

## Bank Lending

### A. Moral Hazard and Adverse Selection in Financial Contracting

As we saw in the first week, a key role of intermediaries is to transform illiquid loans into liquid deposits. Loans are illiquid because only the bank holds the information needed to evaluate correctly how much they are worth. However, the bank itself is a trusted counter-party, so its obligations (deposits) are liquid.

Lack of information acts as the key barrier to making efficient financial contracts. This is probably the most important idea in this class. Two key problems arise when information is poor. The first is adverse selection, which occurs *before* a financial contract is completed. The second is moral hazard, which occurs *after* a financial contract is completed.

### B. Financial Intermediaries

Why is it important to have intermediaries? Information collection about a potential entrepreneur is key to solving the adverse selection problem (because it allows the lender to tell who's good and who's bad), and that the ability to foreclose on a defaulting borrower was key to creating incentives for "morally challenged" borrowers to avoid cheating (if a bank can not foreclose on a loan and collect substantial value in liquidation, then they are in a very weak bargaining position in a loan workout).

So, intermediaries are specialists is:

- Doing "due diligence" before making loans in order to separate the wheat from the chaff;
- Work-out/foreclose when loans go bad.

It would be very difficult for the ultimate saver (e.g. the bank depositor) to engage in these activities because they don't have the skills to do it. Intermediaries pool the savings of many individuals, allowing them to take advantage of economies of scale in information production and loan work-outs. At the same time, they also reap the benefits of diversification; by making many loans, an intermediary holds a much safer portfolio than any small investor could achieve on their own.

Note that the beauty of a debt contract is that relatively little work needs to be done most of the time. After a loan is made, banks basically just have to collect checks. They do not get involved in running the business. It is only if borrowers are late on payments that banks become very active.

As we will see later, some financial institutions such as venture capital firms do much more than banks, which make loans (debt contracts). VCs tend to become very actively involved in the

running of the business. More on this later.

Here is a summary of what intermediaries accomplish:

Financial contracting: They structure and enforce efficient financial contracts with borrowers that may be difficult to understand, and with borrowers that may have a strong incentive to chisel;

Risk Management: Holding a well-diversified portfolio reduces the risks dramatically of the intermediary itself defaulting;

Liquidity production: Because the intermediary itself is quite safe, it can fund itself by issuing very safe, and hence liquid, financial assets (e.g. deposits).

These functions support each other. Economies of scale in financial contracting supports risk management because it is efficient for the intermediary to make many loans. Risk management supports the production of liquid assets. Because liquidity production is so valuable, intermediaries go to much greater lengths beyond diversification to manage risks. We will study this later.

### C. Real Bank Balance Sheets

As we said in the first lecture, banks are the dominant financial intermediary. So, we will now look more closely at what banks actually do.

Here's (roughly) what the aggregate balance sheet for all banks in the U.S. looks like today and in 1980, expressed as a percentage of the balance sheet:

<i>Assets</i>	2006:		1980:	
	<u>\$s</u>	<u>Share of Assets</u>	<u>\$s</u>	<u>Share of Assets</u>
Cash	432	4.3%	410	22.1%
Securities Held to Maturity	1,666	18.0	325	17.5
Loans	<b>5,981</b>	59.3	<b>1,006</b>	54.2
Commercial & Industrial	1,140	11.3	391	21.1
Real Estate Loans	3,432	34.0	269	14.5
Consumer Loans	857	8.5	187	10.1
Other Loans	552	5.5	159	8.6
Other Assets	<u>2,011</u>	19.9	<u>115</u>	6.2
Total	<b>10,090</b>		<b>1,856</b>	

<i>Liabilities</i>				
Deposits	<b>6,731</b>	66.7%	1,481	79.8%
Domestic Transaction Dep	716	7.1	432	23.3
Other borrowing	<u>2,329</u>	23.1	<u>267</u>	14.4
Total Liabilities	<b>9,060</b>	89.8	<b>1,748</b>	94.2
<i>Net Worth (Capital)</i>	<b>1,030</b>	10.3	<b>108</b>	5.8%

Here is a little detail on what these categories mean:

**Assets:**

Securities

Mainly U.S. Treasuries, municipal bonds, and investment grade corporate bonds.

Commercial & Industrial Loans

Loans to businesses, not secured by real estate. These loans are generally illiquid due to the information collection and monitoring services of the bank.

Real Estate Loans

Commercial (loans to businesses that are secured by real estate)  
Residential (e.g. home mortgages)

Savings association had been very important providers of finance for homes until the 1980s; then, commercial banks became much more important due to the collapse of the S&Ls. We will study this in detail later.

Real estate loans tend to be long term; e.g. 30-year mortgages.

Both commercial and residential mortgages are becoming increasingly liquid due to the rise of loan securitization. This is the process by which a loan is converted into a marketable security. It also played a huge role in the subprime mortgage debacle. We will study this phenomenon in detail later.

Consumer Loans

Credit Card

You are all familiar with these. CC loans had been very profitable through the 1980s and 90s, with interest rates averaging between 15 and 20%. Rates have fallen, as have profits.

The CC business is one in which the ability to defeat adverse selection is key to profitability! Best customer: a revolver who does not default. If you can structure your program to get these people, you will be very successful.

#### Auto

These loans are short-term, fully secured loans. Finance companies are also very active in this area (example, General Motors Acceptance Corporation (GMAC)).

#### Student loans

Many of you have these...

#### Other personal loans

### **Liabilities and Net Worth:**

#### Transactions deposits

These are deposits that you can write a check against; they are the most liquid kind of deposit and offer a close substitute for cash. These include demand deposits and NOW accounts.

Demand deposits are special type of deposits that is the most liquid; the bank must give you your funds on demand, and can not pay interest on those funds. Because the funds are demandable, Federal Reserve has the power to require banks to hold a certain percentage of those funds on reserve at a Federal Reserve Bank.

**Discussion Questions:** if demand deposits pay zero interest, why do people hold demand deposits? What happens to the supply of demand deposits when interest rates rise? How can banks respond?

NOW stands for Negotiable Order of Withdrawal. These account pay interest but have a minimum balance and will revert to the status of a demand deposit if the amount falls below the minimum.

#### Non-transaction deposits

These include passbook savings and MMDA (money market deposit accounts), small time deposits, and large time deposits.

Passbook savings and MMDAs pay interest and are liquid since the holder can withdraw funds at any time. Small time deposits (CDs) pay higher interest but are

less liquid than the MMDAs and passbook accounts. Small means under \$100,000, since this is the most that is fully insured by the FDIC. These three categories represent the largest source of deposits to banks; however, they have been losing importance over time due to competition from the mutual fund business.

**Discussion Questions:** Bank deposits generally pay lower interest than mutual funds. Why? Why do people continue to hold deposits? Why are bank deposits becoming less important as time goes by?

Large time deposits are over the \$100,000 insurance limit. These are primarily negotiable certificates of deposit (CDs), that is, they are traded in the secondary market just like bonds.

### Other liabilities

The remainder of bank non-deposit liabilities include borrowing from other banks in the U.S. such as in the Federal Funds market, and borrowing from banks outside the U.S. Some large banks also issue bonds and other securities that are subordinated to their deposit liabilities. Last Fall several large banks (e.g Citigroup) sold convertible preferred to foreign investors in response to big losses in subprime lending (cut dividend too!).

### Net Worth (Capital)

The difference between the book value of assets and liabilities is the net worth or capital of the bank. This residual is important as a buffer to prevent the bank from becoming insolvent. That is, if the value of assets falls below the value of liabilities.

Net Worth is important in protecting the FDIC against possible losses, so it is an important tool for regulation of banks. (More later in the course.)

**Discussion question:** What is the difference between net worth as defined here, and the market value of the bank to its shareholders? Specifically, what aspects of value are included in the market value of the bank that are not included in the book value of net worth?

## D. Off-balance sheet banking

There are many things that banks do that generate profits and/or risks but that do not appear on the balance sheet. Here are the main items:

### Loan Commitments

Most loans to businesses and consumers are structured as lines of credit in which the borrower may decide at any time during the life of the loan to borrow an amount up to a contractually determined maximum. The difference between the amount actually borrowed and the amount committed is not on the balance sheet. However, banks often charge a fee for these undrawn funds (although not usually to consumers on credit cards.)

Loan commitments are another area where banks are providing liquidity to their customers.

### Letters of Credit

These are guarantees sold by the bank to a firm for a fee to insure a third-party that the firm will perform a transaction such as delivering goods or making payment for goods that have been shipped overseas.

### Derivatives

Banks hold positions in F/X (spot, futures, and swaps), financial futures and forwards (and some commodity futures), interest rate swaps, and other derivatives. Small banks hold these positions to manage their own risk; large banks act as dealers in these markets too.

### Loans sales

Loans may be sold **with or without recourse**. If a loan is sold with recourse, the buyer has the option to sell the loan back to the bank at a prearranged price if the borrower's credit quality deteriorates. This generates risk for the selling bank, but they can sell the loan at a higher price with recourse than without recourse.

Also, banks that sell loans often continue to service the loan (that is, collect the checks), and they receive fees for this.

**Discussion question:** Can you imagine circumstances under which a loan sold without recourse exposes the bank to losses? What should the bank do?

## E. Bank Income Statements

Here's the banking system's income statement in 2006 and 1980, in billions.

Interest Income	548	176
Non Interest Income	<u>217</u>	<u>14</u>
Gross Income	765	190
Interest Expenses	263	120
Provisions for Loan Losses	25	4
Non-Interest Expense	290	47
Taxes	<u>59</u>	<u>5</u>
Net Income	128	14
ROE	12.4%	13.0%

So, in 2006 the banking industry earned a return on the book value of net worth (ROE) equal to  $128/1030=12.4\%$ .

Interest expenses and interest income are just what they seem.

Provisions for loan losses is a deduction from current income that represents a bank's expectation of future losses on its loans.

These funds go into the loan loss reserve, which is a contra-asset account on the balance sheet. When a loan actually goes bad, the bank writes the loan down and lowers the loan loss reserve by the same amount (so total assets does not change). If banks have unusually large losses that would deplete their loan loss reserve, they will be forced to increase their current loan loss provisions to build the account back up.

### Non-interest Income

Includes fees earned on deposits, loans, off-balance sheet activities (loan commitments, letters of credit, etc.), fees for advisory services and trust services, fees for servicing loans that have been sold or securitized, gains and losses in trading activity, etc.

### Non-interest Expenses

Salaries, costs of physical assets (land depreciation, branches, computers, etc.). About ½ of this item is salaries to the 1.6 million employees of commercial banks.

**Questions for discussion:** How and why have bank assets and liabilities changed since 1980? What about the income and expenses?

**Example.** Here is a simple example to be sure everyone understands the very basics of accounting in banking. Exemplar bank reports that it holds \$70 billion in loans, \$20 billion in marketable securities, and \$10 billion in cash and deposits at Federal Reserve Banks. It also reports have \$95 in deposits.

1. Construct the balance sheet for this bank.
2. What would the balance sheet look like if the bank allocated 1% of loan balances to “Reserves for Loan Losses”? Where do the funds for the Loan Loss Reserve come from?
3. Construct the bank’s projected income statement from the balance sheet above, using the following assumptions:
  - a. The average contracted interest rate on the bank’s loans is 8% (don’t forget about the 1% default rate).
  - b. The average coupon rate on the bank’s securities is 6.5%.
  - c. The average interest rate to be paid to depositors is 6%.
4. How would the income statement change if an implicit interest rate of 1% were applied to deposits to cover the costs of operating branches?

**Discussion question:** This bank makes a profit because its loans pay a higher interest rate than its deposits. Is this just a matter of interest rate arbitrage, or is more going on?

## F. Lending to Businesses

Bank Lending is a key aspect of financing for businesses due to information problems described above.

Large businesses have access to the commercial paper and corporate bond markets.

Commercial paper (CP) is short-term borrowing from the capital markets. Large firms issue CP to finance their short-term assets. Many of them, however, use banks as a backup source of financing if the CP becomes hard to come by. These products are called CP backup lines of credit; they were very important in the Fall of 1998 following the Russian default, for example.

Banks have lost substantial amounts of business for long-term corporate finance to the bond market, especially since the rise of the junk bond market in the 1980s. Prior to that time, only investment grade firms could issue bonds. Other firms had to borrow from banks.

### Comparing bonds and bank loans.

The key difference between bonds and bank loans has to do with their ownership. Bonds are owned by many thousands of investors, whereas bank loans are owned by one or a few banks.

Because bank loans are owned by one or a few banks:

- A lot of information is collected before the loan is made (due diligence)
- Banks loans are usually secured
- They have many covenants
- Distressed loans usually worked out
- And bank loans are illiquid (although secondary market is growing)

Because bonds are owned by lots of investors:

- Information collection delegated to ratings agencies
- Loan usually not secured
- Loose covenants
- Distressed bonds often end up in Bankruptcy Court
- Liquid

**Discussion question:** Compare bond market borrowers with firms that borrow from banks.

Banks now often make syndicated bank loans to large corporations.

A coalition of banks make a loan to very large firms. The terms of the loan are determined by the *lead arranger*; this bank holds the largest share of the loan, is responsible for servicing the loan, and receives a fee for these activities. Other banks that take smaller pieces are call *participants*. Banks sometimes sell their participation (or a part of their participation) in a syndicated loan to other banks after the loan has been made.

**Discussion question:** How has the emergence of syndicated lending helped banks compete with the bond market for financing large firms' long-term investments?

Banks have retained their importance in lending to small and medium sized businesses. Typical business exhibits a predictable "financial life cycle"

Early stage:

Entrepreneurs begin with their own funds, or with family funds.

Middle stage:

Business growth in the early and middle stages is financed with bank loans. For reason described above, all of the external finance comes in the form of debt to reduce moral hazard problems.

In the case of firms in very high risk, high potential reward businesses, arm's length debt finance is not sufficient to solve moral hazard problems. At these kinds of firms, capital in the middle stage tends to come from venture capital firms.

Later stages:

Once a business has reached sufficient scale and maturity, it may have a chance to access public debt and equity markets.

We will discuss small firm finance in more detail later, where banks and venture capital firms are very important, later on in the class. We will discuss syndicated lending in detail in the Hong Kong Disneyland case.

## G. Loan Securitization

In addition to the development of the syndicated loan market, where banks compete with the bond market for financing large business, the line between direct and indirect finance has become increasingly blurry as banks and other financial intermediaries have begun to securitize their loans. Securitization involves removing an asset (or often a pool of assets) from the balance sheet of an intermediary by selling the asset to a “conduit” firm, known as a Special-Purpose Vehicle (SPV), that in turn pays for these assets by issuing securities (bonds) into the capital market. The SPV typically issues senior and subordinated bonds. The most junior bonds absorb all of the losses on the assets (or pool of assets); if there are more losses than can be absorbed by the most junior loans, then the next most junior bonds begin to absorb losses, etc.

The six steps toward securitization:

1. Set up a legally separate trust (SPV) to serve as a conduit for cash flows;
2. Sell designated loan or pool of loans to the trust (SPV);
3. Have the trust (SPV) issue securities that represent claims to the cash flows generated from the pool of loans, and sell those securities to the public;
4. Contract with an efficient servicing organization to collect the loan payments and forward those to securities owner (this outsourcing feature is optional);
5. To improve the price received for the securities, two approaches can be taken:
  - a. arrange for credit enhancement by the bank or another reputable third party so that the securities can be highly rated;
  - b. strip and reassemble the cash flows from the loan pool based on either timing (as in mortgage-backed securities), or seniority (as in collateralized loan obligations).
6. Make sure a liquid secondary market exists for the securities, or convey to the purchaser the right to put (re-sell) the securities back to the bank on good terms.

**Example:** Here is a simple example of how loan securitization alters bank balance sheets. In this example, the bank sells \$100 million in loans to the SPV, that in turn issues securities:

**Bank balance sheet before securitization**

<u>Assets</u>		<u>Liabilities</u>	
Cash	\$100	Deposits	\$800
Loans	\$900	Equity	\$200

*Sale of \$100 million in loans to SPV*

**SPV balance sheet**

<u>Assets</u>		<u>Liabilities</u>		
Loans	\$100	Senior Bonds	\$80	====> Sold to Investor
		Junior Bonds	\$15	====> Sold to Investors
		Residual	\$5	====> Sold back to originating bank

**Bank balance sheet after securitization**

<u>Assets</u>		<u>Liabilities</u>	
Cash	\$100	Deposits	\$705
Loans	\$800	Equity	\$200
Residual	\$5		

Typically, the bank that originated the assets continues to service those assets (i.e. collect payments, effect workouts if the borrower defaults, etc.). In some cases, such as securitization of loans to businesses, a bank will purchase the most junior class of securities issued by the SPV (i.e. the residual). The three classes of securities created by the SPV in the example are known as ‘tranches’, which means slice in French. In securitization, the cash flows from the original bundle of assets get re-sliced based on priority in this example, and also sometimes based on the timing of principal repayment as in mortgage-backed securities.

We will delve much deeper into securitization when we talk about credit risk management (with specific examples in the Bistro Trust case), and also at the end of the semester when we talk about the collapse of the sub-prime mortgage market.

## Securitization and income flows

How does securitization affect income? The basic drivers are the cash flows generated from the pool of loans that are securitized, and the required yields on the securities issued by the SPV.

Let's assume that the \$100 in loans in my example have an average contracted interest rate of 15%. The loans must be collected and payments made to the holders of the securities, which costs some real resources. Let's assume that these servicing expenses are equal to 2% per year, and the expected loss is 5% per year. These are reasonable figures, for example, if the loans are credit card loans or auto loans, which are often securitized. In this example, assume that the senior bonds sold by the SPV are rated AAA, and due to their high rating the market required yield is 5%. The junior class of bonds are riskier, and are thus rated BB; assume their market yield equals 8%.

**Question:** Compute the 'Excess Spread', which is the expected return that flows to the originator (i.e. the return on the residual tranche).