Economics of Banking
Lecture 3

February 2023

Table of contents

Contents of this lecture:

1. Types of financial intermediation:
2. Shadow banking I
3. Risk management I

Different kinds of FI

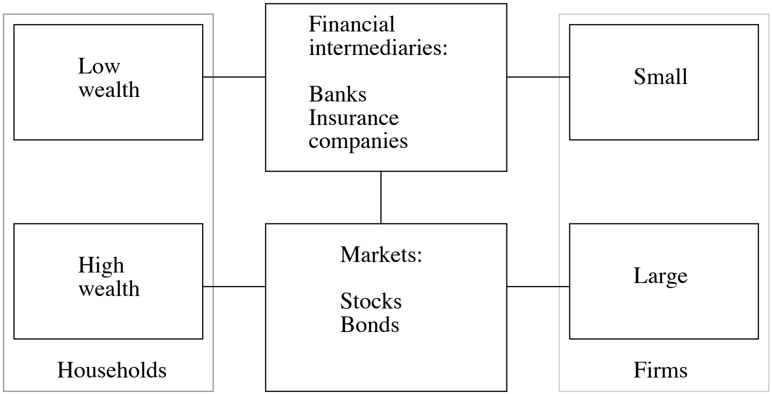
- Commercial banks
- Savings banks
- Venture capitalists
- Insurance companies
- Pension funds
- Hedge funds
- Pawn brokers
- Gambling
- Loan sharks
- Government

Types of banking business

1. Private banking
2. Commercial banking
3. Investment banking
4. Payment
5. Asset management
6. Trading
7. Retail brokerage
8. Agency

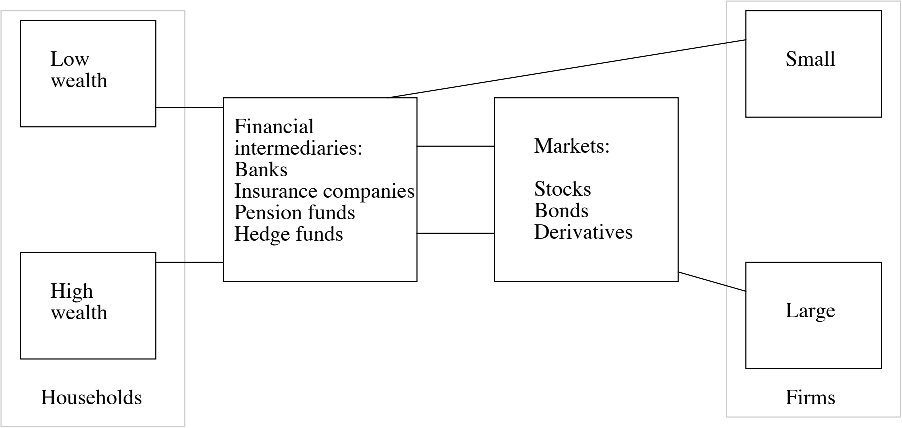
Classical banking business

The classical structure of financial intermediation:



Newer version of FI

Nowadays, the structure is more like this:



Relationship banking

Mutual knowledge of lender and borrower matters, but how?

Allen-Gale: Written contracts not always optimal, improvement possible for both.

Thakor: Knowledge of borrower allows for lender overpricing.

Freixas: Banks better than market when borrower has troubles.

A model where banks matter

Moral hazard model (two technologies, choice not observable).
However, π_G is observable. Monitoring cost C_m.

New feature: Nonperforming loans from bank yields a benefit V (instead of 0) to the firm.

As previously, the market can be used if

$$R \leq \frac{\pi_G G - \pi_B B}{\pi_G - \pi_B},$$

and we define $\overline{\pi}_G$ as the smallest π_G for which the market works. We assume $\pi_G \geq \overline{\pi}_G$.
For each such π_G, the funding condition $\pi_G R(\pi_G) = 1$ gives that

$$R(\pi_G) = \frac{1}{\pi_G}$$

is the repayment rate in the **market.**

Banks setting rates

Some borrowers have a choice between market and bank financing:

Repayment rate set by **bank** should cover funding plus monitoring (and mark-up ρ)

$$R_m(\pi_G) = \frac{1 + m + \rho}{\pi_G},$$

with $m = (1 + \rho)C_m$.

The marginal borrower with risk $\overline{\pi}_G$ chooses the bank if

$$\overline{\pi}_G \left(G - \frac{1}{\pi_G} \right) \leq \overline{\pi}_G (G - R_m(\pi_G)) + (1 - \pi_G)V.$$

and the value π_G^* for which there is $=$ can be found:

$$\pi_G^* = 1 - \frac{\rho + m}{V},$$

Pricing in a two-period model

Model with two periods $t = 0, 1$.
Repayment rates $R_{n,t}$ for borrower with risk π_G.

Finding equilibrium rates:
$t = 1$: Repayment in renewal $R_{r,1}$ is $\geq$ cost of new loan:

$$R_{r,1} = R_{n,1} = \frac{1 + m + \rho}{\pi_G}.$$

$t = 0$: Expected return $1 + \rho + m$ should be
$\pi_G(R_{n,0} + \pi_G R_{r,1}) = \pi_G(R_{n,0} + 1 + m + \rho)$, so that

$$R_{n,0} = \frac{(1 - \pi_G)(1 + m + \rho)}{\pi_G}(< R_{r,1}).$$

What is shadow banking?

Classical (stylized) banking consists of:

$$\text{Households} \rightarrow \text{Bank} \quad \text{and} \quad \text{Bank} \rightarrow \text{Entrepreneurs}$$

so that banking business splits into

(i) Deposit contracts between depositors and banks

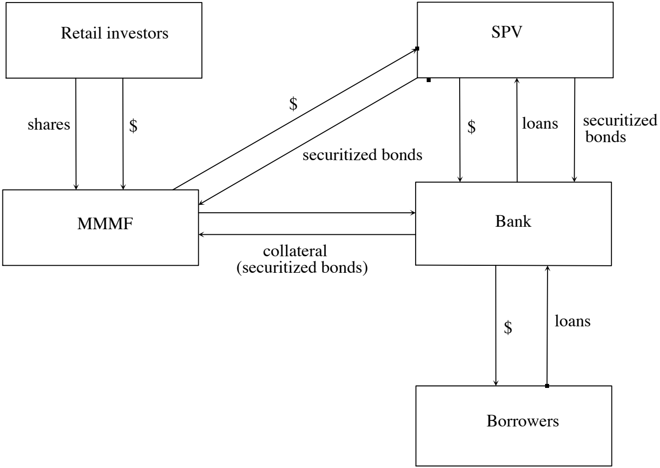
(ii) Loan contracts between banks and entrepreneurs

However, there both of these can take alternative forms:

(i*) Repos (repurchase agreements) instead of deposits

(ii*) Securitization instead of loans

Shadow banking: Structure



Why shadow banking?

(i*) In a **Repo,** the depositor owns the securities bought

If the bank defaults, the depositor keeps the securities

(ii*) After **securitization,** the loan does not count as an asset of the bank

Matters for capital regulation of the bank – lower demand for equity

Pros and Cons of Shadow Banking

- Makes more funds available for investment
- Allows for more flexible supply of securities
- Conceals information to investors
- May increase instability of financial markets

Types of risk in a financial institution

A financial intermediary earns money by taking on risk.
Risk has several forms:

- *Liquidity risk*
- *Interest rate risk*
- *Market risk*
- *Credit risk*
- *Operational risk*

The loss function 1

General model for assessing risk:
Let V_t be observed value of a portfolio of time s
After one period the *loss* is

$$\tilde{L}_{t+1} = -(\tilde{V}_{t+1} - V_t).$$

To proceed, we need a **model** of the change in value:
There are d *risk factors*, written

$$z_t = (z_{t,1}, \ldots, z_{t,d})$$

so that

$$V_t = f(t, z_t).$$

The risk factors in z_t are observable at time t but random at $t+1$.

The loss function 2

Define the (random) *change in risk factor* $\tilde{x}_{t+1} = \tilde{z}_{t+1} - z_t$. Inserting, we get

$$\tilde{L}_{t+1} = -(f(t+1, z_t + \tilde{x}_{t+1}) - f(t, z_t)).$$

For computations, we prefer the *linearized version*

$$\ell_t = -\left(f'_t(t, z_t) + \sum_{i=1}^{d} f'_{z_i}(t, z_t)\tilde{x}_{t+1,i} \right).$$

An example

Portfolio of securities of types $i = 1, \ldots, d$, each having value $S_{t,i}$
Value at time t is

$$V_t = \sum_{i=1}^{d} \lambda_i S_{i_t} = \sum_{i=1}^{d} \lambda_i e^{z_{t,i}}$$

where $z_{t,i} = \ln S_{t,i}$ is the **risk factor** of type i, and $x_{t,i}$ becomes rate of change in value of stock of type i.

Then

$$L_t = -(\tilde{V}_{t+1} - V_t) = -\sum_{i=1}^{d} \lambda_i e^{z_{t,i}} (e^{\tilde{x}_{t,i}} - 1)$$

$$\sim -\sum_{i=1}^{d} \lambda_i e^{z_{t,i}} \tilde{x}_{t,i}$$