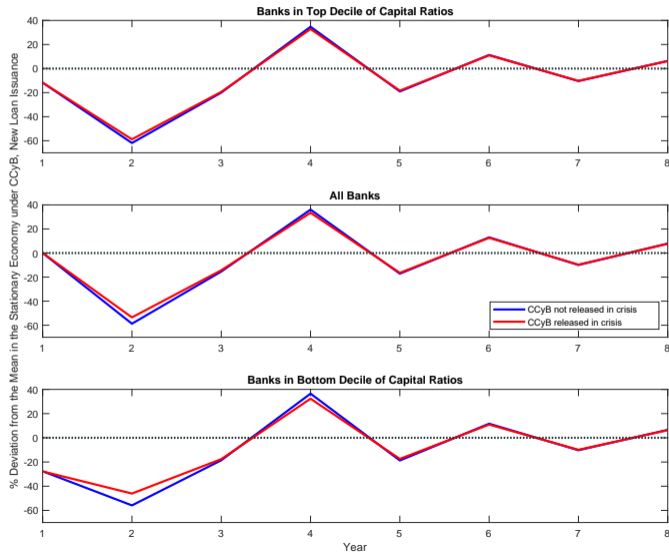
| | 1.5pp CCyB (Baseline) | 1.5pp CCyB (No Market Discipline) |
|-----------------------|--------------------------|--------------------------------------|
| Capital Requirement | 13% | 13% |
| Average Capital Ratio | 14.64% | 13.85% |
| Bank Insolvency Rate | 0.12% | 0.19% |
| New Loans/Deposit | 1.02 | 1.06 |

- Size of private capital buffer depends on precautionary motive and market discipline
- Market discipline makes banks more prudent and hold more capital in normal times
 - ▷ reinforcing CCyB in normal times
 - ▷ but market discipline is not counter-cyclical and can have an opposing effect if a crisis happens

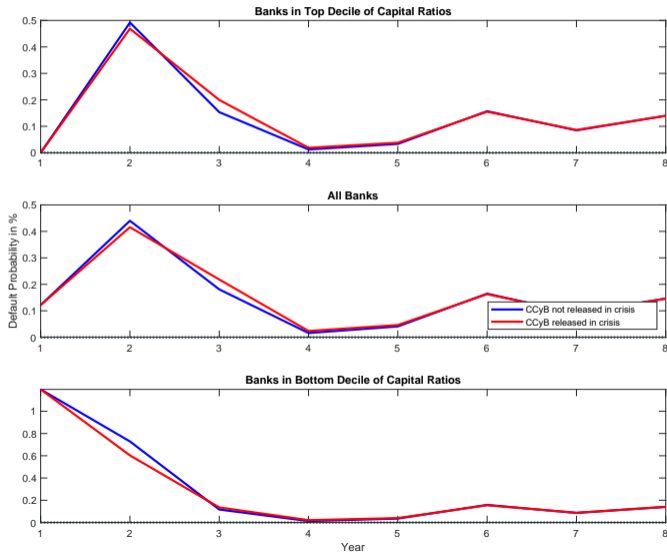
IRF OF CAPITAL RATIO WITH 1.5-PP CCyB (13% → 11.5%)



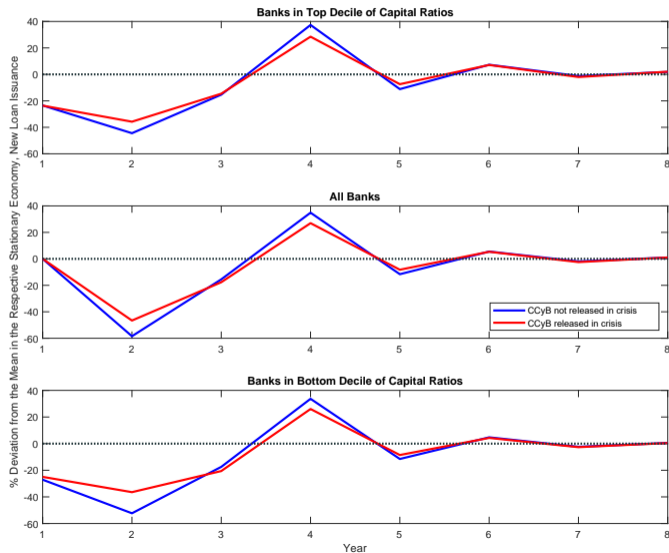
IRF of New Loan Issuance with 1.5-PP CCyB (13% → 11.5%)



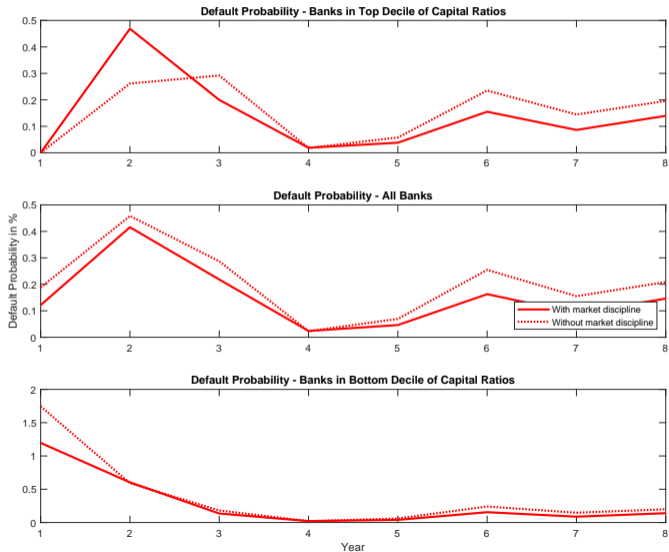
IRF of % of BANK DEFAULT WITH 1.5-PP CCyB (13% \rightarrow 11.5%)



IRF of New Loan Issuance with 5-PP CCyB (16.5% → 11.5%)



IRF of BANK DEFAULT WITH AND W/O MARKET DISCIPLINE, 1.5-PP CCyB



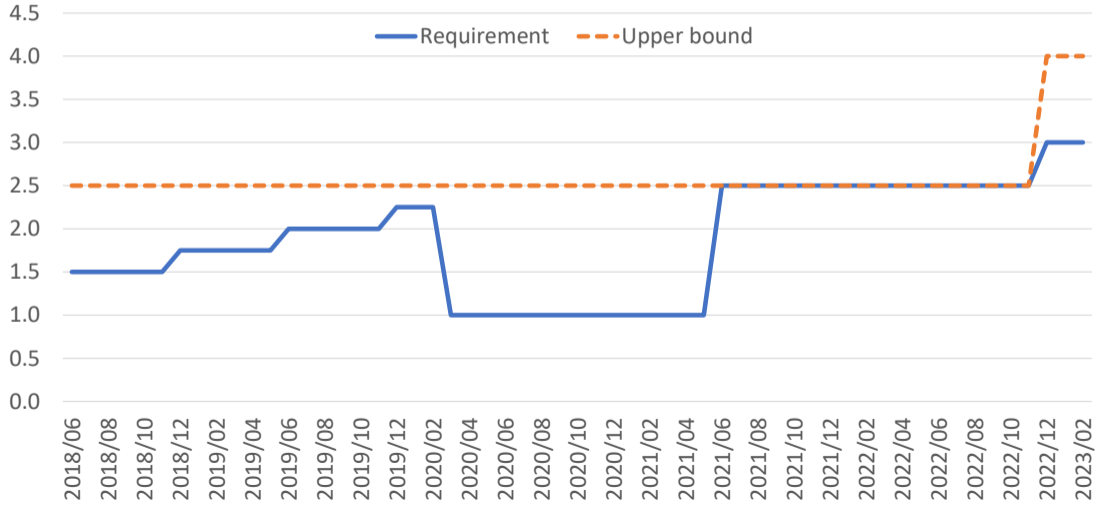
CONCLUSION

1. Confirms the intended benefits of CCyB over constant capital requirements:
 - ▷ Smoother credit supply and bank insolvency dynamics in a crisis-recovery episode
 - ▷ Average quantitative impact limited for a small buffer, but a larger impact as buffer size increases
 - ▷ A larger impact on inadequately-capitalized banks

2. Market discipline has opposing effects on banks:
 - ▷ Lower bank risk-taking during normal times, *complementing CCyB*
 - softens the impact of the crisis on loan supply
 - reduces bank default on average
 - ▷ Larger roll-over risk during a crisis, *working against CCyB*
 - potentially increases default risk for even well-capitalized banks with large exposure on wholesale funding

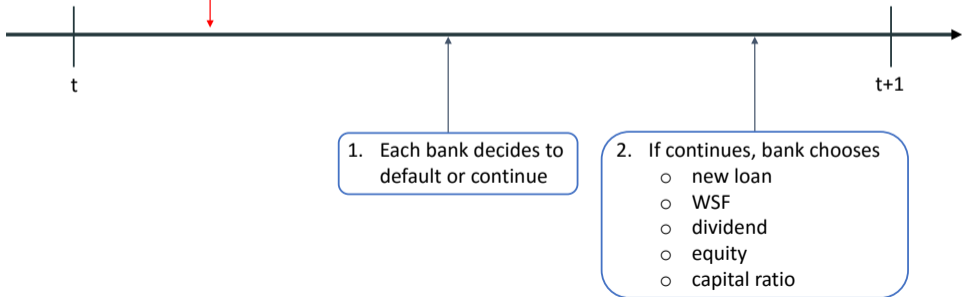
HISTORY OF DYNAMICS CAPITAL REQUIREMENT IN CANADA

Dynamic Capital Requirement in Canada (% of RWA)



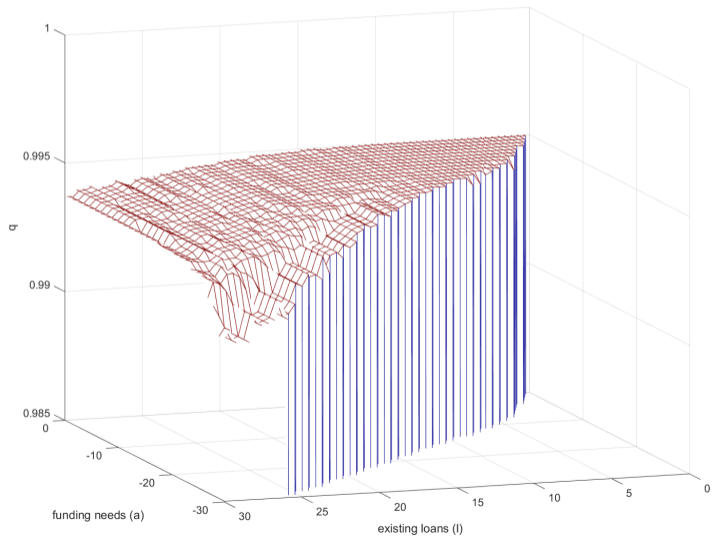
MODEL: TIMING OF SHOCKS AND DECISIONS BACK

- Normal or crisis state realizes
- Bank-specific loan failure rate realizes
- Each bank learns
 - its income
 - the existing loan balance
 - funding needs
 - its type (i.e., deposit and loan risk)



DISCOUNT PRICE OF WSF FOR LARGE BANKS IN NORMAL TIMES

BACK



BANK DISTRIBUTIONS BEFORE AND AFTER THE CRISIS SHOCK

[BACK](#)

