Bank Risk Analysis

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Session One

- INTRODUCTION
- OVERVIEW OF THE FINANCIAL SYSTEM

Six Parts of the Financial System

1. **Money**
   To pay for purchases and store wealth
2. **Financial Instruments**
   To transfer resources from savers to investors and to transfer risk to those best equipped to bear it.
3. **Financial Markets**
   To Buy and sell financial instruments
4. **Financial Institutions**
   To provide access to financial markets, collect information & provide services
5. **Regulatory Agencies**
   To provide oversight for financial system
6. **Central Banks**
   To monitor financial Institutions and stabilize the economy

Six Parts of the Financial System

1. **Money**
   - Money has changed from gold/silver coins to paper currency to electronic funds.
   - Cash can be obtained from an ATM any where in the world.
   - Bills are paid and transactions are checked online.

Six Parts of the Financial System

2. Financial instruments

- Buying and selling **individual stocks** used to be only for the wealthy.
- Today we have **mutual funds** and other stocks available through banks or online.
- Putting together a **portfolio** is open to everyone.
- Examples: Stocks, Corporate Bonds, CDs, Treasury Securities, Futures, Options, Swaps, etc.

Six Parts of the Financial System

3. Financial Markets
   - Once financial markets were located in **coffeehouses and taverns.**
   - Then organized markets were created, like the New York Stock Exchange.
   - Now transactions are mostly handled by electronic markets, NASDAQ.
     - This has reduced the cost of processing financial transactions.
   - There is a much broader array of financial instruments available.

Six Parts of the Financial System

4. Financial Institutions
   - Banks began as vaults, developed into institutions, to today's financial supermarket.
   - Offer a huge assortment of financial products and services.
   - **Financial Intermediaries**: Banks and Non-Banks, Depository and Non-Depository institutions.

Six Parts of the Financial System

5. Government regulatory agencies
   - Government regulatory agencies were introduced by federal government after the Great Depression.
   - Government regulatory agencies provide wide-ranging financial regulation - rules and supervision.
   - Government regulatory agencies examine the systems a bank uses to manage its risk.
   - The 2007-2009 financial crises has led governments to consider greater regulation.

Six Parts of the Financial System

6. Central banks
   - Central banks began as **large private banks to finance wars.**
   - Today: Central banks **control the availability of money** and credit to ensure **low inflation, high growth and stability of financial system**.
   - Today's policymakers strive for transparency in their operations.

Five Core Principles of Money and Banking

1. Time has value.
2. Risk requires compensation.
3. Information is the basis for decisions.
4. Markets determine prices and allocation resources.
5. Stability improves welfare.

Five Core Principles of Money and Banking

A. Core Principle 1: Time has value
   - Time affects the value of financial instruments.
   - Interest is paid to compensate the lenders for the time the borrowers have their money.

Five Core Principles of Money and Banking

B. Core Principle 2: Risk requires compensation
   - In a world of uncertainty, individuals will accept risk only if they are compensated.
   - In the financial world, compensation comes in the form of explicit payments: the higher the risk the bigger the payment.

Five Core Principles of Money and Banking

C. Core Principle 3: Information is the basis for decisions
   - The more important the decision, the more information we gather.
   - Collection and processing of information is the foundation of the financial system.

Five Core Principles of Money and Banking

D. Core Principle 4: Markets determine prices and allocate resources.
   - Markets are the core of the economic system.
   - Markets channel resources and minimize the cost of gathering information and making transactions.
   - The better developed the financial markets, the faster the country will grow.

Five Core Principles of Money and Banking

E. Core Principle 5: Stability improves welfare.
   - A stable economy reduces risk and improves everyone's welfare.
   - Financial instability in the autumn of 2008 triggered the worse global downturn since the Great Depression.
   - A stable economy grows faster than an unstable one.

Sources of Financial News

- Daily
  - The Wall Street Journal
  - Financial Times
  - Bloomberg.com
- Weekly
  - The Economist
  - Business Week
- Data
  - Bureau of Labor Statistics
  - Bureau of Economic Analysis
  - The Federal Reserve Board of St. Louis
- Personal Financial Information
  - www.choosetosave.org
  - www.dinkytown.net
  - www.wsj.com

SESSION TWO

- MONEY AND THE PAYMENTS SYSTEM

Goals of this Session

- To understand **what money is**.
- To understand **how we use money**.
- To understand **how we measure money**.

Money and How We Use It

- Money is *an **asset** that is generally accepted as payment for goods and services or repayment of debt.*
- Income is a **flow of earnings** over time, where wealth is the **value of assets minus liabilities**.

Money and How We Use It

Money has three characteristics or functions:

1. It is a means of payment/medium of exchange
2. It is a unit of account, and
3. It is a store of value.

The first of these characteristics is the most important

Money and How We Use It

1. It is a means of payment/medium of exchange

- People insist on payment in money.
  - Barter requires a "double coincidence of wants".
- Money is easier and finalizes payments so no further claim on buyers and sellers.

Money and How We Use It

2. It is a unit of account.

- Money is used to quote **prices** and record **debts** - it is a **standard of value**.
- Prices provide the information needed to ensure resources are allocated to their best uses.
- Using dollars makes relative price comparisons easier.

YOUR FINANCIAL WORLD

Debit Cards versus Credit Cards

- When you shop, should you use a debit card or a credit card?
- A debit card works like a check only faster.
  - Funds are immediately removed from your account.
- A credit card makes a deferred payment.
  - If not paid on time, there is a late fee.
  - If not paid fully, there is interest on the debt.
  - But if you do pay on time and fully, it is an interest free loan for a period of time.
  - Credit cards allow you to build a credit history.

Money and How We Use It

3. It is a store of value

- A means of payment has to be durable and capable of transferring purchasing power from one day to the next.
- Paper currency does degrade, but is accepted at face value in transactions.
- Other forms of wealth are also a store of value: stocks, bonds, houses, etc.

Money and How We Use It

3. Store of Value (cont.)

- Although other stores of value are sometimes better than money, we hold money because it is liquid.
- Liquidity is *a measure of the ease with which an asset can be turned into a means of payment.*
  - The more costly it is to convert an asset into money, the less liquid it is.

Money and How We Use It

- store of value (cont.)
- Financial institutions use:
  - **Market liquidity** - the ability to sell assets for money.
  - **Funding liquidity** - ability to borrow money to buy securities or make loans.

The Payments System

- The payments system is a **web of arrangements that allow for the exchange of goods and services, as well as assets**.
  - It is critical this functions well.
- Money is at the heart of the payments system.

The Payments System

The possible methods of payment are:

1. Commodity and Fiat Monies
2. Checks
3. Electronic Payments

Commodity and Fiat Monies

- Commodity monies are things with intrinsic/inherent value.
  - Included items like silk and salt. (gold/silver)
- To be successful, must be:
  - Usable by most people,
  - Able to be made into standardized quantities,
  - Durable,
  - Easily transportable, and
  - Divisible into smaller units.

Commodity and Fiat Monies

- Gold has been the most common commodity money as it meets these requirements.
- In **1656**, **Stockholm Banco** issued Europe's first paper money
  - **King of Sweden printed too much paper money to try to finance a war and the bank failed**.
- In **1775**, the **Continental Congress** of the United States of America issues “continentals” to finance the Revolutionary War.

Commodity and Fiat Monies

- Because of huge quantities issued, people became suspicious of government-issued paper money.
- In **1862**, the **Confederate** and the **Union governments** printed money with no backing.
- After the Civil War, the US reverted to using gold as money.

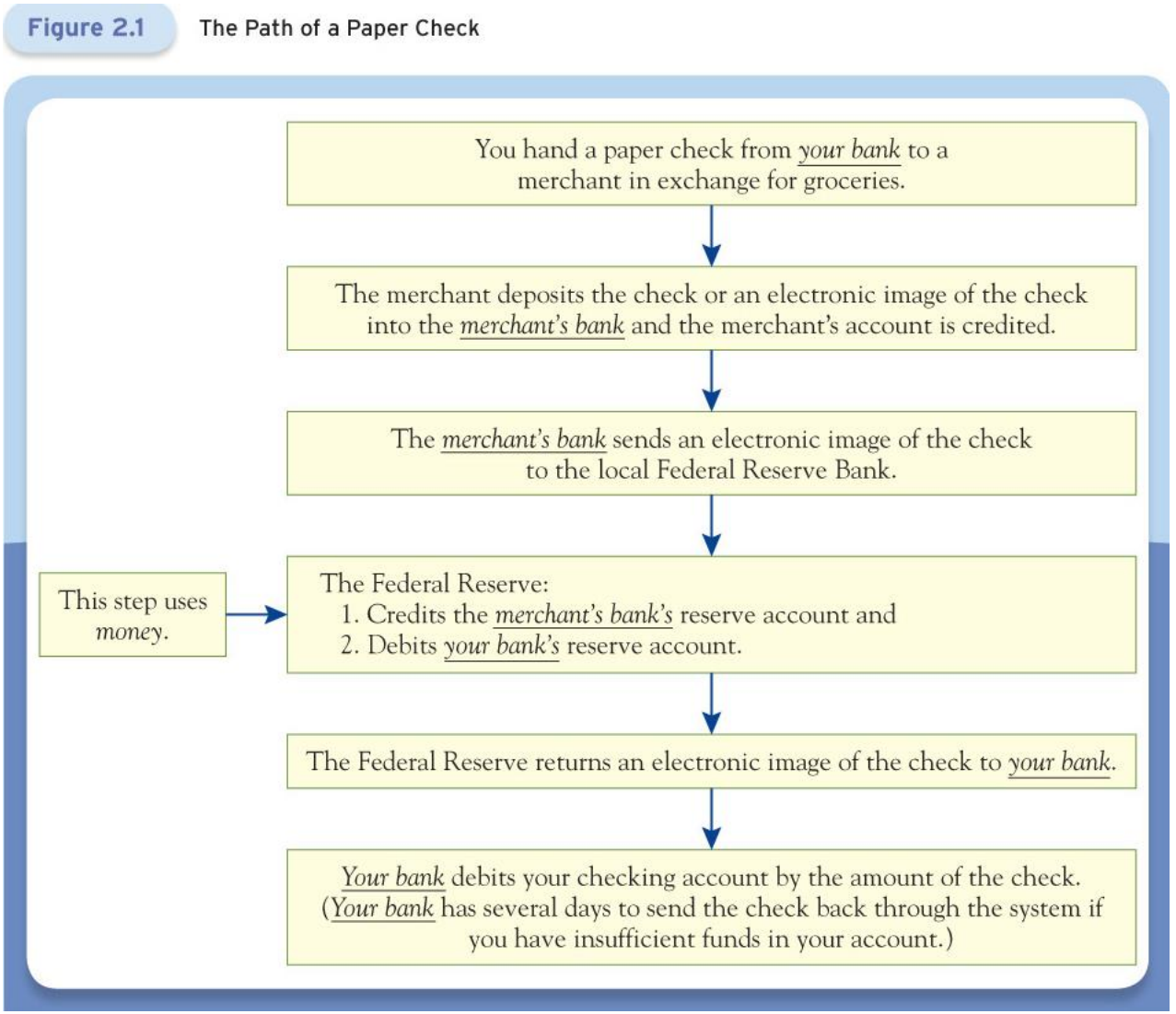
Commodity and Fiat Monies

- Gold coins and notes, backed by gold, were used into the 20th century.
- Today's paper money is called fiat money, because its value comes from government decree, or *fiat*.
- We are willing to accept these bills as payment because the US government stands behind its paper money.
- **In the end, money is about trust/confidence**.

Checks

- A check is an instruction to the bank to take funds from your account and transfer them to another account.
  - A check is therefore not a final payment as currency is.
- A check sets in motion a series of transactions as seen in Figure 2.1.

Figure 2.1: The Path of a Paper Check



- Why have checks not disappeared?
  - Checks are legal proof of payment.
  - Customers wanted them back.
  - Starting in 2004
    - Banks can transmit digital images.
    - Substitute checks are proof of payment.
  - Electronic mechanisms for clearing checks have lowered costs and kept checks as an attractive means of payment.

Electronic Payments

- Electronic payments take the form of:
  - **Credit and debit cards**
  - **Electronic funds transfers**
  - Stored-value card
  - E-money

Electronic Payments

- Debit Cards
  - Works like a check - tells the bank to transfer funds from your account to another.
- Credit Cards
  - A promise by a bank to lend the cardholder money to make a purchase.
  - They do not represent money.

Electronic Payments

- Electronic funds transfers
  - Movements of funds directly from one account to another.
  - Most common form is the automated clearinghouse transaction (ACH).
    - Used for recurring payments like paychecks.
  - Banks use electronic transfers for bank to bank transactions, sending money through **Fedwire**.

Electronic Payments

- Stored-value card
  - **Take it to a bank or an ATM, transfer money to the card, then use the card at a merchant**.
  - Limited usefulness so far.
  - Limited in what can be purchased with them.
  - Require specific hardware.

Electronic Payments

- E-money
  - Can be used to pay for purchases on the Internet.
  - You open an account by transferring funds to the issuer of the e-money.
  - When shopping online, you instruct the issuer to send your e-money to the merchant.
  - Really a form of **private money**.

LESSONS FROM THE CRISIS
MARKET LIQUIDITY, FUNDING LIQUIDITY, AND MAKING MARKETS

- Market liquidity and funding liquidity are both needed for financial markets to function smoothly.
- 2007-2009 financial crisis lead to a sudden loss of liquidity.

LESSONS FROM THE CRISIS
MARKET LIQUIDITY, FUNDING LIQUIDITY, AND MAKING MARKETS

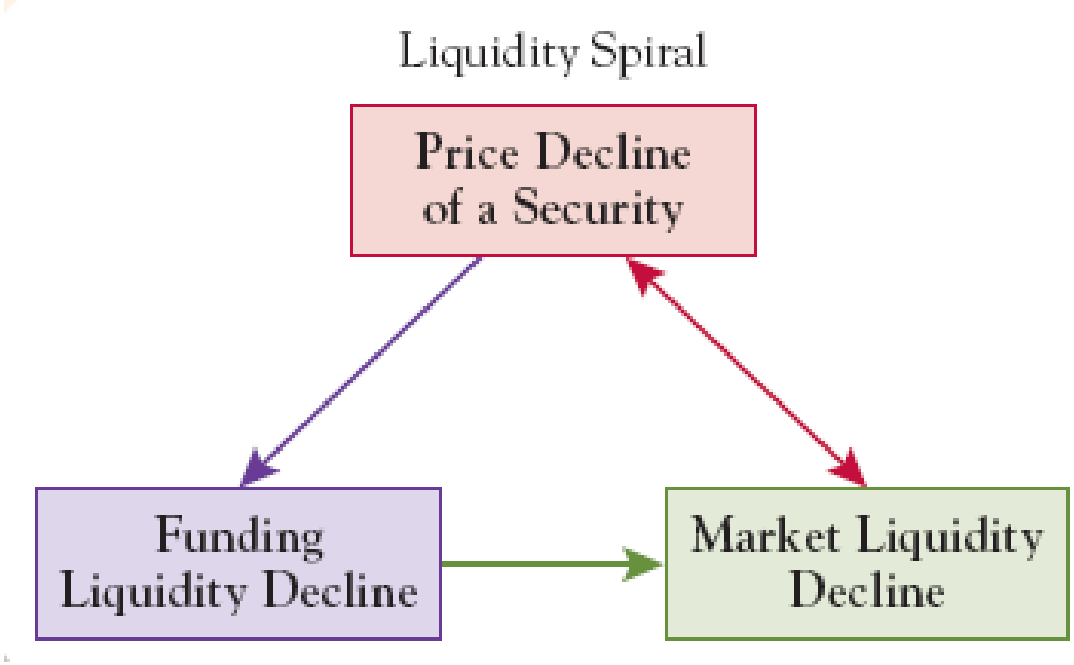
- Before the crisis
  - Financial institutions relied on short-term borrowing to hold long-term financial instruments.
    - They believed funding liquidity would remain readily available.
  - They also believed markets would also be liquid.
    - They would always be able to sell the securities and loans they held.

LESSONS FROM THE CRISIS
MARKET LIQUIDITY, FUNDING LIQUIDITY, AND MAKING MARKETS

- In 2007, doubt lead to a double "liquidity shock" increasing cash holdings.
  - This reduced loans supplied intensifying the decreasing liquidity.
- One lesson: Liquidity is a highly valuable resource that can disappear when most needed.

LESSONS FROM THE CRISIS

MARKET LIQUIDITY, FUNDING LIQUIDITY, AND MAKING MARKETS



The Future of Money

- The future of the three functions of money:
  - Means of payment: disappearing due to ease of electronic transactions.
  - Unit of account: likely to remain.
    - Will always be needed to quote values and prices because it is efficient.
    - But, will we move to one global unit of account?
  - Store of value: disappearing due to liquidity of many financial instruments.

- Technological advances create new methods of payment.
- Cell phones and other types of hand-held mobile devices are providing access to the payments system.
- What will be next?

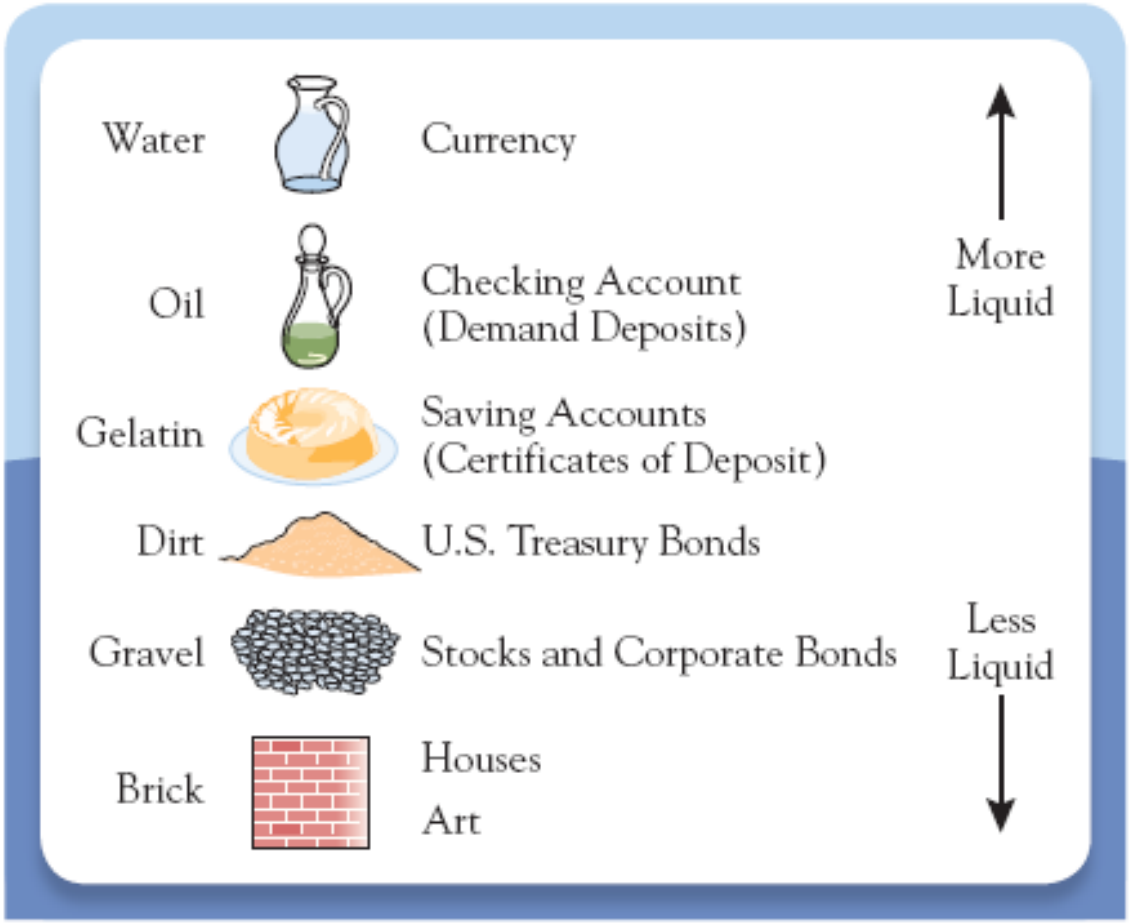
Measuring Money

- Changes in the quantity of money are related to
  - Interest Rates
  - Economic Growth
  - Inflation

Measuring Money

- Inflation:
  - The process of prices rising.
- Inflation rate:
  - The measurement of the process.
- With inflation, you need more money to buy the same basket of goods.
- The primary cause of inflation is too much money.

Figure 2.2 - The Liquidity Spectrum



Measuring Money

Different definitions of money are based upon degree of liquidity.

Drawing the line in different places has led to several measure of money called the money aggregates: M1 and M2.

M1: Narrowest definition.

Only the most liquid assets.

M2: Broader definition.

Includes assets not used as means of payment.

Table 2.1: The Monetary Aggregates

Monetary Aggregates			Value as of January 2010 (US$ billions)
M1	=	Currency in the hands of the public	861.1
	+	Traveler's Checks	5.1
	+	Demand Deposits	435.0
	+	Other Checkable Deposits	375.3
		Total M1	**1676.5**
M2	=	M1	
	+	Small-denomination time deposits	1139.8
	+	Savings Deposits and Money Market Deposit Accounts	4856.5
	+	Retail Money Market Mutual Fund Shares	790.7
		Total M2	**8463.5**

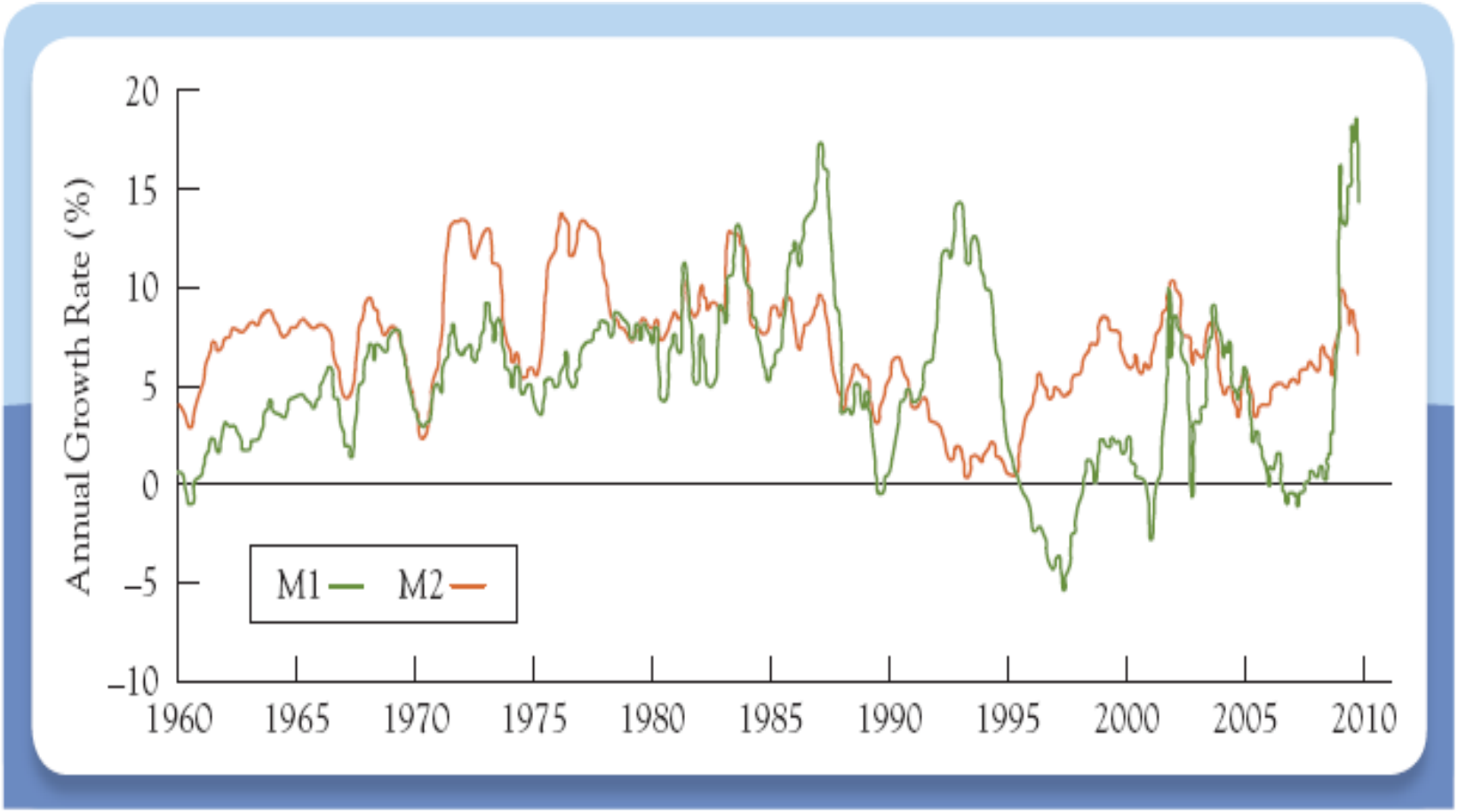
Measuring Money

- What do the money aggregates mean?
  - As of winter 2010, nominal US gross domestic product (GDP) was $14,500 billion.
  - Using the data in Table 2.1 above:
    - GDP is nearly nine times as large as M1.
    - GDP is about 70 percent larger than M2.

Measuring Money

- Which M do we use to understand inflation?
  - Until the early 1980's we used M1.
  - But with changes in accounts, M2 became more useful.
  - M2 represents nearly one-half of GDP, so M1 is no longer a useful measure of money.
  - Figure 2.3 shows the M's growth rates.

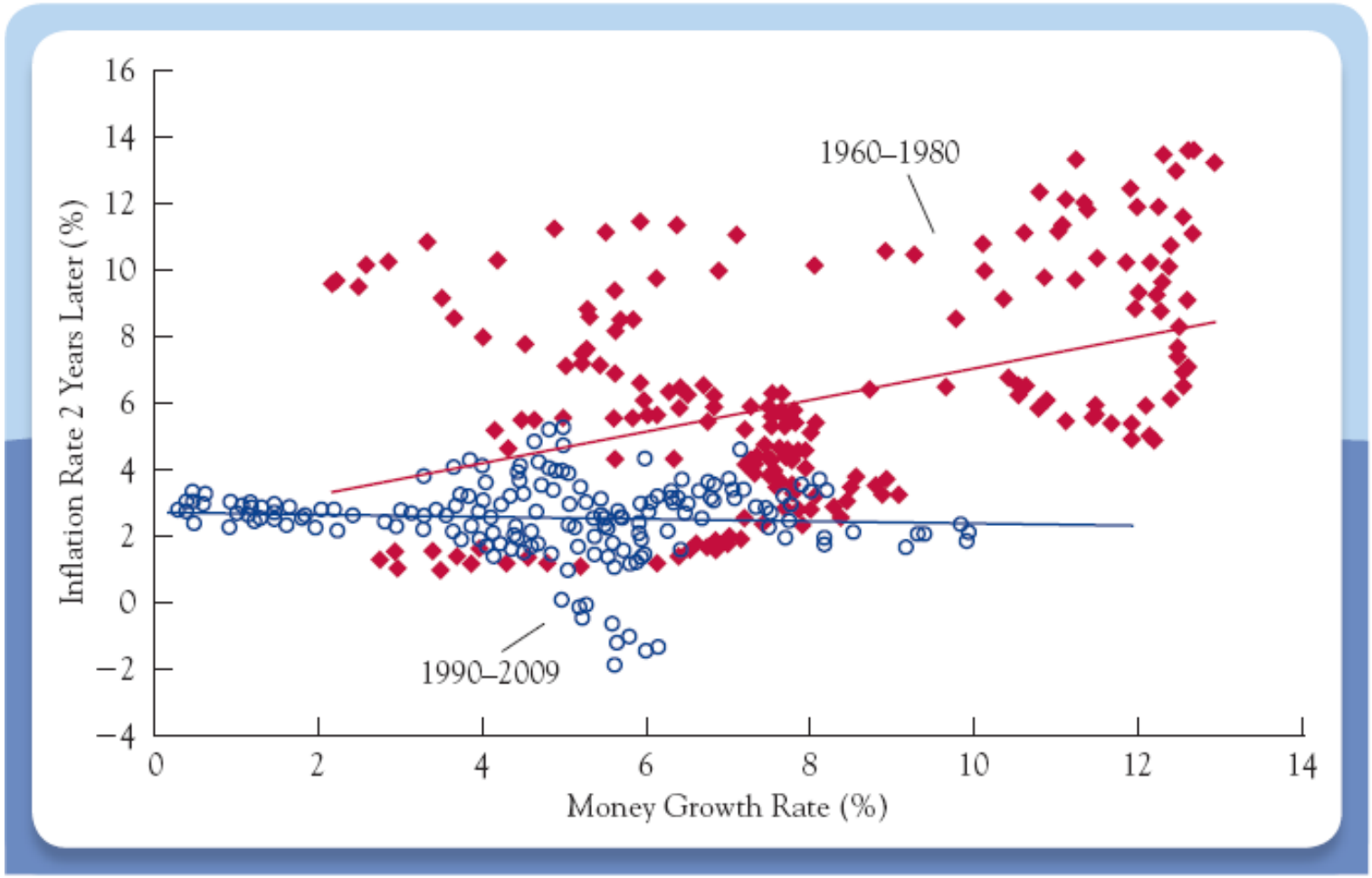
Figure 2.3: Growth Rates of the Money Aggregates



Measuring Money

- How useful is M2 in tracking inflation?
  - When the quantity of money grows quickly, it produces high inflation.
  - Figure 2.4 shows the inflation rate versus M2 two years earlier for the US.
    - Positive correlation up until 1980.
    - From 1990-2000 - no correlation.
  - Growth in M2 stopped being a useful tool for forecasting inflation.

Figure 2.4: Money Growth and Inflation



Measuring Money

- Why does M2 no longer predict inflation?
  - Maybe the relationship only applies at high levels of inflation.
  - Maybe it only shows up over longer periods of time.
  - Maybe we need a new measure of money.
- We do know that at low levels of money growth, inflation is likely to stay low.

- The CPI answers the question:
  "How much more would it cost for people to purchase today the same basket of goods and services that they actually bought at some fixed time in the past?"

- Computing CPI Inflation
  - Survey people to see what they bought.
  - Figure out what it would cost to buy the same basket of goods & service today.
  - Compute the percentage change in the cost of the basket of goods.

$$CPI = \frac{\text{Cost of Basket in Current Year}}{\text{Cost of Basket in Base Year}} * 100$$

Table 2.2: Computing the Consumer Price Index

Year	Price of Food	Price of Housing	Price of Transportation	Cost of the Basket	Consumer Price Index
2010	$100	$200	$100	$150	100
2011	110	205	140	165	110
2012	120	210	180	180	120

$$\text{Inflation Rate } 2011 = \frac{CPI_{2011} - CPI_{2010}}{CPI_{2010}} * 100$$

APPLYING THE CONCEPT
WHERE ARE ALL THOSE $100 BILLS?

- In 2009 the public held about $880 billion in US currency.
  - You can compare this to each person holding $2800.
- 80% of this money was in $100 bills.
- Many of these bills are in other countries.
- People in other countries hold other currencies that are more stable than their own.

SESSION THREE: Financial System

- FINANCIAL INSTRUMENTS
- FINANCIAL MARKETS
- FINANCIAL INSTITUTIONS

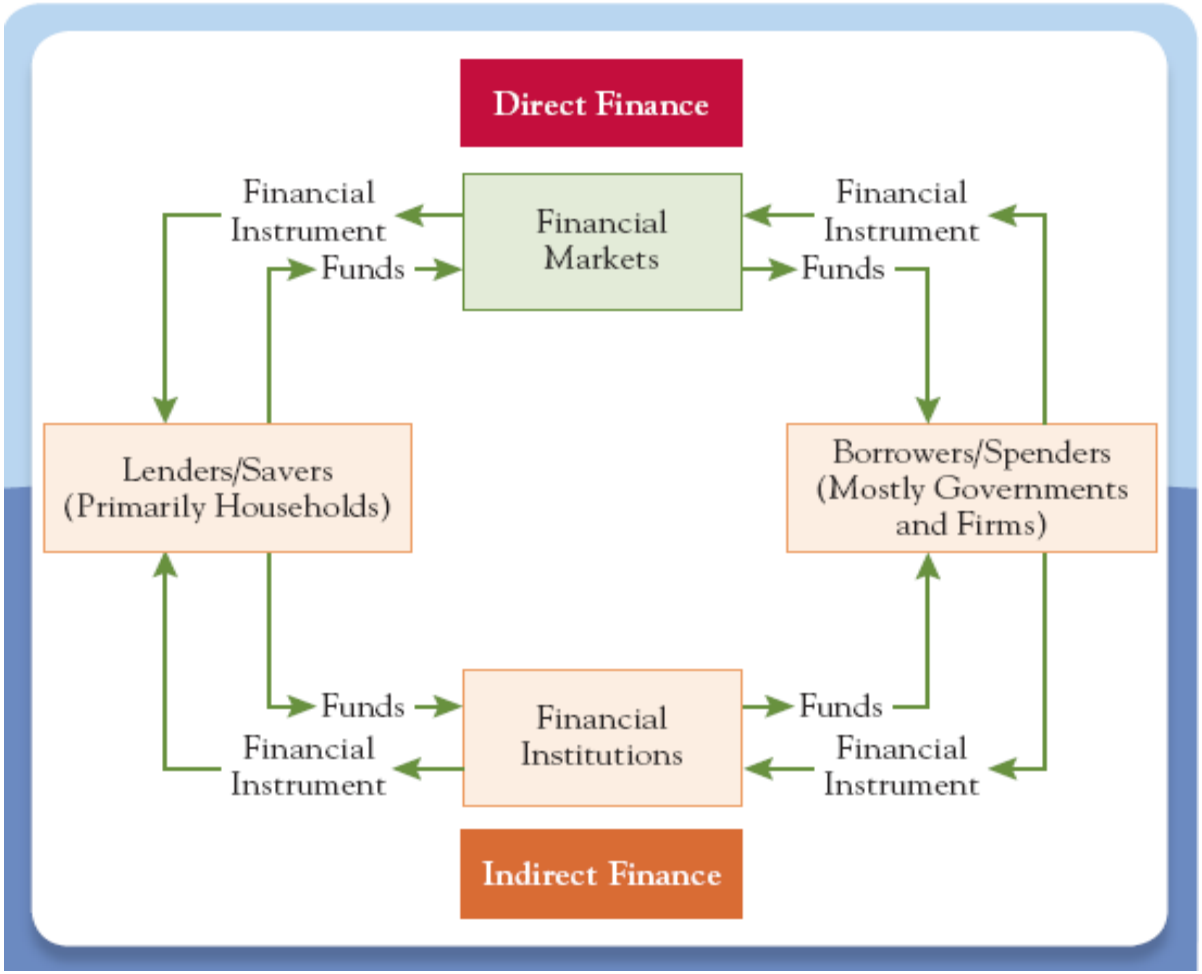
Introduction

- The international financial system exists to facilitate the design, sale, and exchange of a broad set of **contracts** with a very specific set of characteristics.
- We obtain financial resources through this system:
  - Directly from markets, and
  - Indirectly through institutions.

Introduction

- Indirect Finance: An institution stands between lender and borrower (**financial intermediary**)
  - We get a loan from a bank or finance company to buy a car.
- Direct Finance: Borrowers sell securities directly to lenders in the financial markets.
  - Direct finance provides financing for governments and corporations (**direct placement/private placement**).
- Asset: Something of value that you own.
- Liability: Something you owe.

Figure 3.1: Funds Flowing through the Financial System



Introduction

- Financial development is linked to **economic growth.**
- The role of the financial system is to facilitate **production, employment, and consumption**.
- Resources are funneled through the system so resources flow to their most efficient uses.

Introduction

We will survey the financial system in three steps:

1. **Financial instruments or securities**
   - Stocks, bonds, loans and insurance.
   - What is their role in our economy?
2. **Financial Markets**
   - New York Stock Exchange, Nasdaq.
   - Where investors trade financial instruments.
3. **Financial institutions**
   - What they are and what they do.

Financial Instruments

Financial Instruments*: The written legal obligation of one party to transfer something of value, usually money, to another party at some future date, under certain conditions*. **(contract, promissory note, IOU)**

- The **enforceability** of the obligation is important.
- Financial instruments ***obligate*** *one party* (person, company, or government) to transfer something to another party.
- Financial instruments specify payment will be made at *some* ***future date***.
- Financial instruments ***specify certain conditions*** under which a payment will be made.

Uses of Financial Instruments

- Three functions:
  - Financial instruments act as a **means of payment** (like money).
    - Employees take stock options as payment for working.
  - Financial instruments act as **stores of value** (like money).
    - Financial instruments generate increases in wealth that are larger than from holding money.
    - Financial instruments can be used to transfer purchasing power into the future.
  - Financial instruments allow for the **transfer of risk (unlike money**).
    - Futures and insurance contracts allows one person to transfer risk to another.

LESSONS FROM THE CRISIS
LEVERAGE

- The use of borrowing to finance part of an investment is called *leverage*.
  - Leverage played a key role in the financial crisis of 2007-2009.
- How did this happen?
  - The more leverage, the greater the risk that an adverse surprise will lead to bankruptcy.
    - The more highly leveraged, the less net worth.

LESSONS FROM THE CRISIS
LEVERAGE

- How did this happen? (cont.)
  - Some important financial institutions, during the crisis, were leveraged at more than 30 times their net worth.
  - When losses are experienced, firms try to *deleverage* to raise net worth.
    - When too many institutions deleverage, prices fall, losses increase, net worth falls more.
  - This is called the "**paradox of leverage**".

LESSONS FROM THE CRISIS
LEVERAGE

- The “paradox of leverage” reinforces the destabilizing liquidity spiral from Session 2.
- Both spirals feed the cycle of falling prices and widespread deleveraging that was the hallmark of the financial crisis of 2007-2009.

Characteristics of Financial Instruments

- Contracts are very **complex**.
- This complexity is costly, and people do not want to bear these costs.
- ***Standardization*** of financial instruments overcomes potential costs of complexity.
  - Most mortgages feature a standard application with standardized terms.

Characteristics of Financial Instruments

- Financial instruments also communicate ***information***, summarizing certain details about the issuer.
  - Continuous monitoring of an issuer is costly and difficult.
- Mechanisms exist to reduce the cost of monitoring the behavior of *counterparties*.
  - A counterparty is the person or institution on the other side of the contract.

Characteristics of Financial Instruments

- The solution to high cost of obtaining information is to standardize both the instrument and the information about the issuer.
- Financial instruments are designed to handle the problem of *asymmetric information*.

Underlying Versus Derivative Instruments

- Two fundamental classes of financial instruments.
  - Underlying instruments are used by savers/lenders to transfer resources directly to investors/borrowers.
    - This improves the efficient allocation of resources.
    - Examples: stocks and bonds.

Underlying Versus Derivative Instruments

- Derivative instruments are those where their value and payoffs are "derived" from the behavior of the underlying instruments.
  - Examples are futures and options.
  - The primary use is to shift risk among investors.

A Primer for Valuing Financial Instruments

Four fundamental characteristics influence the value of a financial instrument:

1. **Size** of the payment:
   - Larger payment - more valuable.
2. **Timing** of payment:
   - Payment is sooner - more valuable.
3. **Likelihood** payment is made:
   - More likely to be made - more valuable.
4. **Conditions** under with payment is made:
   - Made when we need them - more valuable.

A Primer for Valuing Financial Instruments

We organize financial instruments by how they are used:

- Primarily used as stores of value
  1. **Bank loans**
     - Borrower obtains resources from a lender to be repaid in the future.
  2. **Bonds**
     - A form of a loan issued by a corporation or government.
     - Can be bought and sold in financial markets.
     - Long –term maturity

A Primer for Valuing Financial Instruments

3. Home mortgages

- Home buyers usually need to borrow using the home as collateral for the loan.
  - A specific asset the borrower pledges to protect the lender's interests.

4. Stocks

- The holder owns a small piece of the firm and entitled to part of its profits.
- Firms sell stocks to raise money.
- Primarily used as a stores of wealth.

A Primer for Valuing Financial Instruments

5. Asset-backed securities

- Shares in the returns or payments arising from specific assets, such as home mortgages and student loans.
- Mortgage backed securities bundle a large number of mortgages together into a pool in which shares are sold.
  - Securities backed by *sub-prime mortgages* played an important role in the financial crisis of 2007-2009.

A Primer for Valuing Financial Instruments

Primarily used to Transfer Risk

1. **Insurance contracts**.
   - Primary purpose is to assure that payments will be made under particular, and often rare, circumstances.
2. **Futures contracts**.
   - An agreement between two parties to exchange a fixed quantity of a commodity or an asset at a fixed price on a set future date.
   - A *price* is always specified.
   - This is a type of derivative instrument.

A Primer for Valuing Financial Instruments

3. **Options**
    - Derivative instruments whose prices are based on the value of an underlying asset.
    - Give the holder the right, not obligation, to buy or sell a fixed quantity of the asset at a pre-determined price on either a specific date or at any time during a specified period.

- These offer an opportunity to store value and trade risk in almost any way one would like.

- The biggest risk we all face is becoming disabled and losing our earning capacity.
  - Insuring against this should be one of our highest priorities.
  - More likely than our house burning down.
- It is important to make sure you have enough insurance.
- One risk better transferred to someone else.

SESSION FOUR

- FINANCIAL MARKETS

Financial Markets

- Financial markets are **places where financial instruments are bought and sold**.
- These markets are the economy's central nervous system.
- These markets enable both firms and individuals to find financing for their activities.
- These markets promote economic efficiency:
  - They ensure resources are available to those who put them to their best use.
  - They keep transactions costs low.

The Role of Financial Markets

1. **Liquidity**:
   - Ensure owners can buy and sell financial instruments cheaply.
   - Keeps transactions costs low.
2. **Information**:
   - Pool and communication information about issuers of financial instruments.
3. **Risk sharing**:
   - Provide individuals a place to buy and sell risk.

The Structure of Financial Markets

1. Distinguish between markets where new financial instruments are sold and where they are resold or traded: primary vs secondary markets.
2. Categorize by the way they trade: centralized exchange or not.
3. Group based on the type of instrument they trade: as a store of value or to transfer risk.

Primary versus Secondary Markets

- A primary market is one in which a borrower obtains funds from a lender by selling newly issued securities.
  - Occurs out of the public views.
  - An **investment bank** determines the price, purchases the securities, and resells to clients.
    - This is called ***underwriting*** and is usually very profitable.

Primary versus Secondary Markets

- Secondary financial markets are those where people can buy and sell existing securities.
  - Buying a share of IBM stock is not purchased from the company, but from another investor in a secondary market.
  - These are the prices we hear about in the news.

Centralized Exchanges, OTC's, and ECN's

- Centralized exchanges - buyers and sellers (dealers and brokers) meet in a central, physical location.
- Over-the-counter markets (OTC's) - decentralized markets where dealers stand ready to buy and sell securities electronically.
- Electronic communication networks (ECN's) - electronic system bringing buyers and sellers together without the use of a broker or dealer.

Centralized Exchanges, OTC's, and ECN's

- History
  - The **New York Stock Exchange (NYSE)** is a place with an address where trading takes place in person on the floor of the exchange.
    - A firm purchases a license issued by the Exchange.
    - Others were acquired by specialists who oversaw the trading.

Centralized Exchanges, OTC's, and ECN's

- History (cont.)
  - In the past, the only alternative was an OTC market.
    - Networks of physically dispersed dealers, who buy and sell electronically.
    - The largest is the **Nasdaq**. (National Association of Securities Dealers Automated Quotations)
  - In 2005, the NYSE merged with Archipelago (now NYSE Arca), and Nasdaq merged with Instinet.

Centralized Exchanges, OTC's, and ECN's

- History (cont.)
  - Market continues to globalize.
  - In 2007, the NYSE merged with Paris-based Euronext becoming the first international operator of major exchanges.
  - Nasdaq attempted to acquire the London Stock Exchange but dropped its bid in 2007 right before the financial crisis.

- Trading is what makes financial markets work.
- **Placing an order** in a stock market has the following characteristics:
  - The **stock** you wish to trade.
  - Whether you wish to **buy or sell**.
  - The size of the order - **number of shares**.
  - The **price** you would like to trade.

- You can place a **market order**.
  - Your order is executed at the most favorable price currently available.
  - Values speed over price.
- You can place a **limit order**:
  - Places a maximum on the price to buy or a minimum price to sell.

- Executing a trade requires someone on the other side.
  - **Broker**
  - Direct access to **electronic trading network** through an ECN like Acra or Instinet.
    - Customer orders interact automatically without an intermediary.
    - Liquidity is provided by customers.

- For a well known stock, the NYSE is another place from which to order.
  - Liquidity is supplemented by **designated market makers (DMMs).**
    - The person on the floor charged with making a market.
    - To make the market work, they often buy and sell on their own account.

Debt and Equity versus Derivative Markets

- We distinguish between markets where ***debt and equity*** are traded and those where ***derivative instruments*** are traded.
- Equity markets are the markets for **stocks**.
- Derivative markets are the markets where investors trade instruments like **futures and options.**

Debt and Equity versus Derivative Markets

- In **debt and equity markets**, actual claims are bought and sold for immediate cash payments.
- In **derivative markets**, investors make agreements that are settled later.
- Debt instruments categorized by the loan's maturity
  - Repaid in less than a year - traded in money markets.
  - Maturity of more than a year - traded in bond markets (or capital markets).

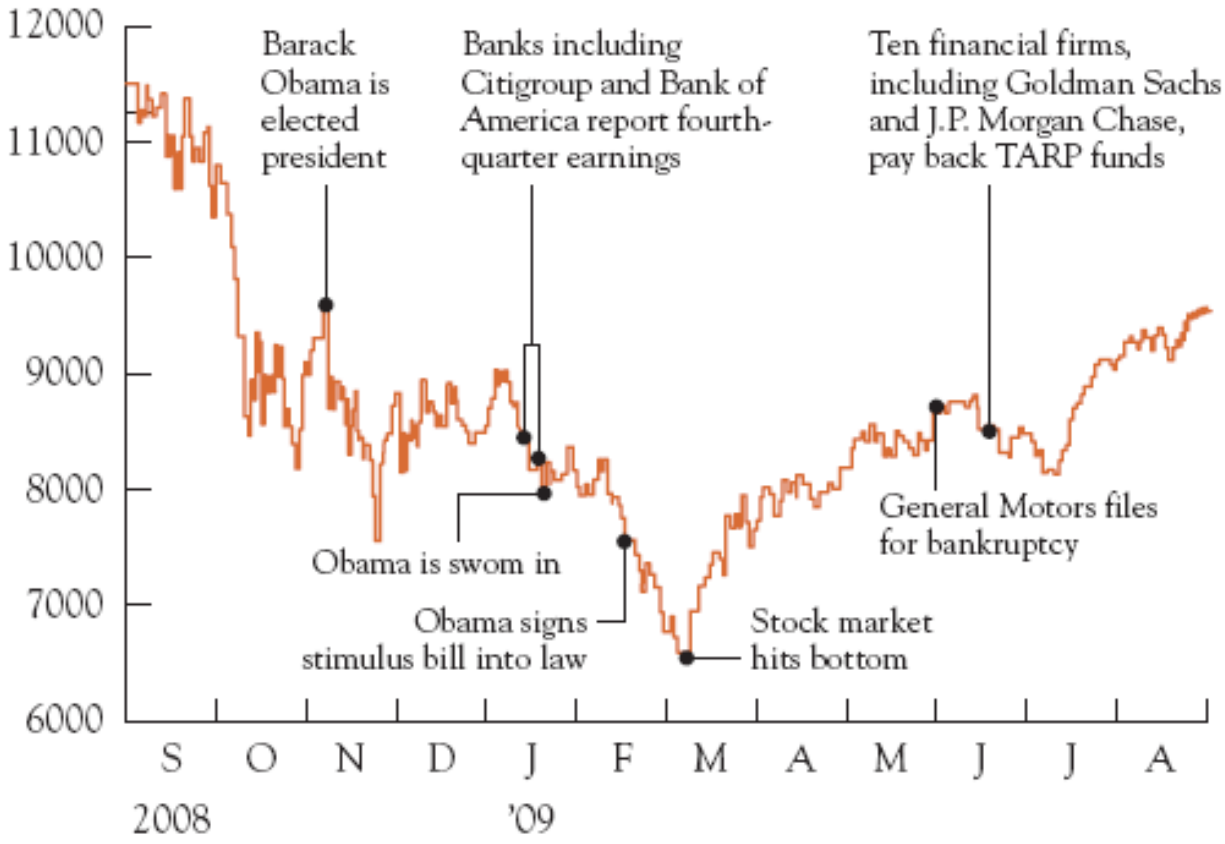
IN THE NEWS

Lessons of the Financial Crisis—One Year Later

- Recall the large swings in financial markets during the financial crisis from 2007-2009.
- Before the crisis, professional investors made their own institutions and the overall financial system vulnerable by taking on too much risk.
- When the crisis hit, they faced a shortfall of liquidity.
- Liquidity swings caused many financial markets to plunge and rebound together.

IN THE NEWS

Lessons of the Financial Crisis—One Year Later



Characteristics of a Well-Run Financial Market

- Must be designed to keep **transaction costs low**.
- **Information** the market pools and communicates must be **accurate and widely available**.
- **Borrowers promises** to pay lenders must be **credible**.

Characteristics of a Well-Run Financial Market

- Because of these criteria, the **governments** are an essential part of financial markets as they **enforce the rules of the game**.
  - Countries with better investor protections have bigger and deeper financial markets.

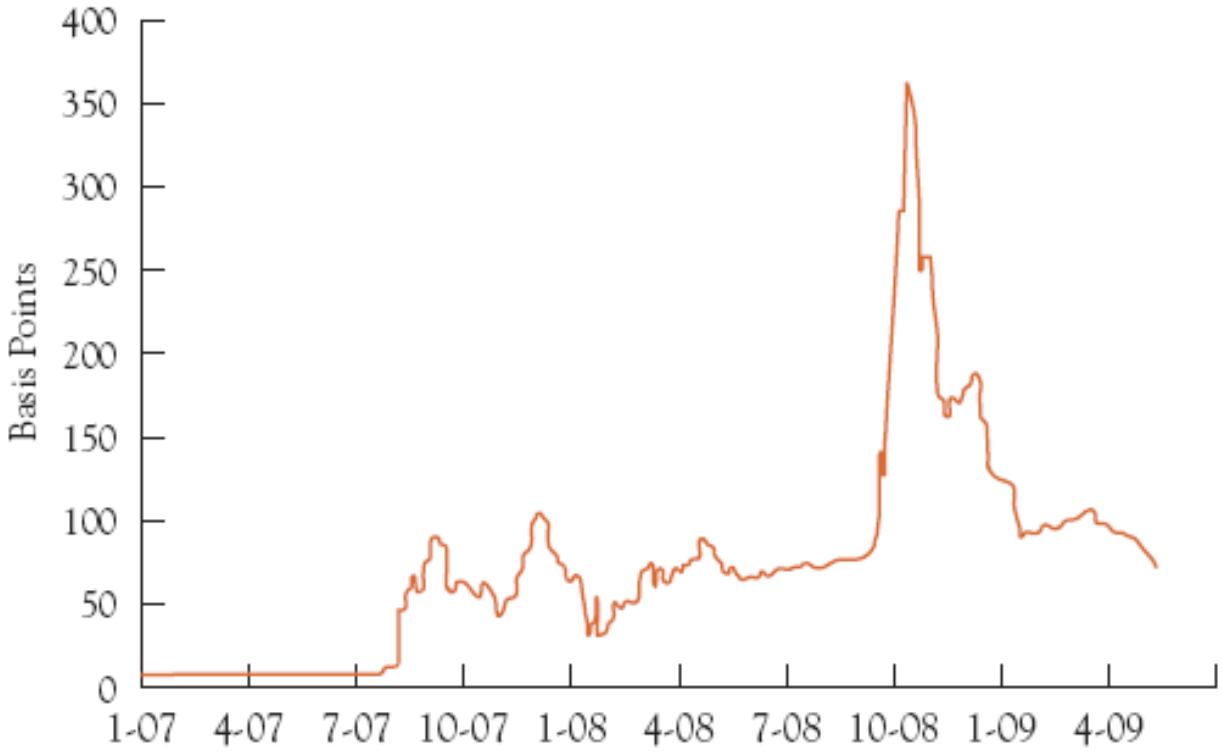
LESSONS FROM THE CRISIS
INTERBANK LENDING

- Liquid, interbank loans are the marginal source of funds for many banks, with their cost guiding other lending rates.
- The financial crisis of 2007-2009 strained interbank lending.
  - Anxious banks preferred to hold their liquid assets in case their own needs arose.
  - They also were concerned about the safety of their trading partners.

LESSONS FROM THE CRISIS
INTERBANK LENDING

- The rising cost and reduced availability of interbank loans created a vicious circle of:
  - increased caution,
  - greater demand for liquid assets,
  - reduced willingness to lend, and
  - higher loan rates.

LESSONS FROM THE CRISIS
INTERBANK LENDING



SESSION FIVE

- FINANCIAL INSTITUTIONS

Financial Institutions

- Firms that **provide access** to the financial markets, both
  - to savers who wish to purchase financial instruments directly and
  - to borrowers who want to issue them.
- Also known as **financial intermediaries**.
  - Examples: banks, insurance companies, securities firms, and pension funds.
- Healthy financial institutions open the flow of resources, **increasing the system's efficiency**.

The Role of Financial Institutions

- To **reduce transaction costs** by specializing in the issuance of standardized securities.
- To **reduce the information costs** of screening and monitoring borrowers.
  - They curb asymmetries, helping resources flow to most productive uses.
- To give savers ready access to their funds.

LESSONS FROM THE CRISIS
SHADOW BANKS

- Financial intermediation and leverage in the US have shifted away from traditional banks and toward other financial institutions less subject to government regulations.
  - Brokerages, insurers, hedge funds, etc.
- These have become known as **shadow banks.**
  - Provide services that compete with banks but do not accept deposits.
  - Take on more risk than traditional banks and are less transparent.

LESSONS FROM THE CRISIS
SHADOW BANKS

- The rise of highly leveraged shadow banks, combined with government relaxation of rules for traditional banks, permitted a rise of leverage in the financial system as a whole.
  - This made the financial system more vulnerable to shocks.
- Rapid growth in some financial instruments made it easier to conceal leverage and risk-taking.

LESSONS FROM THE CRISIS
SHADOW BANKS

- The financial crisis transformed shadow banking.
  - The largest US brokerages failed, merged, or converted themselves into traditional banks to gain access to funding.
- The crisis has encouraged the government to scrutinize any financial institution that could, by risk taking, pose a threat to the financial system.

The Structure of the Financial Industry

- We can divide intermediaries into two broad categories:
  - **Depository institutions**,
    - Take deposits and make loans
    - What most people think of as banks
  - **Non-depository institutions (shadow banks)**.
    - Include insurance companies, securities firms, mutual fund companies, etc.

The Structure of the Financial Industry

1. **Depository institutions** take deposits and make loans.
2. **Insurance companies** accept premiums, which they invest, in return for promising compensation to policy holders under certain events.
3. **Pension funds** invest individual and company contributions in stocks, bonds, and real estate in order to provide payments to retired workers.

The Structure of the Financial Industry

4. **Securities firms include brokers, investment banks, underwriters, and mutual fund companies**.
   - *Brokers and investment banks* issue stocks and bonds to corporate customers, trade them, and advise customers.
   - **Mutual-fund companies** pool the resources of individuals and companies and invest them in portfolios.
   - **Hedge funds** do the same for small groups of wealthy investors.

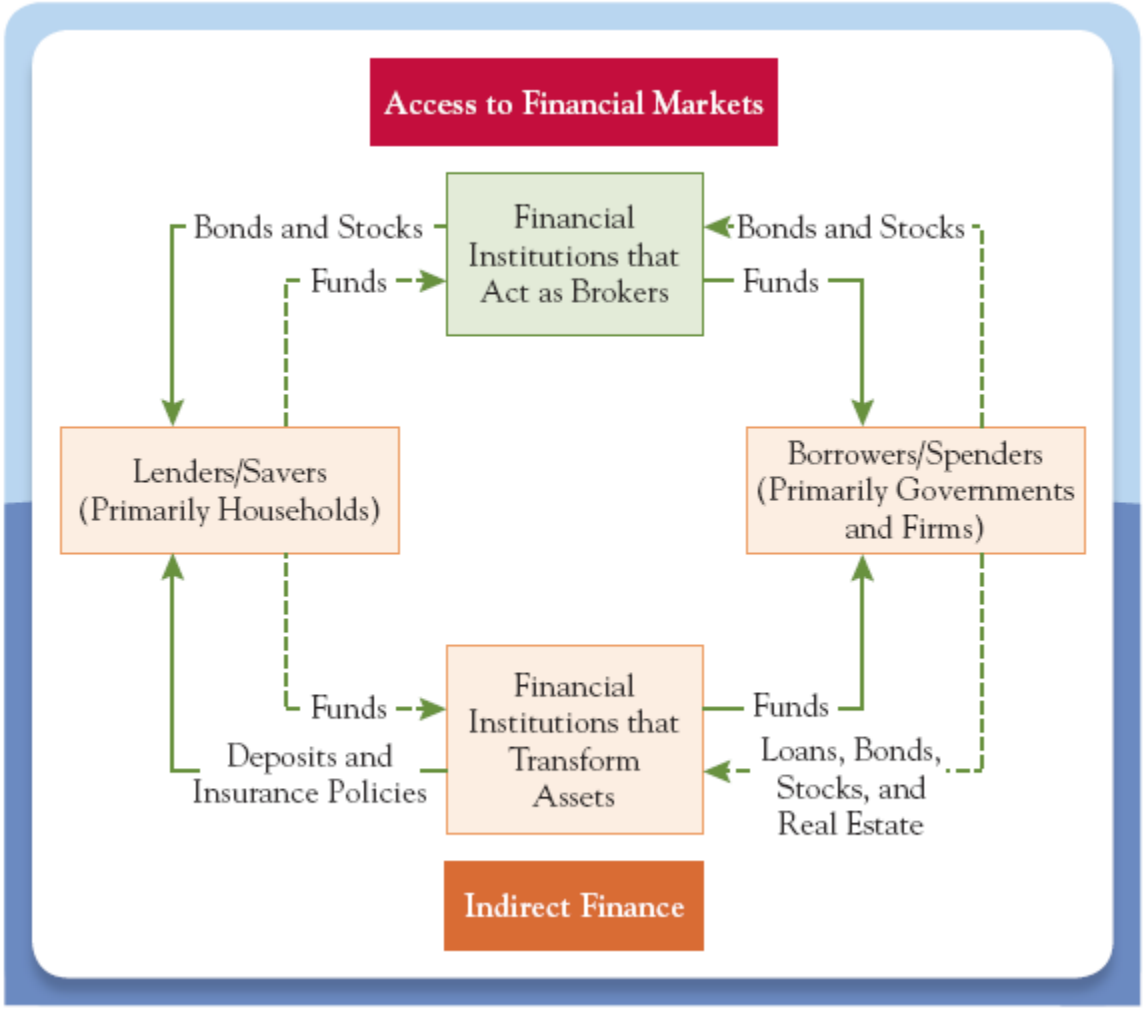
The Structure of the Financial Industry

5. **Finance companies** raise funds directly in the financial markets in order to make loans to individuals and firms.
   - Finance companies tend to specialize in particular types of loans, such as mortgage, automobile, or business equipment.

The Structure of the Financial Industry

6. Government-sponsored enterprises are federal credit agencies that provide loans directly for **farmers** and **home owners**.
   - **Guarantee programs** that insure loans made by private lenders. Also, they
   - **Provides retirement income** and medical care through Social Security and Medicare.

Figure 3.2: Flow of Funds through Financial Institutions



- Most people need to borrow to buy a house.
- Mortgage payment will be your biggest monthly expense so shop around.
- Many offers are from ***mortgage brokers*** - firms that have access to pools of funds earmarked for use as mortgages.
- Who offers your mortgage is not important - get the best rate you can.

SESSION SIX

- BANKS AND BANK MANAGEMENT

Financial Institutions

- Most people use the word *bank* to describe a depository institution.
- There are depository and non-depository institutions that differ by their primary source of funds - the liability side of their balance sheet.
- Depository institutions include
  - Commercial banks, savings and loans, and credit unions.

The Balance Sheet of Commercial Banks

- *Commercial banks* are institutions established to provide banking services to businesses, allowing them to deposit funds safely and borrow them when necessary.
- **Total bank assets equal total bank liabilities plus bank capital**.
- Banks obtain funds from individual depositors and businesses, as well as by borrowing from other financial institutions in financial markets.

The Balance Sheet of Commercial Banks

- The difference between a bank's assets and liabilities is the bank's capital, or net worth:
  - The value of the bank to its owners.
- A **bank's profits** come from both service fees and from the difference between what it pays for its liabilities and the return it receives on its assets.

Assets: Uses of Funds

- The asset side of the balance sheet shows what banks do with the funds they raise.
- Assets are divided into four broad categories:
  - Cash,
  - Securities,
  - Loans, and
  - All other assets.
- In winter of 2010, bank assets were equivalent to about 80 percent of one year's GDP.

Cash Items

Cash asset are of three types:

1. Reserves - the most important
   - Regulations require a certain percent of cash held in reserves.
   - Include the cash in the bank's vault, vault cash, and bank's deposits at the Federal Reserve System.
   - Cash is the most liquid of the bank's assets.
2. **Cash items in process of collection**:
   - The uncollected funds from checks

Cash Items

3. **Balances of the accounts that banks hold at other banks**.
   - Small banks have accounts at large banks - ***correspondent bank*** **deposits**.

- In January 2010, banks held more than 10% of their assets in cash.
- Up to the financial crisis of 2007-2009, banks held about 3%.
- Banks want to minimize cash holdings because they earn less on cash.

Securities

- Second largest component of bank assets.
- Banks (commercial banks) cannot hold stocks, so these are only bonds.
- They are split between:
  - U.S. government and agency securities -- 12.1% of assets), and
  - Other securities (state and local government bonds) -- 7.8% of assets.

Securities

- About half of all securities are mortgage-backed.
- A sizeable portion are very liquid - can be sold quickly if the bank needs cash.
  - Securities are therefore sometimes referred to as *secondary reserves*.
- The share of securities in banks assets has varied around 20% from 1973 to 2010.

Loans

- Primary assets of modern commercial banks, accounting for well over one-half of assets.
- Loans can be divided into five categories:
  1. Business loans called commercial and industrial (C&I) loans;
  2. Real estate loans, including both home and commercial mortgages and home equity loans;
  3. Consumer loans, like auto and credit card loans;
  4. Interbank loans; and
  5. Other types, including loans for the purchase of other securities.

Loans

- The different loan types differ in their **liquidity**.
- The primary difference in various kinds of depository institutions is their composition of loan portfolios.
  - **Commercial banks** make loans primarily to businesses
  - **Savings and loans** provide mortgages to individuals,
  - **Credit unions** specialize in consumer loans.

Liabilities: Sources of Funds

- Banks get funds from savers and from borrowing in the financial markets.
  - To entice individuals to put funds into their bank,
- There are two types of deposit accounts:
  - Transaction accounts - checkable deposits, and
  - Nontransaction accounts – non-checkable deposits (savings deposits)

Checkable Deposits

- Checking accounts can include NOW, super-NOW, and insured market rate accounts.
- Financial innovation has reduced the importance of checkable deposits in the day-to-day business of banking.
  - Checkable deposits plummeted from 40% of total liabilities in the 1970s to less than 10% in 2009.
  - Innovative accounts whose balances are easily transferred to checking accounts change the amount held in traditional deposit accounts.

Personal Finance

- When choosing a bank, make sure to ask questions.
  - What are the fees?
  - How easily can I reach a person?
  - How is the customer service?
- And if choosing an internet bank, make sure they are a U.S. bank and are FDIC insured.

Nontransaction/Noncheckable Deposits (Savings)

- In 2009 these accounted for more than half of fall commercial bank liabilities.
  - Savings deposits, knows as *passbook savings* accounts, were popular for may decades, but less so today.
  - Time deposits are certificates of deposit (CDs) with a fixed maturity.
    - *Large CDs* are greater than $100,000 in face value and are negotiable - they can be bought and sold in financial markets.
    - Large CDs have an important role in bank financing

Borrowings

- Borrowing is the second most important source of bank funds.
  - Accounts for somewhat less than 20% of bank liabilities.
- Banks can borrow by:
  - Borrowing from the Federal Reserve - rare
  - Borrow from other banks.

Borrowings

- Banks with excess reserves will lend their surplus funds to banks that need them through an interbank market called the federal funds market.
  - The lending bank must trust the borrowing bank as these loans are unsecured.
- Commercial banks will also borrow from foreign banks.

Borrowings

- Banks finally can borrow using an instrument called a repurchase agreement, or repo.
  - A short-term collateralized loan in which a security is exchanged for cash.
  - The parties agree to reverse the transaction on a specific future date.

Bank Capital and Profitability

- Remember that net worth equals assets minus liabilities.
- Net worth is referred to as bank capital, or *equity capital*.
- We can think of capital as the owners' stake in the bank.
- Capital is the cushion banks have against a sudden drop in the value of their assets or an unexpected withdrawal of liabilities.
  - It provides some insurance against insolvency.

Bank Capital and Profitability

- An important component of bank capital is loan loss reserves:
  - An amount the bank sets aside to cover potential losses from defaulted loans.
- At some point the bank gives up hope a loan will be repaid and it is *written off*, or erased from the bank's balance sheet.
- At this point, the loan loss reserve is reduced by the amount of the loan that has defaulted.

Bank Capital and Profitability

- The ratio of debt to equity in the U.S. banking system was about 8 to 1 in January 2010.
- Although that is a substantial amount of leverage, it is nearly 25% below the average commercial bank leverage ratio that prevailed prior to the financial crisis of 2007-2009.
  - Debt-to-equity ratio for nonfinancial business in the U.S. is only 1 to 1.
  - Household leverage is less than 1/3 to 1.
- Leverage increases risk AND expected return.

Bank Capital and Profitability

- One of the explanations for the relatively high degree of leverage in banking is the existence of government guarantees like **deposit insurance.**
  - This allows banks to capture the benefits of risk taking without subjecting depositors to potential losses.

Bank Capital and Profitability

There are several measures of bank profitability

1. Return on assets (ROA)
   - The bank's net profit after taxes divided by the bank's total assets.
   - It is a measure of how efficiently a particular banks uses its assets.
   - This is less important to bank owners than the return on their own investment.

Bank Capital and Profitability

2. The bank's return to its owners is measured by the return on equity (ROE).
   - This is the bank's net profit after taxes divide by the bank's capital.

- ROA and ROE are related to leverage.

Bank Capital and Profitability

- Prior to the financial crisis of 2007-2009, the typical U.S. bank had a ROA of about 1.3%.
- For large banks, the ROE tends to be higher than for small banks, suggesting greater leverage, a riskier mix of assets, or the existence of significant economies to scale in banking.
  - Given their performance during the crisis, it seems their higher returns were at least partly due to more leverage or a riskier mix of assets.

Bank Capital and Profitability

3. The final measure of bank profitability is *net interest income*.
   - This is related to the fact that banks pay interest on their liabilities and receive interest on their assets.
     - Deposits and bank borrowing generate interest expenses; securities and loans generate interest income.
   - The difference between the two is *net interest income*.

Bank Capital and Profitability

- Net interest income can also be expressed as a percentage of total assets to yield: net interest margin.
  - This is the bank's interest rate spread - the weighted average difference between the interest rate received on assets and the interest rate paid for liabilities.
- Well run banks have a high net interest income and a high net interest margin.
  - If a bank's net interest margin is currently improving, its profitability is likely to improve in the future.

- It is safe to assume that depository institutions will be with us for some time.
- There are three basic types of depository institutions: commercial banks, savings institutions, and credit unions.
- Not all these depository institutions are likely to survive the financial innovations and economic upheaval of the coming decades.

- China & India could grow even faster.
- China:
  - 75% of investment goes through banks.
  - State-owned enterprises (48% of GDP) receive 73% of credit.
  - Resources are directed inefficiently and disproportionately to government-favored firms.
- India:
  - Banks hold 46% of deposits in Indian government bonds.
  - People mistrust banks.
  - Government needs to free banks to lend where resources are best used.

Off-Balance-Sheet Activities

To generate fees, banks engage in numerous off-balance-sheet activities.

1. Lines of credit - similar to limits on credit cards.
   - The firm pays a bank a fee in return for the ability to borrow whenever necessary.
   - The payment is made when the agreement is signed and firm receives a *loan commitment*.
   - When the firm has *drawn down* the line of credit, the transaction appears on the bank's balance sheet.

Off-Balance-Sheet Activities

2. Letters of credit
   - These guarantee that a customer of the bank will be able to make a promised payment.
   - Customer might request that the bank send a *commercial letter of credit* to an exporter in another country guaranteeing payment for the goods on receipt.
   - In return for taking this risk, the bank receives a fee.

Off-Balance-Sheet Activities

3. Standby letter of credit
   - Standby letters of credit are letters issued to firms and governments that wish to borrow in the financial markets
   - They act as a form of insurance.

- These off-balance-sheet activities expose a bank to risk that is not readily apparent on their balance sheet.
- By allowing for the transfer of risk, modern financial instruments enable individual institutions to concentrate risk in ways that are very difficult for outsiders to discern.

- Small stores act as financial intermediaries to provide loans to people who cannot borrow from mainstream financial institutions.
- The most common type of loan is a *payday loan*.
- They are very expensive and appeal only to those who cannot get credit elsewhere.

SESSION SEVEN

- ANALYZING BANK RISK

Bank Risk: Where It Comes from and What to Do about It

- The **bank's goal** is to make a **profit** in each of its lines of business.
  - They want to pay less for the deposits it receives than for the loans it makes and the securities it buys.
- In the process of doing this, the bank is exposed to a host of **risks**:
  - Liquidity risk
  - Credit risk
  - Interest-rate risk
  - Trading risk

Liquidity Risk

- Liquidity risk is the risk of a sudden demand for liquid funds.
- Banks face liquidity risk on both sides of their balance sheets.
  - **Deposit withdrawal** is a liability-side risk.
  - Things like **lines of credit** are an asset-side risk.
- **Even if a bank has a positive net worth, illiquidity can still drive it out of business**.

Liquidity Risk

- In the past, the common way to **manage liquidity risk** was to hold excess reserves.
  - This is a **passive way** to manage liquidity risk.
  - Holding excess reserves is **expensive**, because it means forgoing higher rates of interest that can be earned with loans or securities.
- There are **two other ways to manage liquidity risk.**
  - The bank can adjust its assets or its liabilities.

Liquidity Risk

On the **asset side** a bank has several options.

1. The easiest is to **sell** a portion of its securities portfolio.
   - Most are **U.S. treasuries** and can be sold quickly at relatively low cost.
   - Banks that are particularly concerned about liquidity risk can structure their securities holdings to facilitate such sales.

Liquidity Risk

2. A second possibility is for the bank to **sell** some of its **loans** to another banks.
   - Banks generally make sure that a portion of the loans they hold are marketable for this purpose.
3. Another way is to **refuse to renew a customer loan** that has come due.
   - However this is bad for business.
     - Can lose a good customer.
     - Reducing assets lowers profitability

Liquidity Risk

Bankers prefer to use liability management to address liquidity risk.

1. Banks can **borrow** to meet any shortfall either from the Fed or from another bank.
2. The bank can **attract additional deposits**.
   - This is where large certificates of deposits are valuable:
     - They allow banks to manage their liquidity risk without changing the asset side of their balance sheet.

Liquidity Risk

- In the financial crisis of 2007-2009, banks could neither sell their illiquid assets nor obtain funding at a reasonable cost to hold those assets.
- When the interbank lending market dried up, many banks faced a threat to their survival.

Credit Risk

- The risk that a bank's loans will not be repaid is called credit risk.
- To manage credit risk, banks use a variety of tools.

1. Diversification is where banks make a variety of different loans to spread the risk.
2. Credit risk analysis is where the bank examines the borrower's credit history to determine the appropriate interest rate to change.

Credit Risk

- **Diversification** can be difficult for banks, especially if they focus on a certain type of lending.
  - If a bank lends in only one **geographic area** or one **industry**, it is exposed to economic downturns that are local or industry-specific.
  - It is important that banks find a way to **hedge** these risks.

Credit Risk

- **Credit risk analysis** produces information that is very similar to the bond rating systems.
  - Banks do this for small firms wishing to borrow, and credit rating agencies perform the service for individual borrowers.
  - The result is an assessment of the likelihood that a particular borrower will default.
- In the financial crisis of 2007-2009, banks underestimated the risks associated with mortgage and other household credit.

LESSONS FROM THE CRISIS
INSUFFICIENT BANK CAPITAL

- A bank's capital is its net worth - a cushion against many risks, including market risk.
  - Market risk is the decline in the market value of assets.
- The larger a bank's capital cushion, the less likely it will be made insolvent by an adverse surprise.
- In the financial crisis of 2007-2009, banks were too leveraged - they had too many assets for each unit of capital.

LESSONS FROM THE CRISIS
INSUFFICIENT BANK CAPITAL

- *Mark-to-market* accounting rules require banks to adjust the recorded value of the assets on their balance sheets when the market value changes.
  - When the price falls, the value is "written down" and *writedowns* reduce a bank's capital.
- Banks don't like to hold a large capital cushion because capital is costly.
- The more leverage the greater the possible reward for each unit of capital and the greater the risk.

Interest-Rate Risk

- A bank's liabilities tend to be short-term, while assets tend to be long term.
  - The mismatch between the two sides of the balance sheet create interest-rate risk.
- When interest rates rise, banks face the risk that the value of their assets will fall more than the value of their liabilities, reducing the bank's capital.
  - Rising interest rates reduce revenues relative to expenses, directly lowering a bank's profits.

Interest-Rate Risk

- The term *interest-rate sensitive* means that a change in interest rates will change the revenue produced by an asset.
- For a bank to make a profit, the interest rate on its liabilities must be lower than the interest rate on its assets.
  - The difference in the two rates is the bank's net interest margin.
- When a bank's liabilities are more interest-rate sensitive than its assets, an increase in interest rates will cut into the bank's profits.

Interest-Rate Risk

- The first step in managing interest-rate risk is to determine **how sensitive the bank's balance sheet is to a change in interest rates**.
- Managers must compute an estimate of the change in the bank's profit for each one-percentage-point change in the interest rate.
- This procedure is called ***gap analysis***.
  - This can be refined to take account of differences in the maturity of assets and liabilities, but it gets complicated.

Interest-Rate Risk

- Bank managers can use a number of **tools to manage interest-rate risk.**

1. They can match the interest-rate sensitivity of assets with that of liabilities.
   - Although this decreases interest-rate risk, it increases credit risk.
2. Alternatives include the use of derivatives, specifically interest-rate swaps.

Trading Risk

- Today banks hire traders to actively **buy and sell securities, loans, and derivatives** using a portion of the bank's capital.
- Risk that the instrument may go down in value rather than up is called trading risk, or *market risk*.
- **Traders normally share in the profits from good investment, but the bank pays for the losses**.
  - This creates moral hazard - traders take more risk than the banks would like.

Trading Risk

- The solution to the moral hazard problem is to **compute the risk the traders generate**.
  - Can use standard deviation and value at risk.
- The bank's risk manager **limits the amount of risk any individual trader is allowed to assume** and monitors closely.
- The higher the inherent risk in the bank's portfolio, the more capital the bank will need to hold.

Traders take Risks

- Traders are gambling with someone else's money, sharing the gains but not the losses from their risk taking.
- Traders are prone to taking too much risk, and in the cases here, hiding their losses when trades turn sour.
- The moral hazard present a challenge to bank owners, who must try to rein in traders' tendencies.
- Odds are that someone who is making large profits on some days will register big losses on other days.

Other Risks

- *Foreign exchange risk* comes from holding assets denominated in one currency and liabilities denominated in another.
- Banks manage this in two ways:
  - They work to attract deposits that are denominated in the same currency as their loans, **matching assets to liabilities**.
  - They **use foreign exchange futures and swaps to hedge the risk**.

Other Risks

- *Sovereign risk* arises from the fact that some foreign borrowers may not repay their loans because their government prohibits them from doing so.
  - If a foreign country is experiencing a financial crisis, the government may decide to restrict dollar-denominated payments.
- Banks have three options:
  - Diversification,
  - Refuse certain countries, and
  - Derivatives to hedge the risk.

Other Risks

- Operational risk is when computer systems fail or buildings burn down.
  - This was an issues for some banks when the World Trade Center was destroyed.
- The banks must make sure their computer systems and buildings are sufficiently robust to withstand potential disasters.
  - This means anticipating what might happen and testing to ensure a system's readiness.

Summary of Sources and Management of Bank Risk

Table 12.3 Risks Banks Face and How They Manage Them

Type of Risk	Source of Risk	Recommended Responses
Liquidity Risk	Sudden withdrawals by depositors or takedowns of credit lines	1. Hold sufficient cash reserves to meet customer demand. 2. Manage assets–sell securities or loans (contracts the size of the balance sheet) 3. Manage liabilities–attract more deposits (maintains the size of the balance sheet)
Credit Risk	Default by borrowers on their loans	1. Diversify to spread risk. 2. Use statistical models to screen for creditworthy borrowers. 3. Monitor to reduce moral hazard.
Interest-Rate Risk	Mismatch in maturity of assets and liabilities coupled with a change in interest rates	1. Closely match the maturity of both sides of the balance sheet. 2. Use derivatives such as interest-rate swaps.
Trading (Market) Risk	Trading losses in the bank's own account	Closely monitor traders using risk management tools, including value at risk.