

Lecture 20: Banking and Management of Financial Institutions

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The Bank Balance Sheet

- Liabilities
 - Checkable deposits
 - Nontransaction deposits
 - Borrowings
 - Bank capital

The Bank Balance Sheet

- Assets
 - Reserves
 - Cash items in process of collection
 - Deposits at other banks
 - Securities
 - Loans
 - Other assets

Table 1 Balance Sheet of All Commercial Banks (items as a percentage of the total, December 2008)

Assets (Uses of Funds)*		Liabilities (Sources of Funds)	
Reserves and cash items	8%	Checkable deposits	6%
Securities		Nontransaction deposits	
U.S. government and agency	10	Small-denomination time deposits	
State and local government and		(< \$100,000) + savings deposits	37
other securities	12	Large-denomination time deposits	16
Loans		Borrowings	31
Commercial and industrial	13	Bank capital	10
Real estate	31		
Consumer	7		
Interbank	3		
Other	7		
Other assets (for example,			
physical capital)	9		
Total	100	Total	100

*In order of decreasing liquidity.

Source: www.federalreserve.gov/releases/h8/current/.

Basic Banking: Cash Deposit

First National Bank		First National Bank	
Assets	Liabilities	Assets	Liabilities
Vault Cash +\$100	Checkable deposits +\$100	Reserves +\$100	Checkable deposits +\$100

- Opening of a checking account leads to an increase in the bank's reserves equal to the increase in checkable deposits

Basic Banking: Check Deposit

First National Bank	
Assets	Liabilities
Cash items in process of collection +\$100	Checkable deposits +\$100

When a bank receives additional deposits, it gains an equal amount of reserves; when it loses deposits, it loses an equal amount of reserves

First National Bank		Second National Bank	
Assets	Liabilities	Assets	Liabilities
Reserves +\$100	Checkable deposits +\$100	Reserves -\$100	Checkable deposits -\$100

Basic Banking: Making a Profit

First National Bank			
Assets		Liabilities	
Required reserves	+\$10	Checkable deposits	+\$100
Excess reserves	+\$90		

First National Bank			
Assets		Liabilities	
Required reserves	+\$10	Checkable deposits	+\$100
Loans	+\$90		

- Asset transformation: selling liabilities with one set of characteristics and using the proceeds to buy assets with a different set of characteristics
- The bank borrows short and lends long

Bank Management

- Liquidity Management
- Asset Management
- Liability Management
- Capital Adequacy Management
- Credit Risk
- Interest-rate Risk

Liquidity Management: Ample Excess Reserves

Assets		Liabilities	
Reserves	\$20M	Deposits	\$100M
Loans	\$80M	Bank Capital	\$10M
Securities	\$10M		

Assets		Liabilities	
Reserves	\$10M	Deposits	\$90M
Loans	\$80M	Bank Capital	\$10M
Securities	\$10M		

- Suppose bank's required reserves are 10%
- If a bank has ample excess reserves, a deposit outflow does not necessitate changes in other parts of its balance sheet

Liquidity Management: Shortfall in Reserves

Assets		Liabilities	
Reserves	\$10M	Deposits	\$100M
Loans	\$90M	Bank Capital	\$10M
Securities	\$10M		

Assets		Liabilities	
Reserves	\$0	Deposits	\$90M
Loans	\$90M	Bank Capital	\$10M
Securities	\$10M		

- Reserves are a legal requirement and the shortfall must be eliminated
- Excess reserves are insurance against the costs associated with deposit outflows

Liquidity Management: Borrowing

Assets		Liabilities	
Reserves	\$9M	Deposits	\$90M
Loans	\$90M	Borrowing	\$9M
Securities	\$10M	Bank Capital	\$10M

- Cost incurred is the interest rate paid on the borrowed funds

Liquidity Management: Securities Sale

Assets		Liabilities	
Reserves	\$9M	Deposits	\$90M
Loans	\$90M	Bank Capital	\$10M
Securities	\$1M		

- The cost of selling securities is the brokerage and other transaction costs

Liquidity Management: Federal Reserve

Assets		Liabilities	
Reserves	\$9M	Deposits	\$90M
Loans	\$90M	Borrow from Fed	\$9M
Securities	\$10M	Bank Capital	\$10M

- Borrowing from the Fed also incurs interest payments based on the discount rate

Liquidity Management: Reduce Loans

Assets		Liabilities	
Reserves	\$9M	Deposits	\$90M
Loans	\$81M	Bank Capital	\$10M
Securities	\$10M		

- Reduction of loans is the most costly way of acquiring reserves
- Calling in loans antagonizes customers
- Other banks may only agree to purchase loans at a substantial discount

Asset Management: Three Goals

- Seek the highest possible returns on loans and securities
- Reduce risk
- Have adequate liquidity

Asset Management: Four Tools

- Find borrowers who will pay high interest rates and have low possibility of defaulting
- Purchase securities with high returns and low risk
- Lower risk by diversifying
- Balance need for liquidity against increased returns from less liquid assets

Liability Management

- Recent phenomenon due to rise of money center banks
- Expansion of overnight loan markets and new financial instruments (such as negotiable CDs)
- Checkable deposits have decreased in importance as source of bank funds

Capital Adequacy Management

- Bank capital helps prevent bank failure
- The amount of capital affects return for the owners (equity holders) of the bank
- Regulatory requirement

Capital Adequacy Management: Preventing Bank Failure

High Bank Capital				Low Bank Capital			
Assets		Liabilities		Assets		Liabilities	
Reserves	\$10M	Deposits	\$90M	Reserves	\$10M	Deposits	\$96M
Loans	\$90M	Bank Capital	\$10M	Loans	\$90M	Bank Capital	\$4M

High Bank Capital				Low Bank Capital			
Assets		Liabilities		Assets		Liabilities	
Reserves	\$10M	Deposits	\$90M	Reserves	\$10M	Deposits	\$96M
Loans	\$85M	Bank Capital	\$5M	Loans	\$85M	Bank Capital	-\$1M

Capital Adequacy Management: Returns to Equity Holders

Return on Assets: net profit after taxes per dollar of assets

$$ROA = \frac{\text{net profit after taxes}}{\text{assets}}$$

Return on Equity: net profit after taxes per dollar of equity capital

$$ROE = \frac{\text{net profit after taxes}}{\text{equity capital}}$$

Relationship between ROA and ROE is expressed by the
Equity Multiplier: the amount of assets per dollar of equity capital

$$EM = \frac{\text{Assets}}{\text{Equity Capital}}$$

$$\frac{\text{net profit after taxes}}{\text{equity capital}} = \frac{\text{net profit after taxes}}{\text{assets}} \times \frac{\text{assets}}{\text{equity capital}}$$

$$ROE = ROA \times EM$$

Capital Adequacy Management: Safety

- Benefits the owners of a bank by making their investment safe
- Costly to owners of a bank because the higher the bank capital, the lower the return on equity
- Choice depends on the state of the economy and levels of confidence

Application: How a Capital Crunch Caused a Credit Crunch in 2008

- Shortfalls of bank capital led to slower credit growth
 - Huge losses for banks from their holdings of securities backed by residential mortgages.
 - Losses reduced bank capital
- Banks could not raise much capital on a weak economy, and had to tighten their lending standards and reduce lending.

Credit Risk: Overcoming Adverse Selection and Moral Hazard

- Screening and Monitoring
 - Screening
 - Specialization in lending
 - Monitoring and enforcement of restrictive covenants

Credit Risk: Overcoming Adverse Selection and Moral Hazard

- Long-term customer relationships
- Loan commitments
- Collateral and compensating balances
- Credit rationing

Interest-Rate Risk

First National Bank			
Assets		Liabilities	
Rate-sensitive assets	\$20M	Rate-sensitive liabilities	\$50M
Variable-rate and short-term loans		Variable-rate CDs	
Short-term securities		Money market deposit accounts	
Fixed-rate assets	\$80M	Fixed-rate liabilities	\$50M
Reserves		Checkable deposits	
Long-term loans		Savings deposits	
Long-term securities		Long-term CDs	
		Equity capital	

- If a bank has more rate-sensitive liabilities than assets, a rise in interest rates will reduce bank profits and a decline in interest rates will raise bank profits

Interest Rate Risk: Gap Analysis

- Basic gap analysis:

(rate sensitive assets - rate sensitive liabilities) x Δ interest rates =
 Δ in bank profit

- Maturity bucket approach

- Measures the gap for several maturity subintervals.

- Standardized gap analysis

- Accounts for different degrees of rate sensitivity.

Interest Rate Risk: Duration Analysis

$\% \Delta$ in market value of security $\cong$ percentage point Δ in interest rate
x duration in years.

- Uses the weighted average duration of a financial institution's assets and of its liabilities to see how net worth responds to a change in interest rates.

Off-Balance-Sheet Activities

- Loan sales (secondary loan participation)
- Generation of fee income. Examples:
 - Servicing mortgage-backed securities.
 - Creating SIVs (structured investment vehicles) which can potentially expose banks to risk, as it happened in the subprime financial crisis of 2007-2008.

Off-Balance-Sheet Activities

- Trading activities and risk management techniques
 - Financial futures, options for debt instruments, interest rate swaps, transactions in the foreign exchange market and speculation.
 - Principal-agent problem arises

Off-Balance-Sheet Activities

- Internal controls to reduce the principal-agent problem
 - Separation of trading activities and bookkeeping
 - Limits on exposure
 - Value-at-risk
 - Stress testing

References

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- Mishkin, Frederic S., *The Economics of Money, Banking, and Financial Markets*, Addison-Wesley