

Banks in an Arrow-Debreu economy

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Theory of Banking

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What is a bank?

A bank is an institution whose current operations consist in granting loans and receiving deposits from the public

- *current*: ordinary operations vs. occasional operations
- *and*: combination of lending and borrowing is a typical characteristic of commercial banks
- *public*: on the liability side of the bank, the customers are general public who is not armed to assess the safety and soundness of a financial institution

Main functions of Banks

- Offering liquidity and payment services
- Transforming assets
- Managing credit, interest rate and liquidity risks
- Processing information and monitoring borrowers

Liquidity and payment services/1

Historically, banks played two different roles in the management of fiat money: money change and provision of payment services

- Money changing

Banco (Italian word) was the bench on which the money changers placed their coins

- Management of deposits

- Safekeeping services: initially, bank deposits were not supposed to be lent and they had a zero return
- Convertible into "good money": Coins differed in their composition of precious metals and banks were required to make payment in good money

Liquidity and payment services/1

- Payment services

They include management of clients' accounts and the finality of payments

The safety and efficiency of these payment systems have become a fundamental concern for governments and central banks

Transforming assets/2

- Convenience of denomination
 - Banks choose the unit size (denomination) of its products (deposits and loans) in a way that is convenient for their clients
 - Banks play the role of intermediaries by collecting small deposits and investing the proceeds into large loans
- Quality transformation
 - Bank deposits offer better risk-return characteristics than direct investments, due to
 - (1) indivisibilities in investment: small investors cannot diversify their portfolios;
 - (2) asymmetric information: banks have better information than depositors
- Maturity transformation
 - Transforming securities with short maturity into securities with long maturity
 - This generates interest rate and liquidity risks

Credit risk

- The risk that a borrower is not able to repay her debt (principal or interest)
- To make their loans more secure, banks use collateral, or assignment of creditors' rights or public/government endorsement

Interest rate and Liquidity risks

- Maturity transformation exposes banks to risks
- Cost of funds depends on the level of short-term interest rates and it may rise above the contractual level of the loans issued by the banks
- Unexpected withdrawals of deposits may force banks to seek more expensive sources of funds

→ Banks have to manage the combination of interest rate risk (due to the difference in maturity) and liquidity risk (due to the difference in the marketability of the claims issued and of the claims held).

Monitoring and Information processing/5

It consists in screening loan applicants and monitoring their projects.

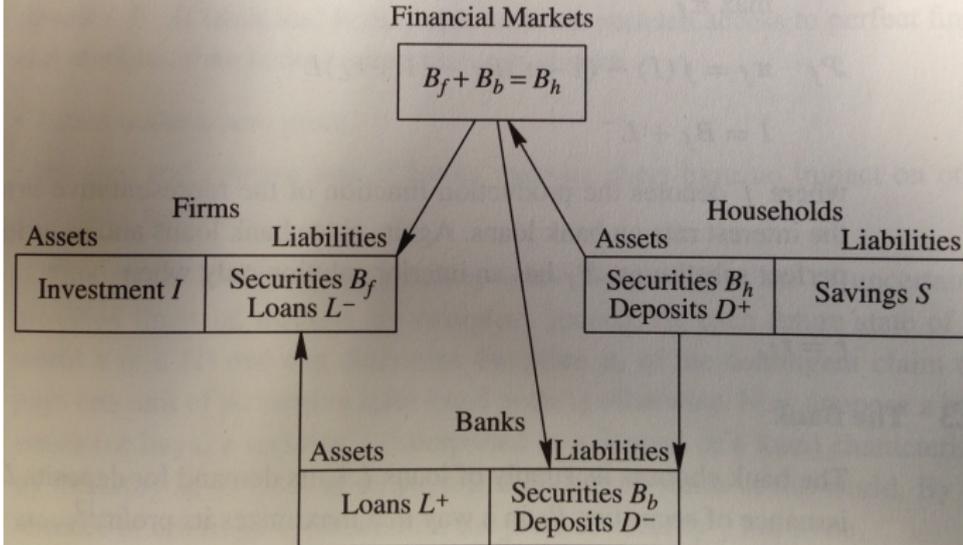
- Monitoring activity relates to a special ability of banks in screening loan demand and/or realized returns of debtors relative to individual consumers
- Monitoring affects the quality of the assets held at a bank.
- This is one of main differences between bank financing and trading securities in financial markets

Banks in an Arrow-Debreu economy

- Two dates, $t = 1, 2$
- Unique physical good initially owned by consumers
- All agents behave competitively
- Economic agents: consumers, firms, banks/intermediaries

Arrow-Debreu economy/1

1.2 Banking in General Equilibrium Theory



Consumers' behaviour/1

- Consumers choose a consumption profile (C_1, C_2) and the allocation of savings between deposits D_h and bonds B_h so to

$$\text{Max } u(C_1, C_2)$$

subject to

$$C_1 + B_h + D_h = \omega_1$$

$$pC_2 = \Pi_f + \Pi_b + (1 + r)B_h + (1 + r_D)D_h$$

Observe that for a consumer $\text{Liabilities} = \text{Savings}$ and $\text{Assets} = \text{Deposits} + \text{Bonds}$.

- For an interior solution, $r = r_D$.

Firms' behaviour/2

Firms choose their level of investment I and their sources of financing (L_f, B_f) loans and bonds, according to the following program

$$\text{Max } \Pi_f$$

subject to

$$\Pi_f = pf(I) - (1+r)B_f - (1+r_L)L_f$$

$$I = B_f + L_f$$

Observe that for a firm $\text{Liabilities} = \text{Securities} + \text{Loans}$, and $\text{Assets} = \text{Investment}$

- For an interior solution, $r = r_L$.

Banks' behaviour /3

Banks choose their loan supply L_b and their financing (D_b, B_b) through deposits and bonds so to

$$\text{Max } \Pi_b$$

subject to

$$\Pi_b = r_L L_b - (1 + r) B_b - (1 + r_D) D_b$$

$$L_b = B_b + D_b$$

Observe that for a bank $\text{Liabilities} = \text{Deposits} + \text{Securities}$, and $\text{Assets} = \text{Loans}$.

- For an interior solution, $r = r_D$.

Equilibrium /4

An equilibrium in this economy is characterized by a vector of interest rates (r, r_D, r_L) and three vectors of demand and supply levels : (C_1, C_2, B_h, D_h) for consumers, (I, B_f, L_f) for firms, (L_b, D_b, B_b) for banks such that:

- Each agent behaves optimally,
- Each market clears:

$$I = S \quad (\text{good market})$$

$$D_b = D_h \quad (\text{deposit market})$$

$$L_f = L_b \quad (\text{loan market})$$

$$B_h = B_f + B_b \quad (\text{bond/financial market})$$

Irrelevance of banks /5

If firms and consumers have unrestricted access to perfect financial markets then in a competitive equilibrium,

- banks make zero profits
- the size and the composition of banks' balance sheets have no effect on other economic agents

In perfect and complete financial markets, bonds, deposits and loans are perfect substitutes. This makes banks (and money) inessential.

Banks and financial markets

- Banks usually deal with *financial contracts* (loans and deposits) which cannot be easily resold, as opposed to financial securities (stocks and bonds) that are marketable instruments
- Hence, banks typically hold these contracts...
- Securitization allows banks to resell the loans they originated. However, the possibilities of securitization are not unlimited
- Banks have to transform financial securities because the contracts and securities issued by borrowers (loans) are usually different from those desired by investors (depositors)

Existence of financial intermediaries

- Classical **transaction cost** justification, based on the existence of economies of scale and economies of scope in banking activities.

However, physical and technological costs do not provide a satisfactory explanation given the significant progress in telecommunications and computers

- **Informational Asymmetries**

These asymmetries generate market imperfections that can be seen as some typical form of transaction costs which is specific to the lender-borrower relationship

If lenders have doubts on the credit worthiness of borrowers, they may trust more those borrowers that they know better ... so as if creditors have doubts about the true value of a risky project they may agree in financing it if their bank has a stake in the same project...

This would help in understanding the role of economies of scope between borrowing and lending activities

Bryant (1980) and Diamond and Dybvig (1983)

- We start by examining a theory that explains banks' existence by virtue of the qualitative asset transformation that they perform, protecting individual consumers from unexpected liquidity needs
- Depository institutions take the form of pools of depositors and are able to provide insurance against idiosyncratic shocks that affect households' consumption needs