

Banking Competition Revisited: Shadow Banks v.s. Commercial Banks

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Motivation

- It has long been argued that the competition (for deposits) among banks are detrimental to the financial stability. (Keeley 1990. Hellman et. al. 2000. Boyd et. al. 2005)
- In this paper, I am particularly interested in the emerging competition from shadow banking sector.

“This new system threatened the once-dominant traditional commercial banks...Shadow banks and commercial banks were codependent competitors. Their new activities were very profitable-and, it turned out, very risky” - Financial Crisis Inquiry Report

Preview of this paper

In this presentation, I will show:

- Both in theory and data that commercial banks will respond to shadow banks' competition by increasing their deposit rates and switching to riskier portfolios.
- The effect is especially stronger in the countries with higher moral hazard (generous deposit insurance, loose banking regulation, or weak supervisory power)
- A deposit ceiling or a capital ratio requirement could decrease both commercial and shadow banks risks, although shadow banks are not directly regulated.

Model

Commercial Bank chooses:

- 1 Deposit rate: R
- 2 Amount of equity: E
- 3 α share in risky asset and $1 - \alpha$ in safe asset

to maximize the expected profit:

$$\max_{E, \alpha, R} \Pi^C = \int_{\underline{y}}^{\bar{y}} \left[g(\alpha) \cdot K \cdot y + h(1 - \alpha) \cdot K \cdot r - D(R; R^S) \cdot R \right]^+ dF(y) - E \cdot R^E$$

$D(R; R^S)$ is deposit supplied by household. $D_1 > 0$ and $D_2 < 0$

r is the riskless return

y is the random return of risky projects.

$K = E + D$ is the total capital

R^E is the cost of equity

Main Result

Proposition

*Commercial bank will chooses 1) a **higher deposit rate** and 2) a **riskier portfolio**, if shadow bank chooses a higher deposit rate. Formally,*

$$\frac{dR^{C^*}}{dR^S} > 0 \quad \text{and} \quad \frac{d\alpha^{C^*}}{dR^S} > 0$$

where $(\alpha^{C^*}, R^{C^*}) = \operatorname{argmax} \Pi^C(\alpha, R; R^S)$.

The idea is that

- deposit are supermodular (strategically complementary a la Bertrand).
- Increase in deposit rate leads to increased bankruptcy probability.
- Bank are protected by limited liability. Higher bankruptcy leads to higher moral hazard (more risk taking)

Policy Recommendation - Deposit Rate Ceiling

Proposition

A binding CB deposit rate ceiling will decrease both commercial bank and shadow bank's deposit rates and risky portfolio.

- Since Commercial Bank is directly regulated, CB's deposit rate will decrease, so does its risky portfolio.
- Because CB's deposit rate decreases, SB's deposit rate will voluntarily decrease. So does its risky portfolio.

Policy Recommendation - Capital Requirement

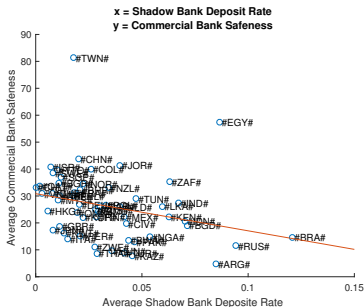
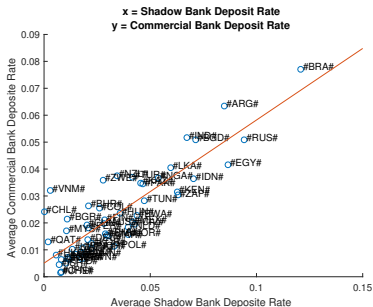
Proposition

A binding CB capital requirement decreases both commercial bank and shadow bank's deposit rates and risky portfolio.

- Higher equity ratio, banks are not likely to gamble on its own equity.
- Higher equity ratio also means marginal return to deposit is lower, so they will offer lower deposit rate, which indirectly leads to safer portfolios.
- Because CB's deposit rate decreases, SB's deposit rate will voluntarily decrease. So does its risky portfolio.

- The data is from Compustat Global database (1987-2015)
- 1224 Commercial Banks: SIC code 60 (Depository Institutions)
 - BNP Paribas (FRA)
 - Bank of Japan (JPN)
 - Korea Savings Bank (KOR)
- 587 Shadow Banks: SIC code 61 (Non-depository Credit Institutions)
 - Australian Finance Group (AUS)
 - Provident Financial Group PLC (GBR)
 - Samsung Card (KOR)

Some stylized fact:



- Interest Rate = interest expense/total asset = $\mathbf{xint/at}$
- Risky Portfolio = Non cash holding = $1 - \mathbf{ch/at}$
- Z-score = $(ROA + CAR)/\sigma(ROA) = (\mathbf{ib/at} + \mathbf{ceq/at}) / \sigma(\mathbf{ib/at})$

Main Result

First Stage:

$$\text{average_SB_Interest}_{ct} = \gamma_0 + \gamma_1 \cdot \text{SB_number}_{ct} + \gamma_3 \cdot X_{ict} + \mu_c + \tau_t + \epsilon_{ict}$$

Second Stage:

$$\text{CB_}Y_{ict} = \beta_0 + \beta_1 \cdot \widehat{\text{average_SB_Interest}}_{ct} + \beta_2 \cdot X_{ict} + \mu_c + \tau_t + \epsilon_{ict}$$

I use the number of shadow banks in the country-year as an IV for average_SB_Interest

.	Deposit Rate	Risky Portfolio	Z-score
Average SB Rate	0.930***	1.654***	-770.8***
Controls	YES	YES	YES
IV (# of SB)	YES	YES	YES
Country FE	YES	YES	YES
Year FE	YES	YES	YES
Observation	7223	7223	7135
# of CB	914	914	898
# of Countries	61	61	62

Split Sample Regression for Deposit Insurance

- Demirgüç-Kunt and Detragiache (2002) argues that **deposit insurance** exacerbates the moral hazard problem.
- With explicit deposit insurance, commercial banks enjoy more degree of freedom.
- We could see a higher response from commercial banks in the country with deposit insurance.

	insurance=0	insurance=1	insurance=0	insurance=1
Dependent Variable	Deposit Rate	Deposit Rate	Z score	Z score
Average SB Rate	0.844***	1.282***	142.272	-986.185***
Controls	YES	YES	YES	YES
IV (# SB)	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observation	998	6747	997	6660
# of CB	141	776	140	761
# of Countries	13	47	12	47

Split Sample Regression for Deposit Insurance

- In addition, the moral hazard problem will be higher if the deposit insurance is **more generous**.
- Demirgüç-Kunt, Kane and Laeven (2014) provides a moral hazard (MH) index that measures the DI's generosity.

	Low MH	Middle MH	High MH	Low MH	Middle MH	High MH
Dependent Variable	Deposit Rate	Deposit Rate	Deposit Rate	Z score	Z score	Z score
Average SB Rate	-0.523	0.847***	1.206***	864.514	18.734	-2243***
Controls	YES	YES	YES	YES	YES	YES
IV (# SB)	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observation	2594	1921	2232	2530	1911	2219
# of CB	293	241	242	284	238	239
# of Countries	16	16	15	16	16	15

Split Sample Regression for Banking Regulation

- Similarly, we would see a higher degree of freedom for commercial banks in countries with **loose regulation** or **weak supervisory power**.
- The index for regulation and supervisory power is from Barth, Caprio and Levine (2012)

	High Regulation	Low Regulation	High Regulation	Low Regulation
Dependent Variable	Deposit Rate	Deposit Rate	Z score	Z score
Average SB Rate	-0.328	0.700***	569.805	-731.195***
Controls	YES	YES	YES	YES
IV (# SB)	YES	YES	YES	YES
Country FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observation	4823	2953	4767	2921
# of CB	575	347	568	338
# of Countries	41	21	41	21

Split Sample Regression for Supervisory Power

- We could see a higher response from commercial banks to the competition from shadow banks in countries with **weak supervisory power**.

	High supervisory	Middle supervisory	Low supervisory	High supervisory	Middle supervisory	Low supervisory
Dependent Variable	Deposit Rate	Deposit Rate	Deposit Rate	Z score	Z score	Z score
Average SB Rate	0.604*	0.567***	1.738***	131.838	-148.051	-2267***
Controls	YES	YES	YES	YES	YES	YES
IV (# SB)	YES	YES	YES	YES	YES	YES
Country FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Observation	1832	2601	2856	1781	2578	2842
# of CB	213	346	303	210	336	300
# of Countries	14	25	16	14	25	16

Conclusion

In this paper, I have shown:

- Both in theory and data, commercial banks will respond to shadow banks' competition by **increasing their deposit rates** and **switching to riskier portfolios**.
- The effect is especially stronger in the countries with higher moral hazard (**generous deposit insurance, loose banking regulation, or weak supervisory power**)
- **A deposit ceiling** or a **capital ratio requirement** could decrease both commercial and shadow banks risks, even though shadow banks are not directly regulated.

Contributions:

- First paper to analyze the emerging effects of shadow banks on commercial banks.
- Propose the indirect or spillover effects of banking regulations on shadow banking sector, even though they are not directly regulated.