Risk-Taking Incentives of Modern Banks

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Motivation

- Risk-taking in FIs with large and stable franchise
  - UBS in Switzerland
  - AIG in the US
  - Washington Mutual in the US

- But franchise value limits risk taking (Jensen and Meckling, 1976)

- Our goal: reconcile theory and evidence
OECD Financial Intermediaries

Returns Jul 07–Dec '08 vs Market to Book '05

Stock return
Jul'07-Dec'08, %

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Observation:
- Traditionally, changing risk in existing business, but in fact:
  - **Stable core business** (e.g., relationship banking)
    - Non-scalable, profitable, safe
    - Spare borrowing capacity
  - **Add new risky business** (e.g., carry trade)
    - Scalable
    - Modest gains ("alpha"), but a small probability of large losses
Franchise value and incentives to take risk

- **Overall effect can be positive or negative:**
  - Borrowing capacity binding, more franchise → stop risk taking
  - Borrowing capacity not binding, more franchise → risk on larger scale
**Related Literature**

- **Does franchise value** reduce bank risk-taking?
  - Yes: Keeley (1990), Demsetz et al. (1996), Repullo (2004);
  - No: Blum (1990), Hellman et al. (2000), Matutes and Vives (2000), Calem and Rob (1999), Perotti et al. (2011)

- **Does capital** make bank more stable?
  - Yes: Beltratti and Stulz (2012), Berger and Bouwman (2013)
  - No: Barth et al. (2006), Huang and Ratnovski (2009), GSFR (2009), Camara et al. (2010)

- **Does better institutional environment** reduce bank risk?
  - Yes: Laeven (2001), La Porta et al. (2003), Boyd and Hakenes (2012)
  - No: Giannonne et al. (2011), Gourinchas et al. (2011)
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Basic model: Investment

- Three dates (0, 1, 2), no discounting, universal risk neutrality
- Bank has no initial capital, funded with debt
- Agents: the banker (owner-manager), creditors (depositors)

Two types of investments available:

- **Core** project (safe, not scalable):
  - invest 1 at date 0, certain return $R$ at date 2
  - $NPV = R - 1 > 0$ franchise value

- **Market-based** investment (risky, scalable):
  - invest $X$ at date 1, return at date 2:
    $$
    \begin{cases}
    (1 + \alpha)X & \text{w.p. } p \\
    0 & \text{w.p. } 1 - p
    \end{cases}
    $$
  - $NPV = p(1 + \alpha) - 1 < 0$
  - Less profitable: $\alpha < R - 1$
Basic model: Agents

Banker:
- chooses the scale of risky investment $X$
- maximizes expected profit
- credit constrained (Holmstrom and Tirole, 1997)

$$\Pi \geq b(1 + X)$$ \hspace{1cm} (2)

- Core project not credit constrained: $R - 1 \geq b$
- Risky investment credit constrained: $\rho \alpha < b$

Two types of creditors:
- date 0: charge $r_0$ (till date 2)
- date 1: charge $r_1$
Basic model: Timeline

**Date 0**
- A bank has no initial capital;
- A bank attracts funds at the interest rate $r_0$ to invest in the *core* project of size $I$.

**Date 1**
- A bank chooses whether to invest in the *risky* asset of size $X$ and attracts additional funds at the interest rate $r_1$;
- A bank chooses whether to convert the assets into private benefits.

**Date 2**
- Projects returns are realized and returns are distributed.
Exogenous Cost of Bank Funding

- \( r_0 = r_1 = 0 \) (deposit insurance / TBTF)

- Banker maximizes payoff:
  \[
  p \left[ R - 1 + (1 + \alpha)X - X \right] + (1 - p) \max \left[ R - 1 - X, 0 \right] \tag{3}
  \]
  
  \( \text{return upon success} \)
  \( \text{return upon failure} \)

- when \( X \leq R - 1 \), never takes risk
Exogenous Cost of Bank Funding

- **Incentives to take risk**
  
  \[ p[R - 1 + \alpha X] > R - 1 \]  
  
  Banker undertakes risky investment only on a sufficient scale:
  
  \[ X > X_{\text{min}} = \frac{(1 - p)(R - 1)}{p\alpha} \]

- **Leverage constraint**

  \[ p[R - 1 + \alpha X] \geq b(1 + X) \]  

  Maximum scale of risky investment:
  
  \[ X \leq X_{\text{max}} = \frac{p(R - 1) - b}{b - p\alpha} \]

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Exogenous Cost of Bank Funding

- Bank takes risk at scale $X_{\text{max}}$ if $X_{\text{max}} > X_{\text{min}}$

  $$b < b_{\text{max}} = \frac{p\alpha(R - 1)}{p\alpha + (1 - p)(R - 1)}$$

- Interpret low $b$ as good institutional environment
Main Result:

**Proposition**

Higher franchise value → bank more likely to undertake risky investment and at a larger scale
Interest rates $r_0$ and $r_1$ are endogenous

Bank creditors break even

When bank is insolvent, assets $R$ are distributed according to seniority rule:

- upon bankruptcy:
  - $\theta X$ to date 1 creditors
  - $R - \theta X$ to date 0 creditors
- $\theta$ is seniority of date 1 creditors, exogenous, $0 < \theta < \frac{R}{X}$

Solve backwards
Bank takes risk and at scale $X^\theta_{\text{max}}$ if

$$\begin{cases}
    b < b^\theta_{\text{max}} (< b_{\text{max}}) \\
    \theta > \theta_{\text{min}}
\end{cases}$$

Main result holds:

$\uparrow R \rightarrow$ more risk
Additional result:

- Risk taking increases when new debt is senior:
  \[ \theta \uparrow \rightarrow \text{more risk} \]

  - \[ \theta \uparrow \Rightarrow \theta \uparrow r_0 \Rightarrow \text{less to lose on core project} \]
  
  - \[ \theta \uparrow \Rightarrow \theta \downarrow r_1 \Rightarrow \text{risky project more attractive} \]
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Bank has to exert effort to improve the expected value of the core investment

**Assumptions:**
- Exogenous cost of funding $r_0 = r_1 = 0$
- Return on the core project is $R$ w.p. $e$ and 0 otherwise
- $e \in [0; 1]$ is banker’s effort at date 0 at a private cost $ce^2/2$
- Realization of $R$ is known after the effort is exerted

**Main result:**
- For $b < b_{max}$, the presence of risky investment opportunity increases bank incentives to exert effort in the core project
Consider the role of bank capital

**Assumptions:**
- Exogenous cost of funding $r_0 = r_1 = 0$
- Bank is financed by inside equity $k < 1$
- $1 - k$ of debt finances the core project and $X$ the risky investment

**Main result:**
- For $b < b^k_{\text{max}}$ (where $b^k_{\text{max}} > b_{\text{max}}$), bank undertakes the risky investment
- Higher capital $k$: bank is more likely to take risk and at a larger scale
- Note: this result concerns high actual capital, not high capital requirements
Policy Implications

- Risk-taking in dynamics: special focus on well-capitalized banks’ rapid asset growth
- Leverage ratios are important in addition to risk-weighted capital requirements
- Better protection of creditor rights may increase risk-taking
- Dangers of high seniority funding
  - repo market reform
- Lack of bank competition increases risk-taking via franchise value accumulation
Why do banks with high franchise value take more risk?

Banks take risk through new borrowing
Franchise value allows to borrow more

We show that:
- franchise value
- better institutional environment
- more senior debt

increase bank risk-taking.