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

Chong Shu

Marshall School of Business
University of Southern California

Abstract

In this paper, I propose a novel and understudied deposit competition from the shadow banking sector:

- shadow banks induce traditional commercial banks to take higher risks.
- government could regulate both commercial banks' and shadow banks' risk by either a deposit ceiling regulation or an equity ratio requirement, even though shadow banks are not directly regulated.
- A panel data from 1987 to 2015 of 63 countries' 1811 banks confirm that higher deposit rates by shadow banks will cause commercial banks to increase their deposit rates and risky portfolios.
- especially in countries with generous deposit insurance, loose banking regulation, or weak supervisor power.

Introduction

A central problem of the 2008 financial crisis is the excessive borrowing and risky investments. According to many, such excessive risks are induced by the phenomenal growth of shadow banking sector that that erodes traditional commercial banks' profitability. As a result, commercial banks will take higher risks due to their diminished profitability and increased bankruptcy pressure. the Financial Crisis Inquiry Report (2011) prepared by the U.S. government states:

"Shadow banks and commercial banks were codependent competitors. Their new activities were very profitable-and, it turned out, very risky"

Figure 1 provides a stylzed fact that commercials behaviors are related to shadow banks' competition.

Figure 1: Univariate Regression
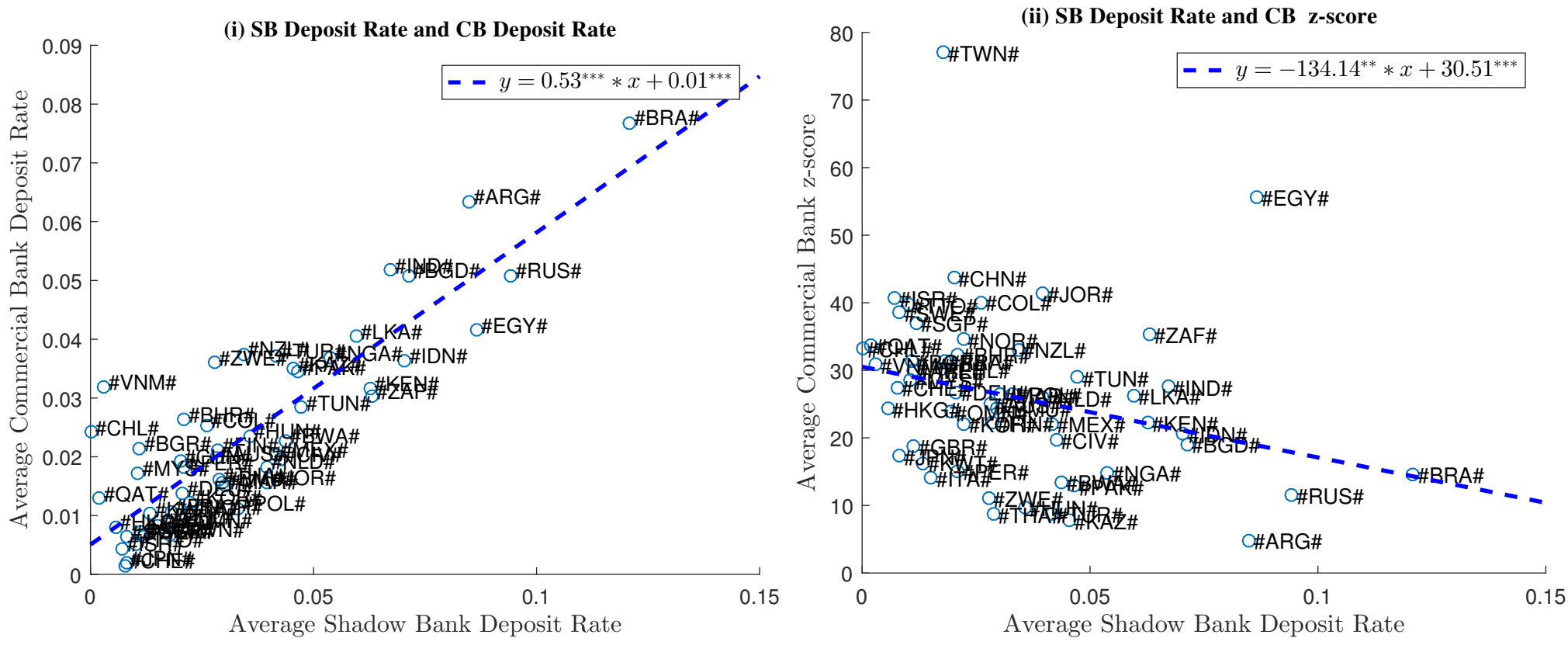
where z-score measures a bank's distance to bankruptcy (safeness). Each observation is a country in 2015. x-axis is shadow banks' average interest expense rate. Figure 1 shows that commercial banks' deposit rate and risk taking are positively correlated with shadow banks' interest expense rate. (endogeneity issue will be tackled in the main section)

Model

Commercial Bank chooses:

❶ Deposit rate: R
❷ Equity amount: E
❸ Risky Portfolio: α

to maximize the expected profit:

$$\max_{E,\alpha,R} \int_{\underline{y}}^{\bar{y}} \left[g(\alpha)Ky + h(1-\alpha)Kr - D(R;R^S)R \right]^+ dF(y)$$

subject to

$$K = E + D \quad \text{and} \quad \frac{E}{E+D} \geq \bar{e}$$

- $D(R;R^S)$ is deposit supplied by household. R^S is shadow bank's rate. $D_1 > 0$ and $D_2 < 0$
- r is the riskless return.
- y is the random return of risky projects.

Main Result

Proposition: If shadow bank chooses a higher deposit rate, commercial bank will 1) choose a higher deposit rate and 2) a riskier portfolio.

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

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

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

Policy I: Deposit Rate Ceiling

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

Policy II: Capital Requirement

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

Data

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)

Identification Strategy

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:

$$\text{CB\_}Y_{ict} = \beta_0 + \beta_1 \cdot \widehat{\text{average\_SB\_Interest}}_{ct} + \beta_2 \cdot X_{ict} + \mu_c + \tau_t + \epsilon_{ict}$$

(where $\text{CB\_}Y_{ict}$ is commercial bank's deposit rate and riskiness. I use the number of shadow banks in the country-year as an IV for average_SB_Interest.)

- Commercial banks won't have any incentive to increase their deposit rates unless shadow banks increase their rates, no matter how many shadow banks are there in the market.

Empirical Result

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

Deposit Insurance

Split sample regression for countries with or without explicit deposit insurance:

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

- The result is statistically and economically stronger in countries with explicit deposit insurance, especially a generous one.

Banking Regulation and supervisory power

Split sample regression for banking regulation:

	High Rgltn. Rate	Low Rgltn. Rate	High Rgltn. Z score	Low Rgltn. Z score
Average SB Rate	−0.328	**0.700*****	569.805	**−731.195*****
Controls	✓	✓	✓	✓
IV (# SB)	✓	✓	✓	✓
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Observation	4823	2953	4767	2921
# of CB	575	347	568	338
# of Countries	41	21	41	21

Split sample regression for supervisory power:

	High Power Rate	Middle Power Rate	Low Power Rate	High Power Z-score	Middle Power Z-score	Low Power Z-score
Average SB Rate	0.60*	**0.56*****	**1.73*****	131.83	−148	**−2267*****
Controls	✓	✓	✓	✓	✓	✓
IV (# SB)	✓	✓	✓	✓	✓	✓
Country FE	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Observation	1832	2601	2856	1781	2578	2842
# of CB	213	346	303	210	336	300
# of Countries	14	25	16	14	25	16

- The result is statistically and economically stronger in countries with loose banking regulation or weak supervisory power

Contact

Chong Shu
USC Marshall School of Business
chongshu@marshall.usc.edu