Topics in Bank Management: Lecture 1

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Introduction to the Course

- This course is a PhD-level introduction to modern theories of banks and financial intermediation.
- This course will be taught entirely in English.
- Website: `http://rncarpio.com/teaching/BankTopics`
- Announcements, slides, & homeworks will be posted on website

About Me: Ronaldo Carpio

- BS Electrical Engineering & CS, UC Berkeley
- Master's in Public Policy, UC Berkeley
- PhD Economics, UC Davis
- Joined School of Banking & Finance in 2012

Outline of the Course

- This course will focus on theory and models.

- The goal is to become familiar with the models underlying current research, and also to become familiar with the current frontier in research.

- The financial crisis has demonstrated the real-world importance of banks, but banks do not fit comfortably in the models economists commonly use.

- We will critique models when they don't fit, and try to suggest ways of improvement.

Prerequisites

- Game theory and models of asymmetric information will be used heavily in this course.

- You should be comfortable with games and Nash Equilibria.

- We will have a self-contained introduction to games with asymmetric information later in the course.

- We will briefly discuss a general equilibrium model this week, but it won't be used very much.

Textbook & Readings

- The main textbook is "Microeconomics of Banking, 2nd Ed." by Xavier Freixas & Jean-Charles Rochet.

- Please email me if you don't have a copy.

- We will go through most of the chapters, plus some additional topics that are not covered in the book.

- Two useful pre-crisis survey articles on financial intermediation, availalbe on the course website, are:
    - Allen & Santomero (2001), "What do financial intermediaries do?"
    - Gorton & Winton (2003), "Financial Intermediation"

Tentative Course Plan

- There will be around 12 weeks of lectures.

- We will cover Chapters 1-5 and 7-8 in the textbook for the first 9 weeks.

- Then, we will cover the topics "Debt vs. Equity" and "Alternatives to Banks for Financial Intermediation" for 2 weeks.

- In the last week, students will give a short (25 minute) presentation on a current research paper. I will provide a list later.

Grading

- Class Participation: 30%, Written Assignments 30%, Final Exam 40%

- Class Participation: Each week, please read the assigned readings before class, and prepare *three* questions, together with a preliminary answer. We will discuss these questions in class.

- Written Assignments: there will be a few problem sets assigned, and an Article Review assignment (detailed format will be given out later).

- Final Exam will be take-home.

Contacting Me

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- Office Hours: Friday 15:00-16:00 or by appointment

Planned Topics

- Introduction & Motivation (Ch. 1)

- The Role of Financial Intermediaries (Ch. 2)

- The Industrial Organization Approach to Banking (Ch. 3)

- The Lender-Borrower Relationship (Ch. 4)

- Equilibrium in the Credit Market and Its Macroeconomic Implications (Ch. 5)

- Individual Bank Runs and Systemic Risk (Ch. 7)

- Managing Risks in the Banking Firm (Ch. 8)

- Debt vs. Equity: A Security Design View

- Alternatives to Banks for Intermediation

Outline of Today's Lecture

- What is a Bank, and Why do Banks Exist?

- Functions of Banks

- Problems with Standard Theories: General Equilibrium, Theory of the Firm

What Do Banks Do?

- Banks are complicated enterprises, and they perform many inter-related tasks.

- These tasks may or may not be essential; an interesting question in the wake of the financial crisis is whether some of these tasks may be split up to reduce risk.

- For example, some economists propose splitting banks into firms that only take deposits (and invest in safe bonds), and firms that only make loans (funded by equity).

- The traditional view of the essential banking activity is that they take deposits and make loans.

- Here, we will list some of the related activities that we see banks have done in the past and present.

Liquidity and Payment Services

- These are services that make it easier to use money for trade, rather than barter.

- One of the oldest roles of banks was *money changing*: exchange between different currencies issued by different institutions.

- A large variety of coins circulated, but not all coins were accepted everywhere.

- Banks exchanged different coins, especially at international marketplaces and trade fairs.

- Also specialized in sorting "good" from "bad" coins.

Safe-Keepers of Deposits

- Management of deposits: safekeeping of coins or bullion.

- Protection against fire, theft, etc.

- Initially, the deposited items were not lent out, and the depositor paid the bank for the service, rather than the bank paying interest to the depositor.

Payment Services

- Payment services: allowing clients to pay each other at a distance, without having to directly transfer money to each other.

- Bank notes (proof of money on deposit at the bank) could be used instead of actual money for transactions, hence "bank money"

- Allow money transfers between faraway cities or countries.

- Clearing activities: after a promise of payment has been made (e.g. through a check), the bank will actually transfer the funds to another bank.

Asset Transformation

- The type of asset supplied by depositors may be different from the type of asset that is demanded by borrowers.

- For example: depositors want to deposit small amounts of money, but large borrowers want to borrow large, indivisible amounts.

- Quality transformation: bank deposits can offer better risk characteristics than directly investing in a project.

- This may occur when the bank can diversify its investments, but a single depositor cannot (e.g. investing in corporate bonds)

- This can also occur when a bank has better information or monitoring capabilities than depositors.

- Maturity transformation: transform securities with short duration (e.g. demand deposits) into long duration securities (e.g. home loans).

- This involves liquidity risk, since there is a chance the depositors will withdraw their money before the long-duration loan is repaid.

Risk Management

- Traditionally, there are three sources of risk affecting banks.

- The bank's job is to appraise these risks and balance the level of risk with the possibility of profit.

- Credit risk: the risk that a loan will not be repaid. Banks manage this risk by screening borrowers, monitoring projects, etc.

- Interest Rate Risk: the risk that the market interest rate changes unfavorably.

- Liquidity Risk: the risk that the bank will not have enough liquid assets to cover unexpected withdrawals or losses.

Monitoring and Information Processing

- ▸ Banks can invest in technologies that allow them to screen loan applicants and monitor their projects.

- ▸ They can develop long-term relationships between themselves and their borrowers, which lowers information costs and allows them to monitor more effectively.

- ▸ This is one of the main differences between bank lending and issuing securities on the financial markets.

Allocating Resources in the Economy

- Banks also play a role in the economic growth and development of a country.

- Banks determine which projects get financed. In developing economies, it may be difficult to finance large projects using the capital markets.

- Countries such as Japan and Germany are seen as "bank-oriented", while the US and UK are seen as "market-oriented" in terms of the way that most capital allocation takes place.

- These different systems may have effects on the development of the country. Some argue that "market-oriented" systems are not very good at dealing with nondiversifiable risks, while "bank-oriented" systems are not very good at financing new technologies.

Irrelevance of Banks in General Equilibrium

- ▸ Recall the *general equilibrium* model from microeconomics.

- ▸ A GE model determines the prices and quantities of all goods in the economy simultaneously.

- ▸ Economists use GE models to see how much of each good is produced, how much is consumed by each consumer, and the prices of all goods.

- ▸ Let's see what happens when we try to use a simple GE model to study an economy with a consumer and a bank.

Assumptions

- There are two time periods: $t = 1, 2$

- There is one consumer, one bank, and one industrial firm.

- There is are two physical "goods": the good consumed at $t = 1$, and the good consumed at $t = 2$.

- The initial endowment of good 1 is ω_1, which is owned by the consumer. There is initially zero of good 2.

- We will assume the price of good 1 is 1, and the price of good 2 is p (recall that only relative prices matter for the consumer problem).

- Good 1 is the "numeraire", that is, all prices of all goods and securities are measured relative to good 1.

- There are three financial "goods":
  - deposits, issued by the bank and held by the consumer
  - bonds, which can be issued by both the bank and the firm, and held by the consumer
  - loans, which are issued by the firm, and held by the bank

Assumptions

- All agents are competitive (i.e. price takers).

- Markets are *complete*: for each state of the world, there exists a security (a "contingent claim") that pays off in that state of the world. In our model, there is only one state of the world (that is, there is no uncertainty)

- No transaction costs, indivisibilities, trading restrictions

- No informational asymmetry: all agents have the same information, that is, the same perceived probability for each state of the world. In our case, there's only one state, so this must hold

Assumptions

- Out of the initial endowment ω_1 held by the consumer, an amount c_1 will be consumed at $t = 1$.

- The rest will be allocated between deposits D_h and bonds B_h; these will pay an endogenously determined interest rate (r_D and r, respectively).

- The consumer owns 100 % of the equity of the bank and the firms, so any profits Π_f, Π_b will be paid out to the consumer at $t = 2$.

- The consumer's total income at $t = 2$ will be determined by his return on deposits and bonds, plus the profits paid out by the firms.

- The firm produces the consumption good for $t = 2$ and sells it on the market at an endogenously determined price p.

Consumer's Problem

- The consumer has a utility function over the amount of consumption at $t = 1, 2$: $u(c_1, c_2)$

- The consumer's problem:

$$\max_{c_1, B_h, D_h} u(c_1, c_2) \qquad \text{subject to}$$

$$c_1 + B_h + D_h = w_1$$

$$pc_2 = \Pi_f + \Pi_b + (1 + r)B_h + (1 + r_D)D_h$$

- Bonds and deposits are perfect substitutes, so there will be an interior solution (i.e. B_h and D_h are both positive) only if $r = r_D$.

- If $r > r_D$, then the consumer will allocate zero to D_h, and vice versa.

Firm's Problem

- The firm chooses its investment level I and the amount of money to borrow from the bank through loans L_f, and the amount to issue as bonds B_f.

- The firm sells its output at price p and has a production function $f(I)$.

- It must repay the bank at interest rate r_L, and repay the consumer at interest rate r.

- The firm's problem:

$$\max_{I, L_f, B_f} \Pi_f \qquad \text{subject to}$$

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

$$I = B_f + L_f$$

- Again, there will be an interior solution (B_f, L_f are both positive) only if $r = r_L$.

Bank's Problem

- The bank chooses its supply of loans L_b, its demand for deposits D_b, and its issuance of bonds B_b.

- Bank's problem:

$$\max L_b, D_b, B_b \Pi_b \qquad \text{subject to}$$

$$\Pi_B = r_L L_b - r B_b - r_D D_b$$

$$L_b = B_b + D_b$$

General Equilibrium

- General equilibrium is a price vector and an allocation of goods such that:
    - all agents maximize their utility, given prices
    - the market clears (i.e. supply = demand for all goods).
- Here, the prices are p, r, r_L, r_D.
- The quantities of goods are
    - Consumer: (c_1, c_2, B_h, D_h)
    - Firm: (I, B_f, L_f)
    - Bank: (L_b, B_b, D_b)

Market Clearing Conditions

- Goods market: $I = D_h + B_h$
- Deposit market: $D_b = D_h$
- Credit market: $L_f = L_b$
- Bond market: $B_h = B_f + B_b$

Equilibrium

- We claim that equilibrium requires $r = r_L = r_D$. Why?

- Suppose $r > r_D$. The consumer will allocate 0 to deposits D_h, but the bank will allocate everything to deposits D_b. This violates market clearing.

- Likewise, if $r > r_L$, the firm will allocate 0 to loans, but the bank will allocate everything to loans, which violates market clearing.

- Therefore, $r = r_L = r_D$ in equilibrium.

- Then, banks make zero profit.

- Banks' decisions about their balance sheets have no effect on other agents because households are completely indifferent between deposits and bonds.

- Similarly, the firm is indifferent between bank loans and issuing bonds.

Irrelevance of Banks in General Equilibrium

- **Result 1.1**: If firms and households have unrestricted access to perfect financial markets, then in a competitive equilibrium:
  - Banks make a zero profit.
  - The size and composition of banks' balance sheets have no effect on other agents.
- This is the banking analogue of the Modigliani-Miller theorem that states capital structure (e.g. debt vs. equity) has no effect on firm value.
- This result holds if we introduce uncertainty (i.e. multiple possible states of the world), provided that markets remain complete.
- We need to remove some of the assumptions for banks to matter. In Chapter 2, we will use the incomplete markets paradigm (i.e. there are some states of the world for which there are no securities).

Next Week

- For next week, please read Chapter 1 and Chapter 2.1-2.4, 2.7 in the textbook.