VIRTUAL UNIVERSITY OF PAKISTAN

Money & Banking

MGT411

Course Handouts

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MGT411 – MONEY& BANKING

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TEXT AND REFERENCE MATERIAL &
FIVE PARTS OF THE FINANCIAL SYSTEM

The Primary textbook for the course will be

- "Money, Banking and Financial Markets" by Stephan G. Cecchetti

International Edition, McGraw Hill Publishers, ISBN 0-07-111565-X"

Reference books will be

- "The Economics of Money, Banking and Financial Markets", by Fredrick S. Mishkin 7th Edition Addison Wesley Longman Publishers
- "Principles of Money, Banking and Financial Markets" by Lawrence S. Ritter, Willaim L. Silber and Gregory F. Udell, Addison Wesley Longman Publishers

Course Contents

- **Money and the Financial System**
- Money and the Payments System
- Financial Instruments, Financial Markets, and Financial Institutions
- **Interest rate, financial instruments and financial markets**
- Future Value, Present Value and Interest Rates
- Understanding Risk
- Bonds, Pricing and Determination of Interest Rates
- The Risk and Term Structure of Interest Rates
- Stocks, Stock Markets and Market Efficiency
- **Financial Institutions**
- Economics of Financial Intermediation
- Depositary Institutions: Banks and bank Management
- Financial Industry Structure
- Regulating the financial system
- **Central Banks, Monetary Policy and Financial stability**
- Structure of central banks
- Balance sheet and Money Supply process
- Monetary policy
- Exchange rate policy
- **Modern Monetary Economics**
- Money growth and Money Demand
- Aggregate demand
- Business Cycle
- Output and inflation in the short run
- **Money and Banking in Islam**
- Monetary and financial policy and structure for an Interest-free economy
- Islamic Banking in the contemporary world

Five Parts of the Financial System

- Money
- Financial Instruments
- Financial Markets
- Financial Institutions
- Central Banks

1. Money

- To pay for purchases
- To store wealth
- Evolved from gold and silver coins to paper money to today's electronic funds transfers

- Traditional Paycheck system vs. ATM Withdrawals and Mailed transactions vs. E-banking

2. Financial Instruments

- To transfer wealth from savers to borrowers
- To transfer risk to those best equipped to bear it.
- Once investing was an activity reserved for the wealthy
- Costly individual stock transactions through stockbrokers
- Information collection was not so easy
- Now, small investors have the opportunity to purchase shares in "mutual funds."

3. Financial Markets

- To buy and sell financial instruments quickly and cheaply
- Evolved from coffeehouses to trading places (Stock exchanges) to electronic networks
- Transactions are much more cheaper now
- Markets offer a broader array of financial instruments than were available even 50 years ago

4. Financial Institutions

- Provide access to financial markets
- Banks evolved from Vaults and developed into deposits- and loans-agency
- Today's banks are more like financial supermarkets offering a huge assortment of financial products and services for sale.
- Access to financial markets
- Insurance
- Home- and car-loans
- Consumer credit
- Investment advice

5. Central Banks

- Monitors financial Institutions
- Stabilizes the Economy
- Initiated by Monarchs to finance the wars
- The govt. treasuries have evolved into the modern central bank
- Control the availability of money and credit in such a way as to ensure
- Low inflation,
- High growth, and
- The stability of the financial system
- State Bank of Pakistan www.sbp.org.pk

Summary

Five Parts of the Financial System

- Money
- Financial Instruments
- Financial Markets
- Financial Institutions
- Central Banks

FIVE CORE PRINCIPLES OF MONEY AND BANKING

1. Time has Value

- Time affects the value of financial instruments.
- Interest payments exist because of time properties of financial instruments

Example

- At 6% interest rate, 4 year loan of $10,000 for a car

  Requires 48 monthly installments of $263.02 each

  Total repayment = $263.02×48 = $12,624.96

  $12,624.96 > $10,000

  (Total repayment) (Amount of loan)
- Reason: you are compensating the lender for the time during which you use the funds

2. Risk Requires Compensation

- In a world of uncertainty, individuals will accept risk only if they are compensated in some form.
- The world is filled with uncertainty; some possibilities are welcome and some are not
- To deal effectively with risk we must consider the full range of possibilities:
- Eliminate some risks,
- Reduce others,
- Pay someone else to assume particularly onerous risks, and
- Just live with what's left
- Investors must be paid to assume risk, and the higher the risk the higher the required payment
- Car insurance is an example of paying for someone else to shoulder a risk you don't want to take. Both parties to the transaction benefit
- Drivers are sure of compensation in the event of an accident
- The insurance companies make profit by pooling the insurance premiums and investing them
- Now we can understand the valuation of a broad set of financial instruments
- E.g., lenders charge higher rates if there is a chance the borrower will not repay.

3. Information is the basis for decisions

- We collect information before making decisions
- The more important the decision the more information we collect
- The collection and processing of information is the basis of foundation of the financial system.
- Some transactions are arranged so that information is NOT needed
- Stock exchanges are organized to eliminate the need for costly information gathering and thus facilitate the exchange of securities
- One way or another, information is the key to the financial system

4. Markets set prices and allocate resources

- Markets are the core of the economic system; the place, physical or virtual,
- Where buyers and sellers meet
- Where firms go to issue stocks and bonds,
- Where individuals go to purchase assets
- Financial markets are essential to the economy,
- Channeling its resources
- Minimizing the cost of gathering information
- Making transactions
- Well-developed financial markets are a necessary precondition for healthy economic growth
- The role of setting prices and allocation of resources makes the markets vital sources of information
- Markets provide the basis for the allocation of capital by attaching prices to different stocks or bonds

- Financial markets require rules to operate properly and authorities to police them
- The role of the govt. is to ensure investor protection
- Investor will only participate if they perceive the markets are fair

5. Stability improves welfare

- To reduce risk, the volatility must be reduced
- Govt. policymakers play pivotal role in reducing some risks
- A stable economy reduces risk and improves everyone's welfare.
- By stabilizing the economy as whole monetary policymakers eliminate risks that individuals can't and so improve everyone's welfare in the process.
- Stabilizing the economy is the primary function of central banks
- A stable economy grows faster than an unstable one

Financial System Promotes Economic Efficiency

- The Financial System makes it Easier to Trade
- Facilitate Payments - bank checking accounts
- Channel Funds from Savers to Borrowers
- Enable Risk Sharing - Classic examples are insurance and forward markets

1. Facilitate Payments

- Cash transactions (Trade "value for value"). Could hold a lot of cash on hand to pay for things
- Financial intermediaries provide checking accounts, credit cards, debit cards, ATMs
- Make transactions easier.

2. Channel Funds from Savers to Borrowers

- Lending is a form of trade (Trade "value for a promise")
- Give up purchasing power today in exchange for purchasing power in the future.
- Savers: have more funds than they currently need; would like to earn capital income
- Borrowers: need more funds than they currently have; willing and able to repay with interest in the future.
- Why is this important?

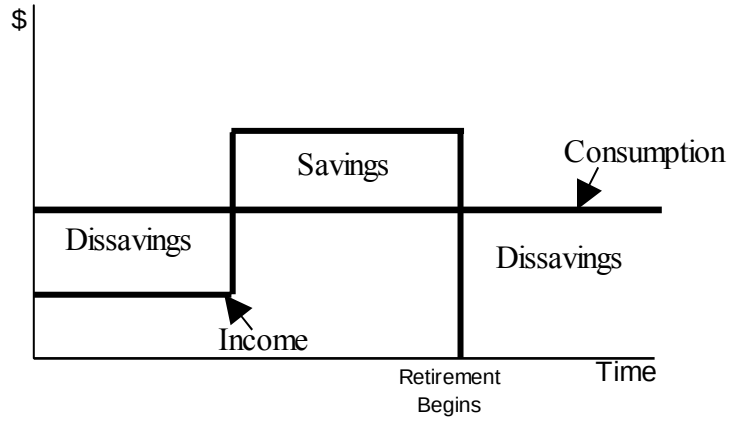
A) Allows those without funds to exploit profitable investment opportunities.

- Commercial loans to growing businesses;
- Venture capital;
- Student loans (investment in human capital);
- Investment in physical capital and new products/processes to promote economic growth

B) Financial System allows the timing of income and expenditures to be decoupled.

- Household earning potential starts low, grows rapidly until the mid 50s, and then declines with age.
- Financial system allows households to borrow when young to prop up consumption (house loans, car loans), repay and then accumulate wealth during middle age, then live off wealth during retirement.

Figure: Channel Funds from Savers to Borrowers



3. Enable Risk Sharing

- The world is an uncertain place. The financial system allows trade in risk. (Trade "value for a promise")
- Two principal forms of trade in risk are insurance and forward contracts.
- Suppose everyone has a 1/1000 chance of dying by age 40 and one would need $1 million to replace lost income to provide for their family.
- What are your options to address this risk?

Summary

- Five Core Principles of Money and Banking
- Time has Value
- Risk Requires Compensation
- Information is the basis for decisions
- Markets set prices and allocate resources
- Stability improves welfare
- Financial System Promotes Economic Efficiency
- Facilitate Payments
- Channel Funds from Savers to Borrowers
- Enable Risk Sharing

MONEY & THE PAYMENT SYSTEM

- Money
- Characteristics of Money
- Liquidity
- Payment system
- Commodity vs. Fiat Money
- Cheques
- Other forms of payments
- Future of Money

Money

- Money is an asset that is generally accepted as payment for goods and services or repayment of debt.
- Not the same as wealth or income
- Money is a component of wealth that is held in a readily- spend able form
- Money is made up of
- Coin and currency
- Chequing account balances
- Other assets that can be turned into cash or demand deposits nearly instantaneously, without risk or cost (liquid wealth)

Distinctions among Money, Wealth, and Income

- While money, income and wealth are all measured in some currency unit, they differ significantly in their meaning.
- People have money if they have large amounts of currency or big bank accounts at a point in time. (Stock variable)
- Someone earns income (not money) from work or investments over a period of time. (Flow variable)
- People have wealth if they have assets that can be converted into more currency than is necessary to pay their debts at a point in time. (Stock variable)

Characteristics of Money

- A means of payment
- A unit of Account
- A Store of Value

A means of payment

- The primary use of money is as a means of payment.
- Money is accepted in economic exchanges.
- Barter is an alternative to using money but it doesn't work very well.
- Barter requires a "double coincidence of wants," meaning that in order for trade to take place both parties must want what the other has.
- Money finalizes payments so that buyers and sellers have no further claim on each other.
- As economies have become more complex and physically dispersed the need for money has grown.
- Just as the division of labor and specialization allow for efficient production, money allows for efficient exchange.

A unit of Account

- We measure value using rupees and paisas.
- Money is the unit of account that we use to quote prices and record debts.

- Money can be referred to as a standard of value.
- Using money makes comparisons of value easy
- Under barter the general formula for n goods, we will have n (n - 1) / 2 prices
- Two goods 1 price
- 3 goods 3 prices
- 100 goods 4,950 prices
- 10,000 goods 50 million prices

A Store of Value

- For money to function as a means of payment it has to be a store of value too because it must retain its worth from day to day.
- The means of payment has to be durable and capable of transferring purchasing power from one day to the next.
- Money is not the only store of value; wealth can be held in a number of other forms.
- Other stores of value can be preferable to money because they pay interest or deliver other services.
- However, we hold money because it is liquid, meaning that we can use it to make purchases.
- Liquidity is a measure of the ease with which an asset can be turned into a means of payment (namely money).
- The more costly an asset is to turn into money, the less liquid it is.
- Constantly transforming assets into money every time we wish to make a purchase would be extremely costly; hence we hold money

Liquidity

- Liquidity is a measure of the ease an asset can be turned into a means of payment, namely money
- An asset is liquid if it can be easily converted into money and illiquid if it is costly to convert.
- Cash is perfectly liquid.
- Stocks and bonds are somewhat less liquid.
- Land is least liquid.

The Payments System

- The payment system is a web of arrangements that allows for the exchange of goods and services, as well as assets among different people
- Money is at the heart of payment system!

Types of Money

- Commodity Money – Things that have intrinsic value
- Fiat Money – Value comes from government decree (or fiat)

Commodity Money

- The first means of payment were things with intrinsic value like silk or salt.
- Successful commodity monies had the following characteristics
- They were usable in some form by most people;
- They could be made into standardized quantities;
- They were durable;
- They had high value relative to their weight and size so that they were easily transportable; and
- They were divisible into small units so that they were easy to trade
- For most of human history, gold has been the most common commodity money

Fiat Money

- Today we use paper money that is fiat money, meaning that its value comes from government decree (or fiat).
- A note costs about 0.04% its worth to produce.
- These notes are accepted as payment for goods or in settlement of debts for two reasons:

- The law says we must accept them; that is what the words "legal tender" printed on the note means.
- As long as the government stands behind its paper money, and doesn't issue too much of it, we will use it. In the end, money is about trust.

Fiat or Commodity Money?

- Does money need to be backed by a commodity at all?
- The logical answer to this question is no.
- If the monetary system is stable and functions effectively, "backing" is expensive, inconvenient, and unnecessary.
- Today, money is only backed by confidence that government will responsibly limit the quantity of money to ensure that money in circulation will hold its value.

Advantages of Fiat Money

- Fewer resources are used to produce money.
- The quantity of money in circulation can be determined by rational human judgment rather than by discovering further mineral deposits—like gold or diamonds

Disadvantage

- A corrupt or pressured government might issue excessive amounts of money, thereby unleashing severe inflation.

Cheques

- Cheques are another way of paying for things, but
- They are not legal tender
- They are not even money.
- Cheques are instructions to the bank to take funds from your account and transfer those funds to the person or firm whose name is written in the "Pay to the Order of" line.
- When you give someone a Cheque in exchange for a good or service, it is not a final payment;
- A series of transactions must still take place that lead to the final payment
- Following are the steps in the process

1- You hand a paper cheque from your bank to a merchant in exchange for some good
2- The merchant deposits the cheque into merchant's bank and merchant's account is credited
3- The merchant's bank sends the cheque to the local central bank
4- The Central Bank
(a) Credits the merchant's bank's reserve account
(b) Debits your bank's reserve account
(This step involves money)
5- The Central Bank returns the cheque to your bank
6- Your bank debits your Chequing account by the amount of the cheque

- The whole process is time consuming and expensive;
- Though cheque volumes have begun to fall, paper Cheques are still with us because a cancelled cheque is legal proof of payment

Other Forms of Payments

- Debit Cards
- Credit Cards
- Electronic Funds transfers
- Stored Value Cards

OTHER FORMS OF PAYMENTS

Debit Card

- The money in your account is used for payments
- Works like a cheque and there is usually a fee for the transaction

Credit card

- It is a promise by a bank to lend the cardholder money with which to make purchases.
- When the card is used to buy merchandise the seller receives payment immediately
- The money that is used for payment does not belong to the buyer
- Rather, the bank makes the payment, creating a loan that the buyer must repay.
- So, they do not represent money; rather, they represent access to someone else's money

Electronic Funds Transfer

- Move funds directly from one account to another.
- Banks use these transfers to handle transactions among themselves
- Individuals may be familiar with such transfers through direct deposit of their paycheques and the payment of their utility bills, etc

E-money

- Used for purchases on the Internet.
- You open an account by transferring funds to the issuer of the e-money
- When shopping online, instruct the issuer to send your e-money to the merchant
- It is really a form of private money.

Stored-value card

- Retail businesses are experimenting with new forms of electronic payment
- Prepaid cellular cards, Internet scratch cards, calling cards etc

The Future of Money

- The time is rapidly approaching when safe and secure systems for payment will use virtually no money at all
- We will also likely see
- Fewer "varieties" of currency, (a sort of standardization of money) and
- A dramatic reduction in the number of units of account
- Money as a store of value is clearly on the way out as many financial instruments have become highly liquid.

Measuring Money

- Different Definitions of money based upon degree of liquidity. Federal Reserve System defines monetary aggregates.
- Changes in the amount of money in the economy are related to changes in interest rates, economic growth, and most important, inflation.
- Inflation is a sustained rise in the general price level
- With inflation you need more money to buy the same basket of goods because it costs more.
- Inflation makes money less valuable
- The primary cause of inflation is the issuance of too much money
- Because money growth is related to inflation we need to be able to measure how much money is circulating
- Money as a means of payments
- We measure the quantity of money as the quantity of currency in circulation – an unrealistically limited measure, since there are other ways of payments
- Alternatively, broadly categorize financial assets and sort them by the degree of liquidity
- Sort them by the ease with which they can be converted into a means of payments
- Arrange them from most liquid to least liquid

- Where to draw the line?
- In reality, we draw line at different places and compute several measures of money called the monetary aggregates
- M1, M2, and M3
- M1 is the narrowest definition of money and includes only currency and various deposit accounts on which people can write Cheques.
- Currency in the hands of the public,
- Traveler's Cheques,
- Demand deposits and
- Other chequeable deposits
- M2 includes everything that is in M1 plus assets that cannot be used directly as a means of payment and are difficult to turn into currency quickly,
- Small-denomination time deposits,
- Money market deposit accounts,
- Money market mutual fund shares
- M2 is the most commonly quoted monetary aggregate since its movements are most closely related to interest rate and economic growth.
- M3 adds to M2 other assets that are important to large institutions
- Large-denomination time deposits,
- Institutional money market mutual fund shares,
- Repurchase agreements and
- Eurodollars

Symbol	Assetsincluded
C	Currency
M1	C + demand deposits, travelers' Cheques, other chequeable deposits
M2	M1 + small time deposits, savings deposits, money market mutual funds, money market deposit accounts
M3	M2 + large time deposits, repurchase agreements, institutional money market mutual fund balances

Monetary Aggregates	Figures in millions as of March 2005
1. Currency issued	711,997
2. Currency held by SBP	3,188
3. Currency in tills of Scheduled Banks	43,914
4. Currency in circulation (1 – 2 – 3)	664,895
5. Scheduled Banks demand deposits	93,272
6. Other Deposits with SBP	4,826
7. M1 (4+5+6)	**762,993**
8. Scheduled Banks Time Deposits	1,037,678
9. Resident Foreign Currency Deposits	172,074
10. Total Monetary Assets (M2) (7+8+9)	**1,972,745**

Source: State Bank of Pakistan

Table : The Monetary Aggregates	
Monetary Aggregates	**Value as of August 2004 (U.S.$ billion)**
M1= Currency in the hands of the public	686.2
+ Traveler's checks	7.6
+ Demand deposits	315.3
+ Other checkable deposits	328.5
Total M1	**1,337.6**
M2=M1	
+ Small-denomination time deposits	794.7
+ Savings deposits including money market deposit accounts	3415.3
+ Retail money market mutual fund shares	735.5
Total M2	**6,283.1**
M3=M2	
+ Large-denomination time deposits	1,036.3
+ Institutional money market mutual fund shares	1,104.7
+ Repurchase agreements	516.6
+ Eurodollars	344.5
Total M3	**9,285.2**

Figure: Growth Rates in Monetary Aggregates

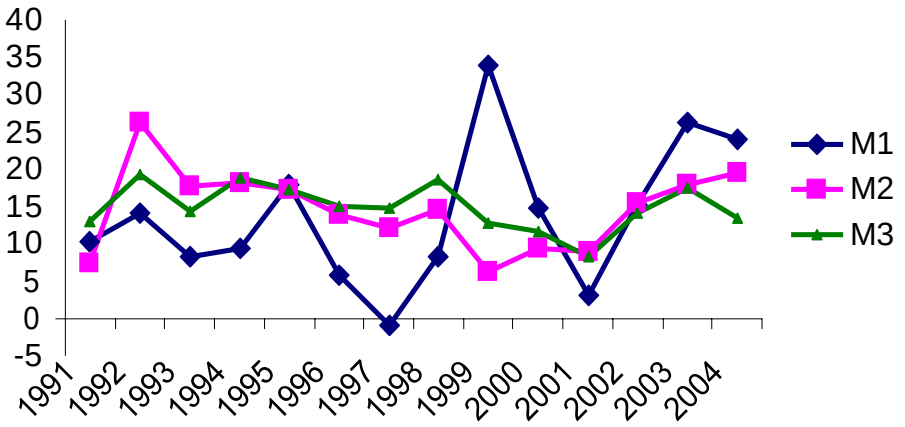
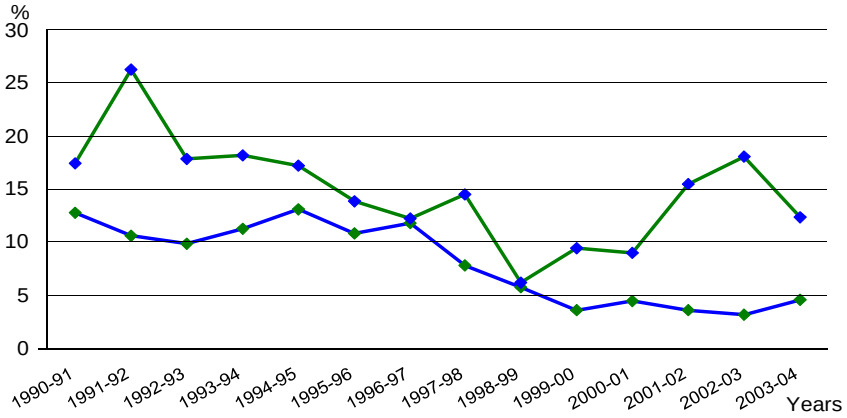


Figure: Money Growth and Inflation



Measures of Inflation

- Fixed-weight Index - CPI
- Deflator – GDP or Personal Consumption Expenditure Deflator

Consumer Price Index (CPI)

- Measure of the overall level of prices used to
- Track changes in the typical household's cost of living
- Allow comparisons of dollar figures from different years

- Survey consumers to determine composition of the typical consumer's "basket" of goods.
- Every month, collect data on prices of all items in the basket; compute cost of basket
- CPI in any month equals

$$100 \frac{\text{Cost of basket in that month}}{\text{Cost of basket in base period}}$$

Example:
The basket contains 20 pizzas and 10 compact discs.

Prices		
Years	**Pizza**	**CDs**
2002	$10	$15
2003	$11	$15
2004	$12	$16
2005	$13	$15

From this table, we can calculate the inflation rate as:

Years	Cost of Basket	CPI	Inflation rate
2002	$350	100.0	n.a.
2003	370	105.7	5.7%
2004	400	114.3	8.1%
2005	410	117.1	2.5%

GDP Deflator

The GDP deflator, also called the implicit price deflator for GDP, measures the price of output relative to its price in the base year. It reflects what's happening to the overall level of prices in the economy

GDP Deflator = (Nominal GDP / Real GDP) ×100

Inflation rate = {(CPI current period – CPI preceding period) / CPI preceding period}*100

Years	Nom. GDP	Real GDP	GDP Deflator	Inflation Rate
2001	Rs46, 200	Rs46, 200	100.0	n.a.
2002	51,400	50,000	102.8	2.8%
2003	58,300	52,000	112.1	9.1%

FINANCIAL INTERMEDIARIES

- Financial Intermediaries
- Financial Instruments
- Uses
- Characteristics
- Value
- Examples

Financial Intermediaries

- The informal arrangements that were the mainstay of the financial system centuries ago have since given way to the formal financial instruments of the modern world
- Today, 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 the financial resources we need from this system in two ways:
- Directly from lenders and
- Indirectly from financial institutions called financial intermediaries.

Indirect Finance

- A financial institution (like a bank) borrows from the lender and then provides funds to the borrower.
- If someone borrows money to buy a car, the car becomes his or her asset and the loan a liability.

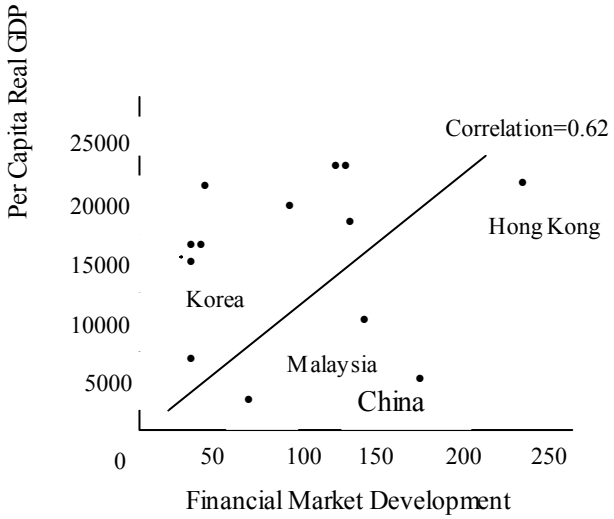
Direct Finance

- Borrowers sell securities directly to lenders in the financial markets.
- Governments and corporations finance their activities this way
- The securities become assets to the lenders who buy them and liabilities to the borrower who sells them

Financial and Economic Development

- Financial development is inextricably linked to economic growth
    - There aren't any rich countries that have very low levels of financial development.

Figure: Financial and Economic Development



Financial Development is measured by the commonly used ratio of broadly defined money to GDP. Economic development is measured by the real GDP per capita.

Financial Instruments

- A financial instrument is the written legal obligation of one party to transfer something of value – usually money – to another party at some future date, under certain conditions, such as stocks, loans, or insurance.
- Written legal obligation means that it is subject to government enforcement;
- The enforceability of the obligation is an important feature of a financial instrument.
- The "party" referred to can be a person, company, or government
- The future date can be specified or can be when some event occurs
- Financial instruments generally specify a number of possible contingencies under which one party is required to make a payment to another
- Stocks, loans, and insurance are all examples of financial instruments

Uses of Financial Instruments

1. Means of Payment	Purchase of Goods or Services
2. Store of Value	Transfer of Purchasing Power into the future
3. Transfer of Risk	Transfer of risk from one person or company to another

Characteristics of Financial Instruments

- Standardization
- Standardized agreements are used in order to overcome the potential costs of complexity
- Because of standardization, most of the financial instruments that we encounter on a day-to-day basis are very homogeneous
- Communicate Information
- Summarize certain essential information about the issuer
- Designed to handle the problem of "asymmetric information",
- Borrowers have some information that they don't disclose to lenders

Classes of Financial Instruments

- Underlying Instruments (Primary or Primitive Securities)
- E.g. Stocks and bonds

- Derivative Instruments
- Value and payoffs are "derived from" the behavior of the underlying instruments
- Futures and options

Value of Financial Instruments

- Size of the promised payment
- People will pay more for an instrument that obligates the issuer to pay the holder a greater sum.
- The bigger the size of the promised payment, the more valuable the financial instrument
- When the payment will be received
- The sooner the payment is made the more valuable is the promise to make it
- The likelihood the payment will be made (risk).
- The more likely it is that the payment will be made, the more valuable the financial instrument
- The conditions under which the payment will be made
- Payments that are made when we need them most are more valuable than other payments

Value of Financial Instruments

1. Size	Payments that are larger are more valuable
2. Timing	Payments that are made sooner are more valuable
3. Likelihood	Payments that are more likely to be made are more valuable
4. Circumstances	Payments that are made when we need them most are more valuable

FINANCIAL INSTRUMENTS & FINANCIAL MARKETS

- Financial Instruments
- Examples
- Financial Markets
- Roles
- Structure
- Financial Institutions

Examples of Financial Instruments

Primarily Stores of Value

- Bank Loans
- A borrower obtains resources from a lender immediately in exchange for a promised set of payments in the future
- Bonds
- A form of a loan, whereby in exchange for obtaining funds today a government or corporation promises to make payments in the future
- Home Mortgages
- A loan that is used to purchase real estate
- The real estate is collateral for the loan,
- It is a specific asset pledged by the borrower in order to protect the interests of the lender in the event of nonpayment.
- If payment is not made the lender can foreclose on the property.
- Stocks
- An owner of a share owns a piece of the firm and is entitled to part of its profits.

Primarily to transfer risk

- Insurance Contracts
- The primary purpose is to assure that payments will be made under particular (and often rare) circumstances
- Futures Contracts
- An agreement to exchange a fixed quantity of a commodity, such as wheat or corn, or an asset, such as a bond, at a fixed price on a set future date
- It is a derivative instrument since its value is based on the price of some other asset.
- It is used to transfer the risk of price fluctuations from one party to another
- Options
- Derivative instruments whose prices are based on the value of some underlying asset;
- They give the holder the right (but not the obligation) to purchase a fixed quantity of the underlying asset at a predetermined price at any time during a specified period.

Financial Markets

- Financial Markets are the places where financial instruments are bought and sold.
- Enable both firms and individuals to find financing for their activities.
- Promote economic efficiency by ensuring that resources are placed at the disposal of those who can put them to best use.
- When they fail to function properly, resources are no longer channeled to their best possible use and the society suffers at large

Role of Financial Markets

Liquidity	Ensure that owners of financial instruments can buy and sell them cheaply and easily
Information	Pool and communicate information about the issuer of a financial instrument
Risk Sharing	Provide individuals with a place to buy and sell risk, sharing them with individuals

Financial markets need to be designed in a way that keeps transactions costs low

Structure of Financial Markets

Primary vs. Secondary Markets

- In a primary market a borrower obtains funds from a lender by selling newly issued securities.
- Most companies use an investment bank, which will determine a price and then purchase the company's securities in preparation for resale to clients; this is called underwriting.
- In the secondary markets people can buy and sell existing securities

Centralized Exchanges vs. Over-the-counter Markets

- In the centralized exchange (e.g. Karachi Stock Exchange www.kse.com.pk), the trading is done "on the floor"

Over-the-counter (or OTC)

- OTC market are electronic networks of dealers who trade with one another from wherever they are located

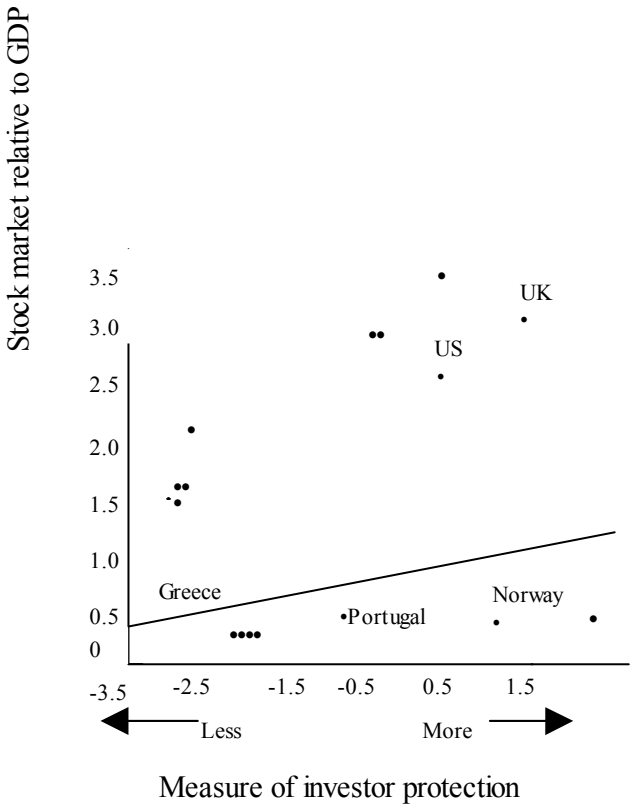
Debt and Equity vs. Derivative Markets

- Equity markets are the markets for stocks, which are usually traded in the countries where the companies are based.
- Debt instruments can be categorized as
- Money market (maturity of less than one year) or Bond markets (maturity of more than one year)

Characteristics of a well-run financial market

- Low transaction costs.
- Information communicated must be accurate and widely available
- If not, the prices will not be correct
- Prices are the link between the financial markets and the real economy
- Investors must be protected.
- A lack of proper safeguards dampens people's willingness to invest

Figure: Market size and investors protection



FINANCIAL INSTITUTIONS

- Financial Institutions
- Structure of Financial Industry
- Time Value of Money

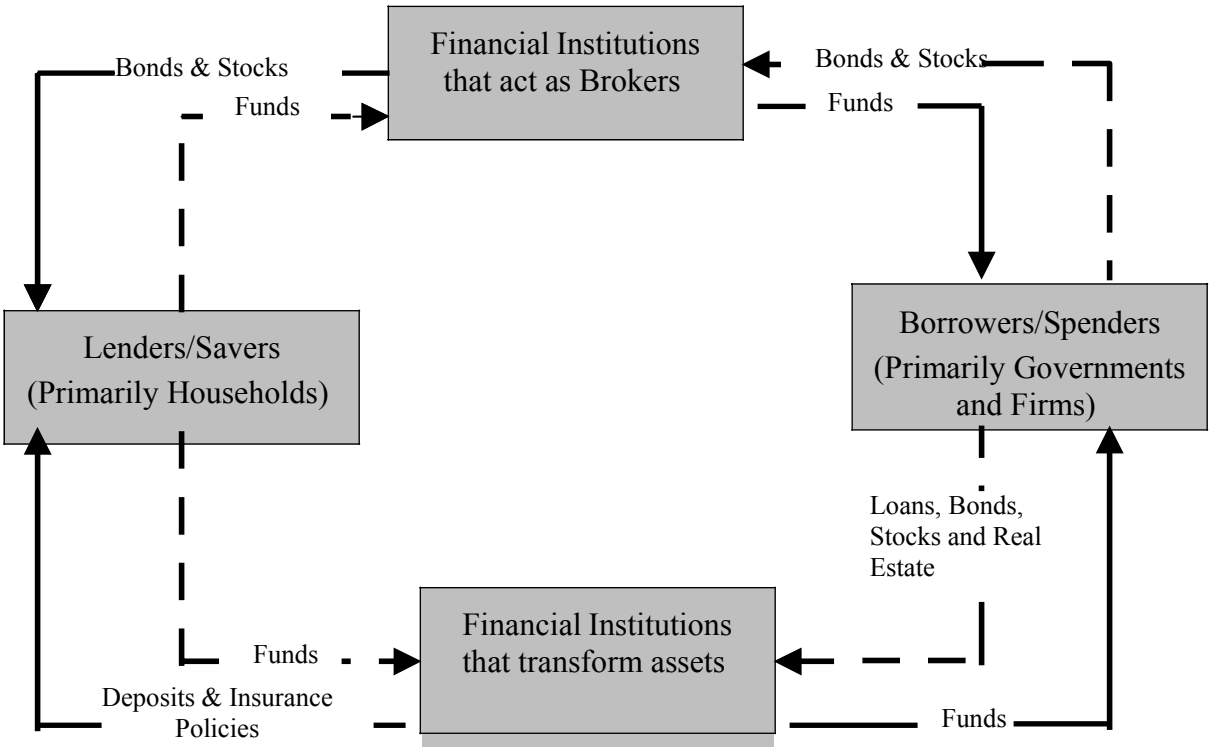
Financial Institutions

- Financial institutions are the firms that provide access to the financial markets;
- They sit between savers and borrowers and so are known as financial intermediaries.
- Banks, insurance companies, securities firms and pension funds
- A system without financial institutions would not work very well for three reasons
- Individual transactions between saver-lenders and borrower-spenders would be extremely expensive.
- Lenders need to evaluate the creditworthiness of borrowers and then monitor them, and individuals are not equipped to do this.
- Most borrowers want to borrow long term, while lenders favor short-term loans

Role of Financial Institutions

- Reduce transactions cost by specializing in the issuance of standardized securities
- Reduce information costs of screening and monitoring borrowers.
- Curb information asymmetries, helping to ensure that resources flow into their most productive uses
- Make long-term loans but allow savers ready access to their funds.
- Provide savers with financial instruments (more liquid and less risky than the individual stocks and bonds) that savers would purchase directly in financial markets

Figure: Flow of funds through Financial Institutions: Access to Financial Markets



Indirect Finance

The simplified Balance Sheet of a Financial Institution	
Assets	**Liabilities**
Bonds Stocks Loans Real estate	Deposits Insurance policies

The structure of the financial industry

The structure of the financial industry:

- Financial institutions or intermediaries can be divided into two broad categories

Depository institutions - take deposits and make loans.

- (Commercial banks, savings banks, and credit unions)

Nondepository institutions

- Insurance companies, securities firms, mutual fund companies, finance companies, and pension funds

Insurance companies

- Accept premiums, which they invest in securities and real estate in return for promising compensation to policyholders should certain events occurs (like death, property losses, etc.)

Pension funds

- Invest individual and company contributions into stocks, bonds and real estate in order to provide payments to retired workers.

Securities firms

- They include brokers, investment banks, and mutual fund companies
- Brokers and investment banks issue stocks and bonds to corporate customers, trade them, and advise clients.
- Mutual fund companies pool the resources of individuals and companies and invest them in portfolios of bonds, stocks, and real estate.

Government Sponsored Enterprises:

- Federal credit agencies that provide loans directly for farmers and home mortgages, as well as guarantee programs that insure the loans made by private lenders.
- HBFC, ZTBL, Khushhali bank, SME Bank
- The government also provides retirement income and medical care to the elderly (and disabled) through Social Security and Medicare.

Finance Companies:

- Raise funds directly in the financial markets in order to make loans to individuals and firms.

- The monetary aggregates are made up of liabilities of commercial banks, so clearly the financial structure is tied to the availability of money and credit.

TIME VALUE OF MONEY

- Time Value of Money
- Future Value Concepts
- Present value
- Application in financial environment

Time Value of Money

- Credit is one of the critical mechanisms we have for allocating resources.
- Even the simplest financial transaction, like saving some of your paycheck each month to buy a car, would be impossible.
- Corporations, most of which survive from day to day by borrowing to finance their activities, would not be able to function.
- Yet even so, most people still take a dim view of the fact that lenders charge interest.
- The main reason for the enduring unpopularity of interest comes from the failure to appreciate the fact that lending has an opportunity cost.
- Think of it from the point of view of the lender.
- Extending a loan means giving up the alternatives. While lenders can eventually recoup the sum they lend, neither the time that the loan was outstanding nor the opportunities missed during that time can be gotten back.
- So interest isn't really "the breeding of money from money," as Aristotle put it; it's more like a rental fee that borrowers must pay lenders to compensate them for lost opportunities.
- It's no surprise that in today's world, interest rates are of enormous importance to virtually everyone
- Individuals, businesses, and governments
- They link the present to the future, allowing us to compare payments made on different dates.
- Interest rates also tell us the future reward for lending today, as well as the cost of borrowing now and repaying later.
- To make sound financial decisions, we must learn how to calculate and compare different rates on various financial instruments

Future Value

- Future Value is the value on some future date of an investment made today.
- To calculate future value we multiply the present value by the interest rate and add that amount of interest to the present value.

PV + Interest = FV

PV + PV*i = FV

$100 + $100(0.05) = $105

PV = Present Value

FV = Future Value

i = interest rate (as a percentage)

- The higher the interest rate (or the amount invested) the higher the future value.

Future Value in one year

$$FV = PV*(1+i)$$

- Now we need to figure out what happens when the time to repayment varies
- When we consider investments with interest payments made for more than one year we need to consider compound interest, or the fact that interest will be paid on interest

Future Value in two years

$100+$100(0.05) +$100(0.05) + $5(0.05) =$110.25

Present Value of the Initial Investment + Interest on the initial investment in the 1st Year + Interest on the initial investment in the 2nd Year+ Interest on the Interest from the 1stYear in the 2nd Year = Future Value in Two Years

General Formula for compound interest – Future value of an investment of PV in n years at interest rate i (measured as a decimal, or 5% = .05)

$FV_n = PV*(1+i)^n$

Table: Computing the Future Value of $100 at 5% annual interest rate		
Years into future	**Computation**	**Future value**
1	$100(1.05)^1$	$105.00
2	$100(1.05)^2$	$110.25
3	$100(1.05)^3$	$115.76
4	$100(1.05)^4$	$121.55
5	$100(1.05)^5$	$127.63
10	$100(1.05)^{10}$	$162.89

Note:

Both n and i must be measured in same time units—if i is annual, then n must be in years, so future value of $100 in 18 months at 5% is

$FV = 100 *(1+.05)^{1.5}$

- How useful it is?
- If you put $1,000 per year into bank at 4% interest, how much would you have saved after 40 years?
- Taking help of future value concept, the accumulated amount through the saving will be $98,826 – more than twice the $40,000 you invested
- How does it work?
- The first $1,000 is deposited for 40 years so its future value is
- $1,000 x $(1.04)^{40}$ = 4,801.02
- The 2nd $1,000 is deposited for 39 years so its future value is
- $1,000 x $(1.04)^{39}$ = 4,616.37
- And so on…..up to the $1,000 deposited in the 40th year
- Adding up all the future values gives you the amount of $98,826

Present Value

- Present Value (PV) is the value today (in the present) of a payment that is promised to be made in the future. OR
- Present Value is the amount that must be invested today in order to realize a specific amount on a given future date.
- To calculate present value we invert the future value calculation;
- We divide future value by one plus the interest rate (to find the present value of a payment to be made one year from now).
- Solving the Future Value Equation

$$FV = PV*(1+i)$$

- Present Value of an amount received in one year.

Example:

- $100 received in one year, i=5%
- PV=$100/ (1+.05) = $95.24
- Note:
- FV = PV*(1+i) = $95.24*(1.05) = $100
- For payments to be made more than one year from now we divide future value by one plus the interest rate raised to the n^{th} power where n is the number of years
- Present Value of $100 received n years in the future:

Example

Present Value of $100 received in 2 ½ years and an interest rate of 8%.

PV = $100 / $(1.08)^{2.5}$ = $82.50

Note:

FV =$82.50 * $(1.08)^{2.5}$ = $100

APPLICATION OF PRESENT VALUE CONCEPTS

- Application of Present Value Concept
- Compound Annual Rate
- Interest Rates vs. Discount Rate
- Internal Rate of Return
- Bond Pricing

Important Properties of Present Value

Present Value is higher:

- The higher the future value (FV) of the payment
- The shorter the time period until payment (n)
- The lower the interest rate (i)

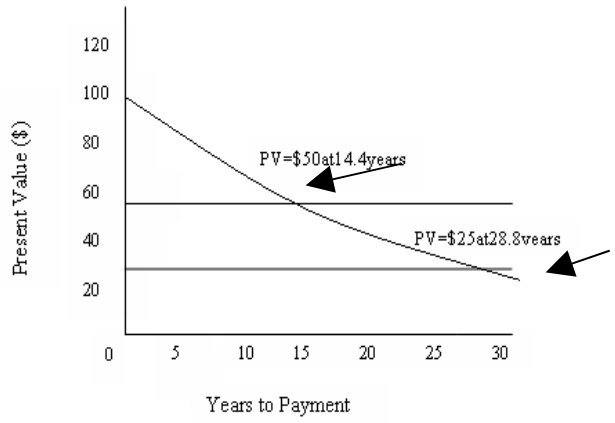
The size of the payment (FV_n)

- Doubling the future value of the payment (without changing time of the payment or interest rate), doubles the present value
- At 5% interest rate, $100 payment has a PV of $90.70
- Doubling it to $200, doubles the PV to $181.40
- Increasing or decreasing FV_n by any percentage will change PV by the same percentage in the same direction

The time until the payment is made (n)

- Continuing with the previous example of $100 at 5%, we allow the time to go from 0 to 30 years.
- This process shows us that the PV payment is worth $100 if it is made immediately, but gradually declines to $23 for a payment made in 30 years

Figure: Present value of $100 at 5% interest rate



The rule of 72

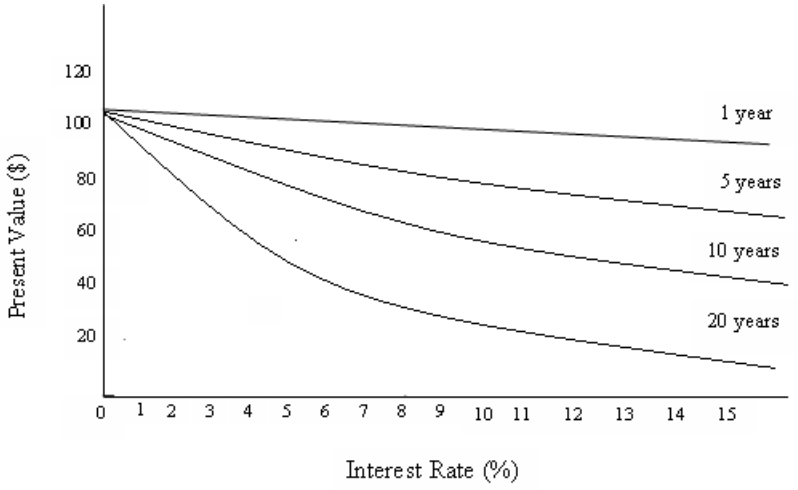
- For reasonable rates of return, the time it takes to double the money, is given approximately by
  t = 72 / i%
- If we have an interest rate of 10%, the time it takes for investment to double is:
  t = 72 / 10 = 7.2 years
- This rule is fairly applicable to discount rates in 5% to 20% range.

The Interest rate (i)

- Higher interest rates are associated with lower present values, no matter what size or timing of the payment
- At any fixed interest rate, an increase in the time until a payment is made reduces its present value

Table: Present Value of a $100 payment				
	Payment due in			
Interest rate	1 Year	5 Years	10 Years	20 Years
1%	$99.01	$95.15	$90.53	$81.95
2% **$3.77**	$98.04	$90.57	**$29.14** $82.03	$67.30
3% **4%**	$97.09	$86.26	**32%** $74.41	$55.37
4%	$96.15	$82.19	$67.56	$45.64
5%	$95.24	$78.35	$61.39	$37.69
6%	$94.34	$74.73	$55.84	$31.18
7%	$93.46	$71.30	$50.83	$25.84
8%	$92.59	$68.06	$46.32	$21.45
9%	$91.74	$64.99	$42.24	$17.84
10%	$90.91	$62.09	$38.55	$14.86
11%	$90.09	$59.35	$35.22	$12.40
12%	$89.29	$56.74	$32.20	$10.37
13%	$88.50	$54.28	$29.46	$8.68
14%	$87.72	$51.94	$26.97	$7.28
15%	$86.96	$49.72	$24.72	$6.11

Figure: The relationship between Present value and Interest Rates



Compound Annual Rates

- Comparing changes over days, months, years and decades can be very difficult.
- The way to deal with such problems is to turn the monthly growth rate into compound-annual rate.
- An investment whose value grows 0.5% per month goes from 100 at the beginning of the month to 100.5 at the end of the month:

  We can verify this as following

$$100 \left(\frac{100.5-100}{100}\right) = [(100.5/100) - 1] = 0.5\%$$

- What if the investment's value continued to grow at 0.5% per month for next 12 months?

- We cant simply multiply 0.5 by 12
- Instead we need to compute a 12 month compound rate
- So the future value of 100 at 0.5 %(0.005) per month compounded for 12 months will be:
  $FV_n = PV(1+i)^n = 100(1.005)^{12} = 106.17$
- An increase of 6.17% which is greater than 6%, had we multiplied 0.5% by 12
- The difference between the two answers grows as the interest rate grows
- At 1% monthly rate, 12 month compounded rate is12.68%
- Another use for compounding is to compute the percentage change per year when we know how much an investment has grown over a number of years
- This rate is called average annual rate
- If an investment has increased 20%, from 100 to 120 over 5 years
- Is average annual rate is simply dividing 20% by 5?
- This way we ignore compounding effect
- Increase in 2nd year must be calculated as percentage of the investment worth at the end of 1st year
- To calculate the average annual rate, we revert to the same equation:

$FV_n = PV(1+i)^n$

$120 = 100(1 + i)^5$

Solving for i

$i = [(120/100)^{1/5} - 1] = 0.0371$

- 5 consecutive annual increases of 3.71% will result in an overall increase of 20%

Interest Rate and Discount Rate

- The interest rate used in the present value calculation is often referred to as the discount rate because the calculation involves discounting or reducing future payments to their equivalent value today.
- Another term that is used for the interest rate is yield
- Saving behavior can be considered in terms of a personal discount rate;
- People with a low rate are more likely to save, while people with a high rate are more likely to borrow
- We all have a discount rate that describes the rate at which we need to be compensated for postponing consumption and saving our income
- If the market offers an interest rate higher than the individual's personal discount rate, we would expect that person to save (and vice versa)
- Higher interest rates mean higher saving

Applying Present Value

- To use present value in practice we need to look at a sequence or stream of payments whose present values must be summed. Present value is additive.
- To see how this is applied we will look at internal rate of return and the valuation of bonds

Internal Rate of Return

- The Internal Rate of Return is the interest rate that equates the present value of an investment with it cost.
- It is the interest rate at which the present value of the revenue stream equals the cost of the investment project.
- In the calculation we solve for the interest rate

A machine with a price of $1,000,000 that generates $150,000/year for 10 years

$1,000,000	$150,000	$150,000	$150,000	.....	$150,000

Solving for i, i=.0814 or 8.14%

- The internal rate of return must be compared to a rate of interest that represents the cost of funds to make the investment.
- These funds could be obtained from retained earnings or borrowing. In either case there is an interest cost
- An investment will be profitable if its internal rate of return exceeds the cost of borrowing

BOND PRICING & RISK

- Bond Pricing
- Real Vs Nominal Interest Rates
- Risk
- Characteristics
- Measurement

Bond Pricing

- A bond is a promise to make a series of payments on specific future date.
- It is a legal contract issued as part of an arrangement to borrow
- The most common type is a coupon bond, which makes annual payments called coupon payments
- The percentage rate is called the coupon rate
- The bond also specifies a maturity date (n) and has a final payment (F), which is the principal, face value, or par value of the bond
- The price of a bond is the present value of its payments
- To value a bond we need to value the repayment of principal and the payments of interest

Valuing the Principal Payment

- A straightforward application of present value where n represents the maturity of the bond
- Valuing the Coupon Payments:
- Requires calculating the present value of the payments and then adding them; remember, present value is additive
- Valuing the Coupon Payments plus Principal
- Means combining the above

Payment stops at the maturity date. (n)

A payment is for the face value (F) or principle of the bond

Coupon Bonds make annual payments called, Coupon Payments (C), based upon an interest rate, the coupon rate (i_c), $C=i_c*F$

A bond that has a $100 principle payment in n years. The present Value (P_{BP}) of this is now:

$$P_{BP} \quad \frac{F}{(1 \quad i)^n} \quad \frac{\$100}{(1 \quad i)^n}$$

If the bond has n coupon payments (C), where $C= i_c * F$, the Present Value (P_{CP}) of the coupon payments is:

$$P_{CP} \quad \frac{C}{(1 \quad i)^1} \quad \frac{C}{(1 \quad i)^2} \quad \frac{C}{(1 \quad i)^3} \quad \cdots\cdots \quad \frac{C}{(1 \quad i)^n}$$

Present Value of Coupon Bond (P_{CB}) = Present value of Yearly Coupon Payments (P_{CP}) + Present Value of the Principal Payment (P_{BP})

$$P_{CB} \quad P_{CP} \quad P_{BP} \quad \frac{C}{(1\ i)^1} \quad \frac{C}{(1\ i)^2} \quad \frac{C}{(1\ i)^3} \quad \cdots\cdots \quad \frac{C}{(1\ i)^n} \quad \frac{F}{(1\ i)^n}$$

Note:

- The value of the coupon bond rises when the yearly coupon payments rise and when the interest rate falls
- Lower interest rates mean higher bond prices and vice versa.
- The value of a bond varies inversely with the interest rate used to discount the promised payments

Real and Nominal Interest Rates

- So far we have been computing the present value using nominal interest rates (i), or interest rates expressed in current-dollar terms
- But inflation affects the purchasing power of a dollar, so we need to consider the real interest rate (r), which is the inflation-adjusted interest rate.
- The Fisher equation tells us that the nominal interest rate is equal to the real interest rate plus the expected rate of inflation

Fisher Equation:

$$i = r + \square^{e}$$

Or

$$r = i - \pi^{e}$$

Figure: Nominal Interest rates, Inflation, and real interest rates

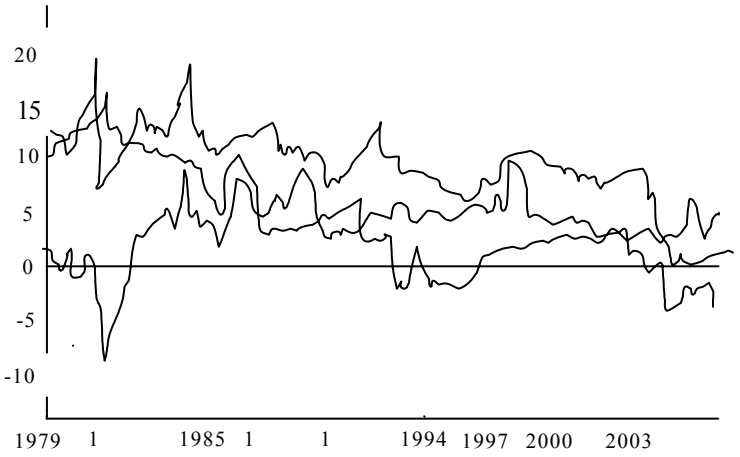
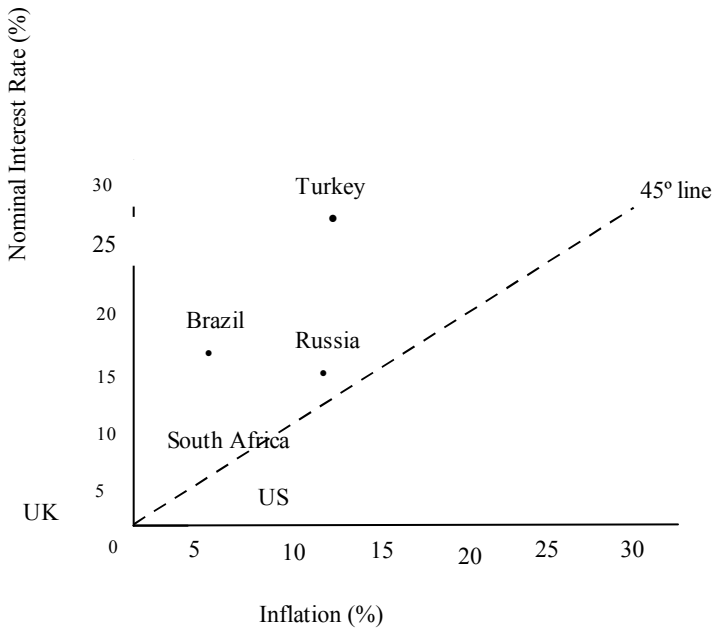


Figure: Inflation and Nominal Interest Rates, April 2004



Risk

- Every day we make decisions that involve financial and economic risk.
- How much car insurance should we buy?
- Should we refinance the home loan now or a year from now?
- Should we save more for retirement, or spend the extra money on a new car?
- Interestingly enough, the tools we use today to measure and analyze risk were first developed to help players analyze games of chance.
- For thousands of years, people have played games based on a throw of the dice, but they had little understanding of how those games actually worked
- Since the invention of probability theory, we have come to realize that many everyday events, including those in economics, finance, and even weather forecasting, are best thought of as analogous to the flip of a coin or the throw of a die
- Still, while experts can make educated guesses about the future path of interest rates, inflation, or the stock market, their predictions are really only that—guess.
- And while meteorologists are fairly good at forecasting the weather a day or two ahead, economists, financial advisors, and business gurus have dismal records.
- So understanding the possibility of various occurrences should allow everyone to make better choices. While risk cannot be eliminated, it can often be managed effectively.
- Finally, while most people view risk as a curse to be avoided whenever possible, risk also creates opportunities.
- The payoff from a winning bet on one hand of cards can often erase the losses on a losing hand.
- Thus the importance of probability theory to the development of modern financial markets is hard to overemphasize.
- People require compensation for taking risks. Without the capacity to measure risk, we could not calculate a fair price for transferring risk from one person to another, nor could we price stocks and bonds, much less sell insurance.
- The market for options didn't exist until economists learned how to compute the price of an option using probability theory
- We need a definition of risk that focuses on the fact that the outcomes of financial and economic decisions are almost always unknown at the time the decisions are made.
- Risk is a measure of uncertainty about the future payoff of an investment, measured over some

Characteristics of risk

- Risk can be quantified.
- Risk arises from uncertainty about the future.
- Risk has to do with the future payoff to an investment, which is unknown.
- Our definition of risk refers to an investment or group of investments.
- Risk must be measured over some time horizon.
- Risk must be measured relative to some benchmark, not in isolation.
- If you want to know the risk associated with a specific investment strategy, the most appropriate benchmark would be the risk associated with other investing strategies

Measuring Risk

Measuring Risk requires:

- List of all possible outcomes
- Chance of each one occurring
- The tossing of a coin
- What are possible outcomes?
- What is the chance of each one occurring?
- Is coin fair?
- Probability is a measure of likelihood that an even will occur
- Its value is between zero and one
- The closer probability is to zero, less likely it is that an event will occur.
- No chance of occurring if probability is exactly zero
- The closer probability is to one, more likely it is that an event will occur.
- The event will definitely occur if probability is exactly one
- Probabilities can also be expressed as frequencies

Table: A Simple Example: All Possible Outcomes of a Single Coin Toss		
Possibilities	**Probability**	**Outcome**
#1	1/2	Heads
#2	1/2	Tails

- We must include all possible outcomes when constructing such a table
- The sum of the probabilities of all the possible outcomes must be 1, since one of the possible outcomes must occur (we just don't know which one)
- To calculate the expected value of an investment, multiply each possible payoff by its probability and then sum all the results. This is also known as the mean.

Case 1

An Investment can rise or fall in value. Assume that an asset purchased for $1000 is equally likely to fall to $700 or rise to $1400

Table: Investing $1,000: Case 1			
Possibilities	**Probability**	**Payoff**	**Payoff ×Probability**
#1	1/2	$700	$350
#2	1/2	$1,400	$700
Expected Value = Sum of (Probability times Payoff) = $1,050			

Expected Value = ½ ($700) + ½ ($1400) = $1050

Case2

The $1,000 investment might pay off

- $100 (prob=.1) or
- $2000 (prob=.1) or
- $700 (prob=.4) or
- $1400 (prob=.4)

Table: Investing $1,000: Case 2			
Possibilities	**Probability**	**Payoff**	**Payoff ×Probability**
#1	0.1	$100	$10
#2	0.4	$700	$280
#3	0.4	$1,400	$560
#4	0.1	$2,000	$200
Expected Value = Sum of (Probability times Payoff) = $1,050			

- Investment payoffs are usually discussed in percentage returns instead of in dollar amounts; this allows investors to compute the gain or loss on the investment regardless of its size
- Though both cases have the same expected return, $50 on a $1000 investment, or 5%, the two investments have different levels or risk.
- A wider payoff range indicates more risk.

MEASURING RISK

- Measuring Risk
- Variance and Standard Deviation
- Value at Risk (VAR)
- Risk Aversion & Risk Premium

Measuring Risk

- Most of us have an intuitive sense for risk and its measurement;
- The wider the range of outcomes the greater the risk
- A financial instrument with no risk at all is a risk-free investment or a risk-free asset;
- Its future value is known with certainty and
- Its return is the risk-free rate of return
- If the risk-free return is 5 percent, a $1000 risk-free investment will pay $1050, its expected value, with certainty.
- If there is a chance that the payoff will be either more or less than $1050, the investment is risky.
- We can measure risk by measuring the spread among an investment's possible outcomes. There are two measures that can be used:
- Variance and Standard Deviation
- Measure of spread
- Value at Risk (VAR)
- Measure of riskiness of worst case

Variance

- The variance is defined as the probability weighted average of the squared deviations of the possible outcomes from their expected value
- **To calculate the variance of an investment, following steps are involved:**
- Compute expected value
- Subtract expected value from each possible payoff
- Square each result
- Multiply by its probability
- Add up the results
- **Compute the expected value:**

  ($1400 x ½) + ($700 x ½) = $1050.
- **Subtract this from each of the possible payoffs:**

  $1400-$1050= $350

  $700-$1050= –$350
- **Square each of the results:**

  $350^2 = 122,500(dollars)^2 and

  (–$350)^2 = 122,500(dollars)^2
- **Multiply each result times its probability and adds up the results:**

  ½ [122,500(dollars)^2] + ½ [122,500(dollars)^2]

  = 122,500(dollars)^2

More compactly;

Variance = ½($1400-$1050)^2 + ½($700-$1050)^2

= 122,500(dollars)^2

Standard Deviation

The standard deviation is the square root of the variance, or:

Standard Deviation (case 1) =$350
Standard Deviation (case 2) =$528

- The greater the standard deviation, the higher the risk
- It more useful because it is measured in the same units as the payoffs (that is, dollars and not squared dollars)
- The standard deviation can then also be converted into a percentage of the initial investment, providing a baseline against which we can measure the risk of alternative investments
- Given a choice between two investments with the same expected payoff, most people would choose the one with the lower standard deviation because it would have less risk

Value at Risk

- Sometimes we are less concerned with the spread of possible outcomes than we are with the value of the worst outcome.
- To assess this sort of risk we use a concept called "value at risk."
- Value at risk measures risk at the maximum potential loss

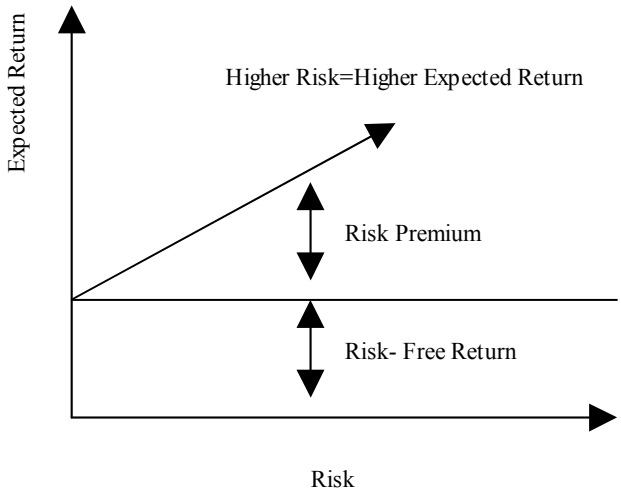
Risk Aversion

- Most people don't like risk and will pay to avoid it; most of us are risk averse
- A risk-averse investor will always prefer an investment with a certain return to one with the same expected return, but any amount of uncertainty.
- Buying insurance is paying someone to take our risks, so if someone wants us to take on risk we must be paid to do so

Risk Premium

- The riskier an investment – the higher the compensation that investors require for holding it – the higher the risk premium
- Riskier investments must have higher expected returns
- There is a trade-off between risk and expected return;
- You can't get a high return without taking considerable risk.

Figure: The Trade-off between Risk and Expected Return



The higher the risk, the higher the expected return. The risk premium equals the expected return on the risky investment minus the risk-free return.

EVALUATING RISK

- Sources of Risk
- Idiosyncratic
- Systematic
- Reducing Risk through Diversification
- Hedging Risk
- Spreading Risk
- Bond and Bond Pricing

How to Evaluate Risk

- Lets go back to our previous example where $1,000 yields either $1,400 and $700 with equal probability
- If we think about this investment in terms of gains and losses, this investment offers an equal chance of gaining $400 or loosing $300
- Should you take the risk?

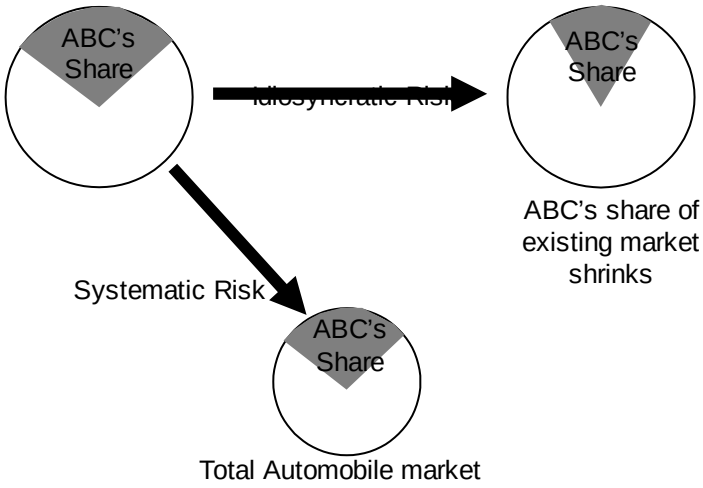
Table: Evaluating the Risk of a $1,000 investment	
A. The Gain	
Payoff	**Probability**
+ $400	½
$0	½
B. The Loss	
Payoff	**Probabilities**
$0	½
- $300	½

Deciding if a risk is worth taking

- List all the possible outcomes or payoffs
- Assign a probability to each possible payoff
- Divide the payoffs into gains and losses
- Ask how much you would be willing to pay to receive the gain
- Ask how much you would be willing to pay to avoid the loss
- If you are willing to pay more to receive the gain than to avoid the loss, you should take the risk

Sources of Risk

- Risk is everywhere. It comes in many forms and from almost every imaginable place
- Regardless of the source, risks can be classified as either idiosyncratic or systematic
- Idiosyncratic, or unique, risks affect only a small number of people.
- Systematic risks affect everyone.
- In the context of the entire economy,
- Higher oil prices would be an idiosyncratic risk and
- Changes in general economic conditions would be systematic risk.



Reducing Risk through Diversification

- Risk can be reduced through diversification, the principle of holding more than one risk at a time.
- Holding several different investments reduces the overall risk that an investor bears
- A combination of risky investments is often less risky than any one individual investment
- There are two ways to diversify your investments:
- You can hedge risks or
- You can spread them among the many investments

Hedging Risk

- Hedging is the strategy of reducing overall risk by making two investments with opposing risks.
- When one does poorly, the other does well, and vice versa.
- So while the payoff from each investment is volatile, together their payoffs are stable.

Table: Payoffs on Two Separate Investments of $100			
	Payoff from Owning Only		
Possibility	**ABC Electric**	**XYZ Oil**	**Probability**
Oil price rises	$100	$120	1/2
Oil price falls	$120	$100	1/2

Let's compare three strategies for investing $100, given the relationships shown in the table:

- Invest $100 in ABC Electric
- Invest $100 in XYZ Oil
- Invest half in each company – $50 in ABC and $50 in XYZ

Table: Results of Possible Investment Strategies: Hedging Risk, Initial Investment = $100		
Investment Strategy	**Expected Payoff**	**Standard Deviation**
ABC Only	$110	$10
XYZ Only	$110	$10
½ and ½	$110	$0

Spreading Risk

- Investments don't always move predictably in opposite directions, so you can't always reduce risk through hedging
- You can lower risk by simply spreading it around and finding investments whose payoffs are completely unrelated
- The more independent sources of risk you hold the lower your overall risk
- Adding more and more independent sources of risk reduces the standard deviation until it becomes negligible.
- Consider three investment strategies:

a. ABC Electric only,
b. EFG Soft only, and
c. Half in ABC and half in EFG

- The expected payoff on each of these strategies is the same: $110.
- For the first two strategies, $100 in either company, the standard deviation is still 10, just as it was before.
- But for the third strategy, $50 in ABC and $50 in EFG, the analysis is more complicated.
- There are four possible outcomes, two for each stock

Table: Payoffs from Investing $50 in each of two Stocks
Initial Investment = $100

Possibilities	ABC	EFG Soft	Total Payoff	Probability
#1	$60	$60	$120	¼
#2	$60	$50	$110	¼
#3	$50	$60	$110	¼
#4	$50	$50	$100	¼

Table: Results of Possible Investment Strategies:
Spreading Risk
Initial Investment = $100

Investment Strategy	Expected Payoff	Standard Deviation
ABC	$110	$10
EFG Soft	$110	$10
½ and ½	$110	$7.1

Lesson 13

BONDS & BONDS PRICING

- Bond & Bond pricing
- Zero Coupon Bond
- Fixed Payment Loan
- Coupon Bonds
- Consols
- Bond Yield
- Yield to Maturity
- Current Yield

Bonds

- Virtually any financial arrangement involving the current transfer of resources from a lender to a borrower, with a transfer back at some time in the future, is a form of bond.
- Car loans, home mortgages, even credit card balances all create a loan from a financial intermediary to an individual making a purchase
- Governments and large corporations sell bonds when they need to borrow
- The ease with which individuals, corporations, and governments borrow is essential to the functioning of our economic system.
- Without this free flow of resources through the bond markets, the economy would grind to a halt.
- Historically, we can trace the concept of using bonds to borrow to monarchs' almost insatiable appetite for resources.
- The Dutch invented modern bonds to finance their lengthy war of independence
- The British refined the use of bonds to finance government activities.
- The practice was soon popular among other countries
- A standard bond specifies the fixed amount to be paid and the exact dates of the payments
- How much should you be paying for a bond?
- The answer depends on bond's characteristics

Bond Prices

- **Zero-coupon bonds**
- Promise a single future payment, such as a Treasury bill.
- **Fixed payment loans**
- Conventional mortgages.
- Car loans
- **Coupon Bonds**
- Make periodic interest payments and repay the principal at maturity.
- Treasury Bonds and most corporate bonds are coupon bonds.
- **Consols**
- Make periodic interest payments forever, never repaying the principal that was borrowed.

Zero-Coupon Bonds

- These are pure discount bonds since they sell at a price below their face value
- The difference between the selling price and the face value represents the interest on the bond
- The price of such a bond, like a Treasury bill (called "T-bill"), is the present value of the future payment

Price of a $100 face value zero-coupon bond

$$\frac{\$100}{(1+i)^n}$$

Where

i is the interest rate in decimal form and

n is time until the payment is made in the same time units as the interest rate

- Given n, the price of a bond and the interest rate move in opposite directions
- The most common maturity of a T-bill is 6 months; the Treasury does not issue them with a maturity greater than 1 year
- The shorter the time until the payment is made the higher the price of the bond, so 6 month T-bills have a higher price that a one-year T-bill

Examples: Assume i=4%

Price of a One-Year Treasury bill

$$\frac{100}{(1+0.04)} \quad \$96.15$$

Price of a Six-Month Treasury bill

$$\frac{100}{(1+0.04)^{1/2}} \quad \$98.06$$

- The interest rate and the price for the T-bill move inversely.
- If we know the face value and the price then we can solve for the interest rate

Fixed Payment Loans

- They promise a fixed number of equal payments at regular intervals
- Home mortgages and car loans are examples of fixed payment loans;
- These loans are amortized, meaning that the borrower pays off the principal along with the interest over the life of the loan.
- Each payment includes both interest and some portion of the principal
- The price of the loan is the present value of all the payments

Value of a Fixed Payment Loan =

$$\frac{FixedPayment}{(1+i)} \quad \frac{FixedPayment}{(1+i)^2} \quad \cdots \quad \frac{FixedPayment}{(1+i)^n}$$

Coupon Bond

The value of a coupon bond is the present value of the periodic interest payments plus the present value of the principal repayment at maturity

$$P_{CB} \quad \frac{CouponPayment}{(1+i)^1} \quad \frac{CouponPayment}{(1+i)^2} \quad \cdots\cdots \quad \frac{CouponPayment}{(1+i)^n} \quad \frac{FaceValue}{(1+i)^n}$$

The latter part, the repayment of the principal, is just like a zero-coupon bond.

Consols

- A consol offers only periodic interest payments; the borrower never repays the principal
- There are no privately issued consols because only governments can credibly promise to make payments forever
- The price of a consol is the present value of all the future interest payments, which is a bit complicated because there are an infinite number of payments

Bond Yields

- Now that we know how to price a bond while interest rate is known; we now move to other direction and calculate the interest rate or return to an investor
- So combining information about the promised payments with the price to obtain what is called the yield – a measure of cost of borrowing or reward for lending.
- Interest rate and yield are used interchangeably

Yield to Maturity

- The most useful measure of the return on holding a bond is called the yield to maturity (YTM).
- This is the yield bondholders receive if they hold the bond to its maturity when the final principal payment is made
- It can be calculated from the present value formula
  Price of One-Year 5 percent Coupon Bond =

$$\frac{\$5}{(1 \quad i)} \quad \frac{\$100}{(1 \quad i)}$$

- The value of i that solves this equation is the yield to maturity
- If the price of the bond is $100, then the yield to maturity equals the coupon rate.
- Since the price rises as the yield falls, when the price is above $100, the yield to maturity must be below the coupon rate.
- Since the price falls as the yield rises, when the price is below $100, the yield to maturity must be above the coupon rate.

Yield to Maturity

- Considering 5% coupon bond
- If YTM is 5% then price is

$$\frac{\$5}{(1 \quad .05)} \quad \frac{\$100}{(1 \quad .05)} = \$100$$

- If YTM is 4% then price is

$$\frac{\$5}{(1 \quad .04)} \quad \frac{\$100}{(1 \quad .04)} = \$100.96$$

- If YTM is 6% then price is

$$\frac{\$5}{(1 \quad .06)} \quad \frac{\$100}{(1 \quad .06)} = \$99.06$$

- Generally
- If the yield to maturity equals the coupon rate, the price of the bond is the same as its face value.
- If the yield is greater than the coupon rate, the price is lower;
- If the yield is below the coupon rate, the price is greater

YIELD TO MATURIRY

- Yield to Maturity
- Current Yield
- Holding Period Returns
- Bond Supply & Demand
- Factors affecting Bond Supply
- Factors affecting Bond Demand

Yield to Maturity: General Relationships

- General Relationships
- If the yield to maturity equals the coupon rate, the price of the bond is the same as its face value.
- If the yield is greater than the coupon rate, the price is lower;
- if the yield is below the coupon rate, the price is greater
- If you buy a bond at a price less than its face value you will receive its interest and a capital gain, which is the difference between the price and the face value.
- As a result you have a higher return than the coupon rate
- When the price is above the face value, the bondholder incurs a capital loss and the bond's yield to maturity falls below its coupon rate.

Table: Relationship between Price and Yield to Maturity	
YTM on a 10% Coupon rate bond maturing in ten years (Face Value = $1,000)	
Price of Bond ($)	**Yield to Maturity (%)**
1,200	7.13
1,100	8.48
1,000	10.00
900	11.75
800	13.81

Three Interesting Facts in the above Table
1. When bond is at par, yield equals coupon rate
2. Price and yield are negatively related
3. Yield greater than coupon rate when bond price is below par value

Current Yield

- Current yield is a commonly used, easy-to-compute measure of the proceeds the bondholder receives for making a loan
- It is the yearly coupon payment divided by the price

$$\text{Current Yield} \quad \frac{\text{Yearly Coupon Payment}}{\text{Price Paid}}$$

- The current yield measures that part of the return from buying the bond that arises solely from the coupon payments;
- It ignores the capital gain or loss that arises when the bond's price differs from its face value
- Let's return to 1-year 5% coupon bond assuming that it is selling for $99.
- Current yield is 5/99 = 0.0505 or 5.05%
- YTM for this bond is calculated to be 6.06% through the following calculations

$$\frac{\$5}{(1 \quad i)} \quad \frac{\$100}{(1 \quad i)} = \$99$$

- If you buy the bond for $99, one year later you get not only the $5 coupon payment but also a guaranteed $1 capital gain, totaling to $6

- Repeating this process for the bond selling for $101, current yield is 4.95% and YTM is 3.96%
- The current yield moves inversely to the price;
- If the price is above the face value, the current yield falls below the coupon rate.
- When the price falls below the face value, the current yield rises above the coupon rate.
- If the price and the face value are equal the current yield and the coupon rate are equal.
- Since the yield to maturity takes account of capital gains (and losses),
- When the bond price is less than its face value the yield to maturity is higher than the current yield,
- If the price is greater than face value, the yield to maturity is lower than the current yield, which is lower than the coupon rate

Relationship between a Bond's Price and its Coupon Rate, Current Yield and Yield to Maturity

- Bond Price < Face Value:
  Coupon Rate < Current Yield < Yield to Maturity
- Bond Price = Face Value:
  Coupon Rate = Current Yield = Yield to Maturity
- Bond Price > Face Value:
  Coupon Rate > Current Yield > Yield to Maturity

Holding Period Returns

- The investor's return from holding a bond need not be the coupon rate
- Most holders of long-term bonds plan to sell them well before they mature, and because the price of the bond may change in the time since its purchase, the return can differ from the yield to maturity
- The holding period return – the return to holding a bond and selling it before maturity.
- The holding period return can differ from the yield to maturity
- The longer the term of the bond, the greater the price movements and associated risk can be

Examples:

- You pay for $100 for a 10-year 6% coupon bond with a face value of $100, you intend to hold the bond for one year, i.e. buy a 10 year bond and sell a 9 year bond an year later
- If interest rate does not change your return will be $6/100 = 0.06 = 6%
- If interest rate falls to 5% over the year then through using bond pricing formula we can see that
- You bought a 10-year bond for $100 and sold a 9-year bond for $107.11
- Now the one year holding return has two parts
- $6 coupon payment and
- $7.11 capital gain
- So now, one year holding Period return =

$$\frac{\$6}{\$100} \quad \frac{\$107.11 \quad \$100}{\$100} \quad \frac{\$13.11}{\$100} \quad .1311$$

Or 13.11%

If the interest rate in one year is 7%...

One year holding Period return =

$$\frac{\$6}{\$100} \quad \frac{\$93.48 \quad \$100}{\$100} \quad \frac{\$.52}{\$100} \quad .0052$$

Or -0.52%

Generalizing, 1-year holding return is

$$\frac{\text{Yearly Coupon Payment}}{\text{Price Paid}} \quad \frac{\text{Change in Price of the Bond}}{\text{Price of the Bond}}$$

Current Yield Capital Gain (as a %)

Bond Market and Interest Rates

- To find out how bond prices are determined and why they change we need to look at the supply and demand in the bond market.
- Let's consider the market for existing bonds at a particular time (the stock of bonds) and consider prices and not interest rates.
- One Year Zero-coupon (discount) Bond

$$P \quad \frac{\$100}{1 \quad i} \quad \text{or} \quad i \quad \frac{\$100 \quad P}{P}$$

Bond Supply, Demand and Equilibrium

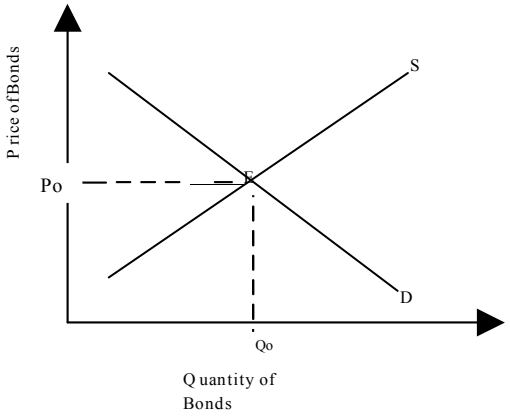
Bond Supply

- The Bond supply curve is the relationship between the price and the quantity of bonds people are willing to sell, all other things being equal.
- From the point of view of investors, the higher the price, the more tempting it is to sell a bond they currently hold.
- From the point of view of companies seeking finance for new projects, the higher the price at which they can sell bonds, the more advantageous it is to do so.
- For a $100 one-year zero-coupon bond, the supply will be higher at $95 than it will be at $90, all other things being equal.

Bond Demand

- The bond demand curve is the relationship between the price and quantity of bonds that investors demand, all other things being equal.
- As the price falls, the reward for holding the bond rises, so the demand goes up
- The lower the price potential bondholders must pay for a fixed-dollar payment on a future date, the more likely they are to buy a bond
- The zero-coupon bond promising to pay $100 in one year will be more attractive at $90 than it will at $95, all other things being equal.

Figure: Supply, demand and equilibrium in the bond market



The supply of bonds from the borrowers slopes up and the demand for bonds from the lenders slopes down. Equilibrium in the bond market is determined by the interaction of supply and demand.

- Equilibrium in the bond market is the point at which supply equals demand.
- If the price is too high (above equilibrium) the excess supply of bonds will push the price back down.
- If the price is too low (below equilibrium) the excess demand for bonds will push it up
- Over time the supply and demand curves can shift, leading to changes in the equilibrium price

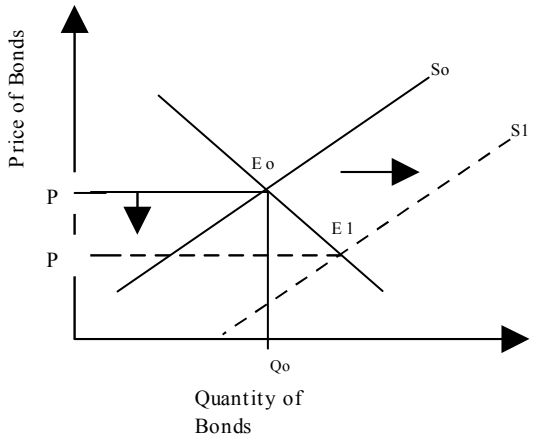
Factors that shift Bond Supply

- **Changes in government borrowing**
- Any increase in the government's borrowing needs increases the quantity of bonds outstanding, shifting the bond supply curve to the right.
- This reduces price and increases the interest rate on the bond.
- **Changes in business conditions**
- Business-cycle expansions mean more investment opportunities, prompting firms to increase their borrowing and increasing the supply of bonds
- As business conditions improve, the bond supply curve shifts to the right.
- This reduces price and increases the interest rate on the bond.
- By the same logic, weak economic growth can lead to rising bond prices and lower interest rates
- **Changes in expected inflation**
- Bond issuers care about the real cost of borrowing,
- So if inflation is expected to increase then the real cost falls and the desire to borrow rises, resulting in the bond supply curve shifting to the right
- This reduces price and increases the interest rate on the bond.

Table: Factors that increase Bond Supply, lower Bond Prices, and Raise Interest Rates

Change	Effect on Bond Supply, Bond Prices, and Interest Rates
An increase in the government's desired expenditure relative to its revenue	Bond Supply shifts to the right, Bond prices decrease and interest rates increase
An improvement in general business conditions	Bond Supply shifts to the right, Bond prices decrease and interest rates increase
An increase in expected inflation, reducing the real cost of repayment	Bond Supply shifts to the right, Bond prices decrease and interest rates increase

Figure: A shift in the supply of bonds



When borrower's desire for funds increases, the bond supply curve shifts to the right, lowering bond prices and raising interest rates.

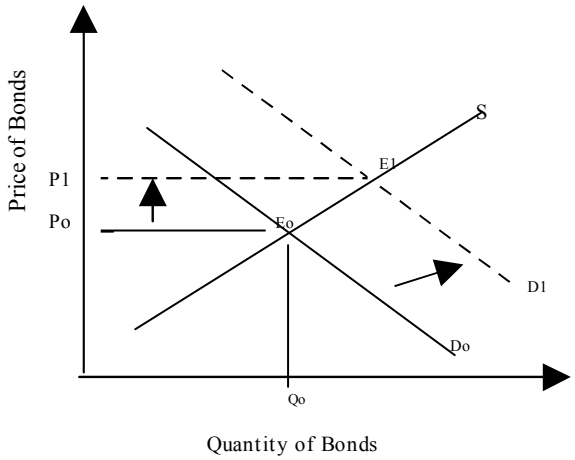
Factors that shift Bond Demand

- **Wealth**
- An increase in wealth shifts the demand for bonds to the right as wealthier people invest more.
- This will happen as the economy grows during an expansion.
- This will increase Bond Prices and lower yields.
- **Expected inflation**
- A fall in expected inflation shifts the bond demand curve to the right, increasing demand at each price and lowering the yield and increasing the Bond's price.
- **Expected return on stocks and other assets**
- If the return on bonds rises relative to the return on alternative investments, the demand for bonds will rise.
- This will increase bond prices and lower yields.
- **Risk relative to alternatives**
- If a bond becomes less risky relative to alternative investments, the demand for the bond shifts to the right.
- **Liquidity of bonds relative to alternatives**
- When a bond becomes more liquid relative to alternatives, the demand curve shifts to the right

Table: Factors that increase Bond demand, raise Bond Prices, and lower Interest Rates

Change	Effect on Bond demand
An increase in wealth increases demand for all assets, including bonds	Bond demand shifts to the right, Bond prices increase and interest rates decrease
A reduction in expected inflation makes bonds with fixed nominal payments more desirable	Bond demand shifts to the right, Bond prices increase and interest rates decrease
An increase in expected return on the bond relative to the expected return on alternatives makes bonds more attractive	Bond demand shifts to the right, Bond prices increase and interest rates decrease
A decrease in the expected future interest rate makes bonds more attractive	Bond demand shifts to the right, Bond prices increase and interest rates decrease
A fall in the riskiness of the bond relative to the riskiness of alternatives makes bonds more attractive.	Bond demand shifts to the right, Bond prices increase and interest rates decrease
An increase in the liquidity of the bond relative to the liquidity of alternatives makes bonds more attractive	Bond demand shifts to the right, Bond prices increase and interest rates decrease

Figure: A shift in Bond Demand



When there is an increase in investor's willingness to hold bonds, the bond demand curve shifts to the right, increasing bond prices and reducing interest rates.

SHIFTS IN EQUILIBRIUM IN THE BOND MARKET & RISK

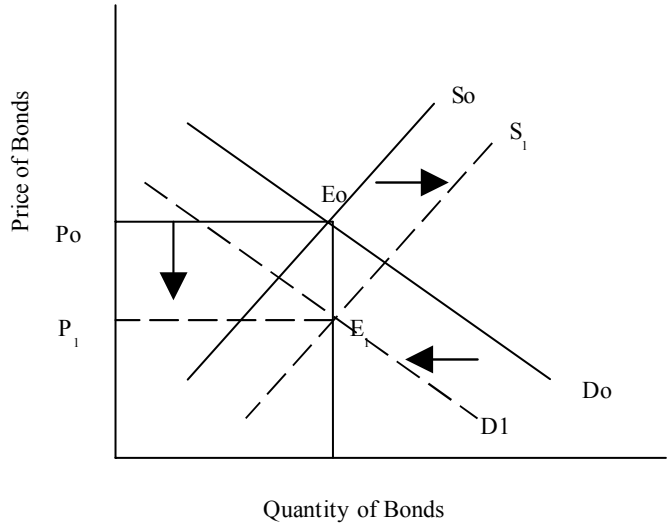
- Shifts in Equilibrium in bond market
- Bond and Risk
- Default Risk
- Inflation Risk
- Interest Rate Risk

Shifts in Equilibrium

An increase in expected inflation:

- An increase in expected inflation shifts bond supply to the right and bond demand to the left.
- The two effects reinforce each other, resulting in a lower bond price and a higher interest rate

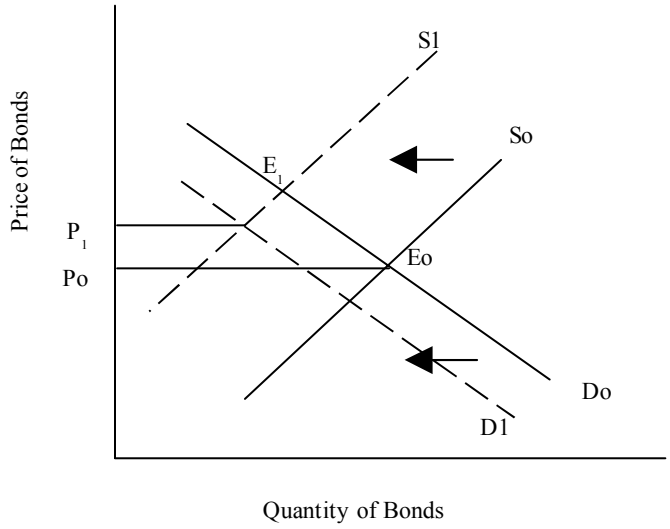
Figure: Effect of an increase in expected inflation



A business-cycle downturn:

- A business-cycle downturn shifts the bond supply to the left and the bond demand to the left.
- In this case the bond price can rise or fall, depending on which shift is greater.
- But interest rates tend to fall in recessions, so bond prices are likely to increase

Figure: Effect of a business cycle down turn



Bonds and Risk

Sources of Bond Risk

- Default Risk
- Inflation Risk
- Interest-Rate Risk

BONDS & SOURCES OF BOND RISK

- Bonds and Risk
- Default Risk
- Inflation Risk
- Interest Rate Risk
- Bond Ratings
- Bond Ratings and Risk
- Tax Effect

Bonds and Risk

Sources of Bond Risk

- Default Risk
- Inflation Risk
- Interest-Rate Risk

Default Risk

- There is no guarantee that a bond issuer will make the promised payments
- Investors who are risk averse require some compensation for bearing risk; the more risk, the more compensation they demand
- The higher the default risk the higher the probability that bondholders will not receive the promised payments and thus, the higher the yield
- Suppose risk-free rate is 5%
- ZEDEX Corp. issues one-year bond at 5%
- Price without risk = ($100 + $5)/1.05 = $100
- Suppose there is 10% probability that ZEDEX Corp. goes bankrupt, get nothing
- Two possible payoffs: $105 and $0

Table: Expected Value of ZEDEX Bond Payment			
Possibilities	**Payoff**	**Probability**	**Payoff × Probabilities**
Full Payment	$105	0.90	$94.50
default	$0	0.10	$0
Expected Value= Sum of Payoffs times Probabilities = $94.50			

- Expected PV of ZEDEX bond payment = $94.5/1.05 = $90
- If the promised payment is $105, YTM will be $105/90 – 1 = 0.1667 or 16.67%
- Default risk premium = 16.67% - 5% = 11.67%

Inflation Risk

- Bonds promise to make fixed-dollar payments, and bondholders are concerned about the purchasing power of those payments
- The nominal interest rate will be equal to the real interest rate plus the expected inflation rate plus the compensation for inflation risk
- The greater the inflation risk, the larger will be the compensation for it
- Assuming real interest rate is 3% with the following information

Probabilities			
Inflation	**Case I**	**Case II**	**Case III**
1%	0.50	0.25	0.10
2%	-	0.50	0.80
3%	0.50	0.25	0.10
Expected Inflation	2%	2%	2%
Standard Deviation	1.0%	0.71%	0.45%

Nominal rate = 3% real rate + 2% expected inflation + compensation for inflation risk

Interest-Rate Risk

- Interest-rate risk arises from the fact that investors don't know the holding period yield of a long-term bond.
- If you have a short investment horizon and buy a long-term bond you will have to sell it before it matures, and so you must worry about what happens if interest rates change
- Because the price of long-term bonds can change dramatically, this can be an important source of risk

Bond Ratings

- The risk of default (i.e., that a bond issuer will fail to make a bond's promised payments) is one of the most important risks a bondholder faces, and it varies among issuers.
- Credit rating agencies have come into existence to assess the default risk of different issuers
- The bond ratings are an assessment of the creditworthiness of the corporate issuer.
- The definitions of creditworthiness used by the rating agencies are based on how likely the issuer firm is to default and the protection creditors have in the event of a default.
- These ratings are concerned only with the possibility of the default. Since they do not address the issue of interest rate risk, the price of a highly rated bond may be quite volatile.

Long Term Ratings by PACRA

InvestmentGrades:

- **AAA:** Highest credit quality. 'AAA' ratings denote the lowest expectation of credit risk.
- **AA:** Very high credit quality. 'AA' ratings denote a very low expectation of credit risk.
- **A:** High credit quality. 'A' ratings denote a low expectation of credit risk.
- **BBB:** Good credit quality. 'BBB' ratings indicate that there is currently a low expectation of credit risk.

SpeculativeGrades:

- **_BB:** Speculative.
- **'BB'** ratings indicate that there is a possibility of credit risk developing,
- **B:** Highly speculative. 'B' ratings indicate that significant credit risk is present, but a limited margin of safety remains.
- **CCC, CC, C:** High default risk. Default is a real possibility.

Short Term Ratings by PACRA

- **A1+:** highest capacity for timely repayment
- **A1**: Strong capacity for timely repayment
- **A2**: satisfactory capacity for timely repayment may be susceptible to adverse economic conditions
- **A3**: an adequate capacity for timely repayment. More susceptible to adverse economic condition

B: timely repayment is susceptible to adverse changes in business, economic, or financial conditions

C: an inadequate capacity to ensure timely repayment

D: high risk of default or which are currently in default

Bond Ratings and Risk

Bond Ratings

- Moody's and Standard & Poor's

Ratings Groups

- Investment Grade
- Non-Investment – Speculative Grade
- Highly Speculative

Commercial Paper Ratings

- Moody's and Standard & Poor's

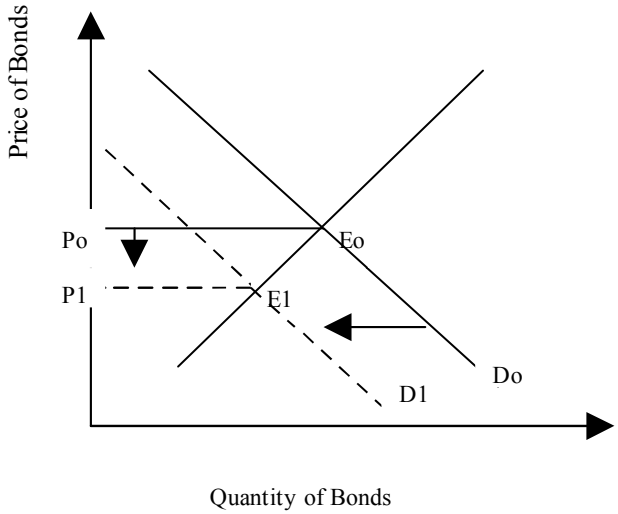
Rating Groups

- Investment
- Speculative
- Default

Bond (Credit) Ratings		
S & P	**Moody's**	**What it means**
AAA	Aaa	Highest quality and credit worthiness
AA	Aa	Slightly less likely to pay principal + interest
A	A	Strong capacity to make payments, upper medium grades
BBB	Baa	Medium grade, adequate capacity to make payments
BB	Ba	Moderate ability to pay, speculative element, vulnerable
B	B	Not desirable investment, long term payment doubtful
CCC	Caa	Poor standing, known vulnerabilities, doubtful payment
CC	Ca	Highly speculative, high default likelihood, known reasons
C	C	Lowest rated class, most unlikely to reach investment grades
D		Already defaulted on payments
NR		No public rating has been requested
+ Or -	&1, 2, 3	Within-class refinement of AA to CCC ratings

The lower a bond's rating the lower its price and the higher its yield.

Figure: The effect of an increase in risk on equilibrium in the bond market



Increased risk reduces the demand for the bond at every price, shifting the demand curve to the left from Do to D1. The result is a decline in the equilibrium price and quantity in the market. Importantly, the price falls from Po to P1, so the yield on the bond must rise.

Increased Risk reduces Bond Demand

- The resulting shift to the left causes a decline in equilibrium price and an increase in the bond yield.
- A bond yield can be thought of as the sum of two parts:
- The yield on the Treasury bond (called "benchmark bonds" because they are close to being risk-free) and
- A risk spread or default risk premium
- If the bond ratings properly reflect the probability of default, then lower the rating of the issuer, the higher the default risk premium
- So we may conclude that when Treasury bond yields change, all other yields will change in the same direction

TAX EFFECT & TERM STRUCTURE OF INTEREST RATE

- Tax Effect
- Term Structure of Interest Rate
- Expectations Hypothesis
- Liquidity Premium

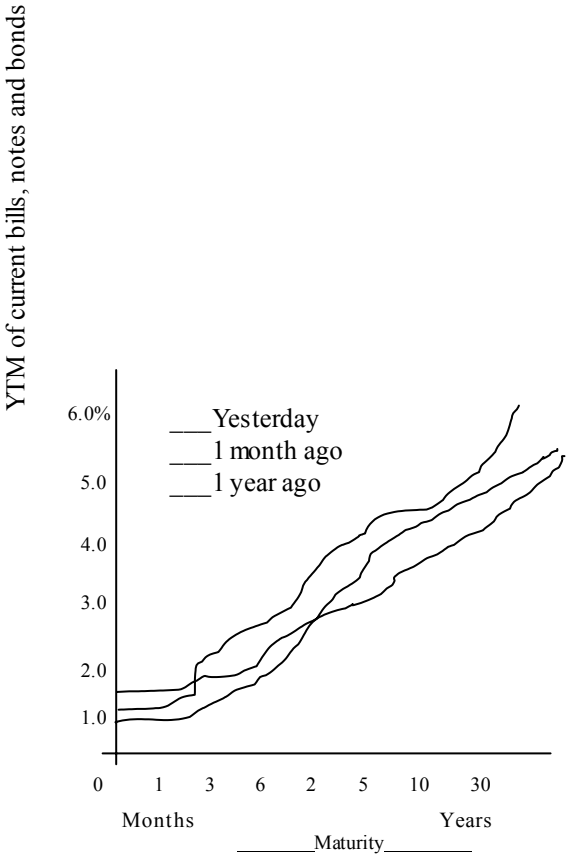
Tax Effect

- The second important factor that affects the return on a bond is taxes
- Bondholders must pay income tax on the interest income they receive from privately issued bonds (taxable bonds), but government bonds are treated differently
- Interest payments on bonds issued by state and local governments, called "municipal" or "tax-exempt" bonds are specifically exempt from taxation
- A tax exemption affects a bond's yield because it affects how much of the return the bondholder gets to keep
- Tax-Exempt Bond Yield = (Taxable Bond Yield) x (1- Tax Rate).

Term Structure of Interest Rates

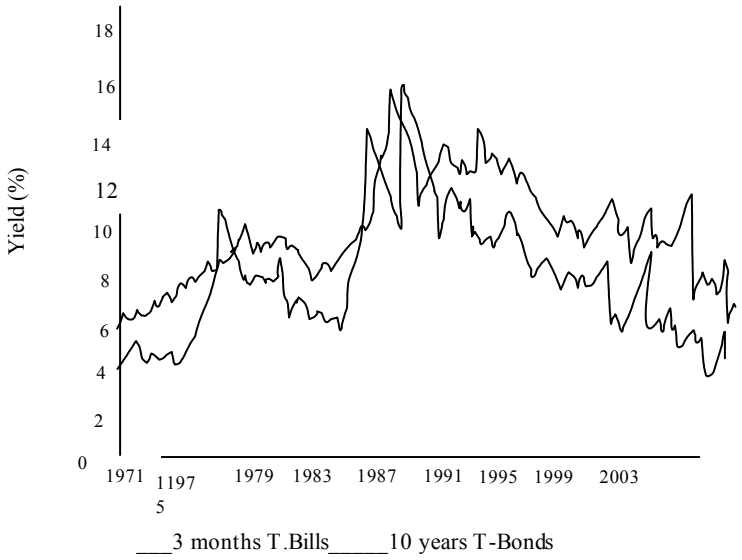
- The relationship among bonds with the same risk characteristics but different maturities is called the term structure of interest rates.
- A plot of the term structure, with the yield to maturity on the vertical axis and the time to maturity on the horizontal axis, is called the yield curve.

Figure: The U.S. Treasury Yield Curve



The figure plots the yields on Treasury bills and bonds for August 27, 2004.

Figure: The Term Structure of Treasury Interest Rates



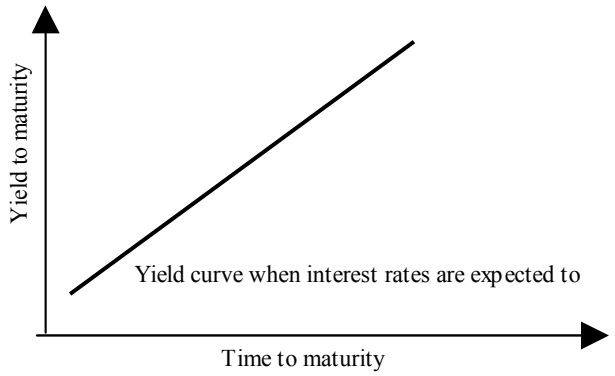
Term Structure "Facts"

- Interest Rates of different maturities tend to move together
- Yields on short-term bond are more volatile than yields on long-term bonds
- Long-term yields tend to be higher than short-term yields.

Expectations Hypothesis

- The risk-free interest rate can be computed, assuming that there is no uncertainty about the future
- Since certainty means that bonds of different maturities are perfect substitutes for each other, an investor would be indifferent between holding
- A two-year bond or
- A series of two one-year bonds
- Certainty means that bonds of different maturities are perfect substitutes for each other
- Assuming that current 1-year interest rate is 5%. The expectations hypothesis implies that the current 2-year interest rate should equal the average of 5% and 1-year interest rate one year in future.
- If future interest rate is 7%, then current 2-year interest rate will be (5+7) / 2 = 6%
- Therefore, when interest rates are expected to rise long-term rates will be higher than short-term rates and the yield curve will slope up (and vice versa)

Figure: Yield Curve



- From this we can construct investment strategies that must have the same yield.
- Assuming the investor has a two-year horizon, the investor can:
- Invest in a two-year bond and hold it to maturity
- Interest rate will be i_{2y}
- Investment will yield $(1 + i_{2y})(1 + i_{2y})$ two years later
- Invest in a one-year bond today and a second one a year from now when the first one matures
- Interest rate will be i^{e}_{y+1}
- Investment will yield $(1 + i_{1y})(1 + i^{e}_{y+1})$ in two years
- The hypothesis tells us that investors will be indifferent between the two strategies, so the strategies must have the same return
- Total return from 2 year bonds over 2 years

$$(1 \quad i_{2y})(1 \quad i_{2y})$$

- Return from one year bond and then another one year bond

$$(1 \quad i_{1y})(1 \quad i^{e}_{1y})$$

- If one and two year bonds are perfect substitutes, then:

$$(1 \quad i_{2y})(1 \quad i_{2y}) \quad (1 \quad i_{1y})(1 \quad {}^{e}_{1y})$$

Or

$$i_{1y} \quad i^{2}_{1y}$$

Or in general terms

$$i_{nt} \quad \frac{i_{1t} \quad i^{e}_{1t\ 1} \quad i^{e}_{1t\ 2} \quad \cdots \quad i^{e}_{1t\ n\ 1}}{n}$$

- Therefore the rate on the two-year bond must be the average of the current one-year rate and the expected future one-year rate
- Implications would be the same old
- Interest rates of different maturities tend to move together.
- Yields on short-term bonds are more volatile than those on long-term bonds.
- Long-term yields tend to be higher than short-term yields
- However, expectations theory can not explain why long-term rates are usually above short term rates
- In order to explain why the yield curve normally slopes upward, we need to extend the hypothesis to include risk

THE LIQUIDITY PREMIUM THEORY

- Bonds
- Liquidity Premium Theory
- Stocks
- Essential Characteristics
- Process
- Measuring Level of a Stock Market
- Valuing Stocks

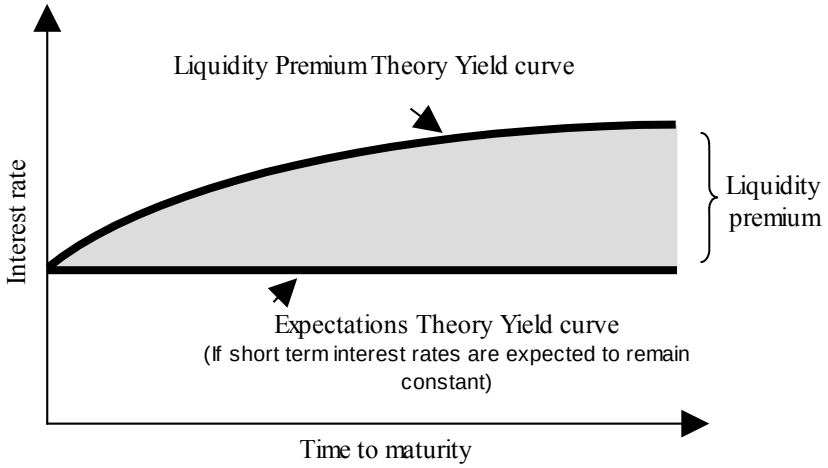
The Liquidity Premium Theory

- Risk is the key to understanding the slope of the yield curve
- The yield curve's upward slope is due to long-term bonds being riskier than short-term bonds
- Bondholders face both inflation and interest-rate. The longer the term the greater the inflation and interest-rate risk
- Inflation risk increases over time because investors, who care about the real return, must forecast inflation over longer periods.
- Interest-rate risk arises when an investor's horizon and the bond's maturity do not match. If holders of long-term bonds need to sell them before maturity and interest rates have increased, the bonds will lose value
- Including risk in the model means that we can think of yield as having two parts:
- Risk-free and
- Risk premium

$$i_{nt} \quad rp_n \quad \frac{i_{1t} \quad i^e_{1t\ 1} \quad i^e_{1t\ 2} \quad \ldots \quad i^e_{1t\ n\ 1}}{n}$$

Risk premium — Pure expectations theory

Figure: Relationship between the Liquidity Premium and Expectations Theories



- Again, we arrive at the same three conclusions about the term structure of interest rates
- Interest rates of different maturities tend to move together.
- Yields on short-term bonds are more volatile than those on long-term bonds.
- Long-term yields tend to be higher than short-term yields

Stocks: An Introduction

- Stocks provide a key instrument for holding personal wealth as well as a way to diversify, spreading and reducing the risks that we face
- For companies, they are one of several ways to obtain financing.
- Additionally,
- Stocks and stock markets are one of the central links between the financial world and the real economy.
- Stock prices are fundamental to the functioning of a market-based economy
- They indicate the value of the companies that issued the stocks and,
- They allocate scarce investment resources
- The firms deemed most valuable in the marketplace for stocks are the ones that will be able to obtain financing for growth. When resources flow to their most valued uses, the economy operates more efficiently
- Most people see stock market as a place where fortunes are easily made or lost, and they recoil at its unfathomable booms and busts.
- Great American Depression (1929)
- Post-September 11, 2001 scenario
- Pakistan stock market on roller-coaster-ride (March 2005)
- What happens in reality?
- Stock prices tend to rise steadily and slowly, and
- Collapse rarely when normal market mechanisms are out of alignment
- For most people the experience of losing or gaining wealth suddenly is more memorable than the experience of making it gradually.
- By being preoccupied with the potential short-term losses associated with crashes, we lose sight of the gains we could realize if we took a longer-term view

Essential Characteristics of Common Stock

- Stocks, also known as common stock or equity, are shares in a firm's ownership
- From their early days, stocks had two important characteristics that today are taken for granted:
- The shares are issued in small denominations and
- The shares are transferable
- Until recently, stockowners received a certificate from the issuing company, but now it is a computerized process where the shares are registered in the names of brokerage firms that hold them on the owner's behalf
- The ownership of common stock conveys a number of rights
- A stockholder is entitled to participate in the shares of the enterprise, but this is a residual claim i.e. meaning the leftovers after all other creditors have been paid.
- Stockholders also have limited liability,
- Even if a company fails, the maximum amount that the stockholder can lose is the initial investment
- Stockholders are entitled to vote at the firm's annual meeting including voting to elect (or remove) the firm's board of directors
- Following are some salient features of stock trading
    1. An individual share represents only a small fraction of the value of the company that issued it
    2. A large number of shares are outstanding

3. Prices of individual shares are low, allowing individuals to make relatively small investments
4. As residual claimants, stockholders receive the proceeds of a firm's activities only after all other creditors have been paid
5. Because of limited liability, investor's losses cannot exceed the price they paid for the stock; and
6. Shareholders can replace managers who are doing a bad job

Measuring the Level of the Stock Market

- Stocks are one way in which we choose to hold our wealth, so when stock values rise we get richer and when they fall we get poorer
- These changes affect our consumption and saving patterns, causing general economic activity to fluctuate
- We need to understand the dynamics of the stock market, in order to
- Manage our personal finances and
- See the connections between stock values and economic conditions
- Stock market indexes
- Designed to give us a sense of the extent to which stock prices are going up or down
- Tell us both how much the value of an average stock has changed, and how much total wealth has gone up or down
- Provide benchmarks for performance of money managers, comparing how they have done to the market as a whole
- Every major country in the world has a stock market, and each of these markets has an index
- For the most part, these are value-weighted indices
- To analyze the performance of these different markets it is useful to look at percentage changes, but percentage change isn't everything
- The Dow Jones Industrial Average
- The Standard & Poor's 500 Index
- NASDAQ Composite index
- Financial Times Stock Exchange 100 Index
- Hang Seng 100
- Nikkei 225
- KSE 100 Index
- The KSE100
- It contains a representative sample of common stock that trade on the Karachi Stock Exchange.
- The KSE stocks that comprise the index have a total market value of around Rs. 1,197 Billion compared to total market value of Rs. 1,365 Billion for over 679 stocks listed on the Karachi Stock Exchange.
- This means that the KSE100 Index represents 88 percent of the total market capitalization of the Karachi Stock Exchange, as of February, 2004

VALUING STOCKS

- Valuing Stocks
- Fundamental Value and Dividend Discount Model
- Risk and Value of Stocks

Valuing Stocks

- People differ in their opinions of how stocks should be valued
- Chartists believe that they can predict changes in a stock's price by looking at patterns in its past price movements
- Behavioralists estimate the value of stocks based on their perceptions of investor psychology and behavior
- Others estimate stock values based on a detailed study of the fundamentals, which can be analyzed by examining the firm's financial statements.
- In this view the value of a firm's stock depends both on its current assets and estimates of its future profitability
- The fundamental value of stocks can be found by using the present value formula to assess how much the promised payments are worth, and then adjusting to allow for risk
- Chartists and Behavioralists focus instead on estimates of the deviation of stock prices from those fundamental values

Fundamental Value and the Dividend-Discount Model

- As with all financial instruments, a stock represents a promise to make monetary payments on future dates, under certain circumstances
- With stocks the payments are in the form of dividends, or distributions of the firm's profits
- The price of a stock today is equal to the present value of the payments the investor will receive from holding the stock
- This is equal to
- The selling price of the stock in one year's time plus
- The dividend payment received in the interim
- Thus the current price is the present value of next year's price plus the dividend
- If P_{today} is the purchase price of stock, $P_{next\ year}$ is the sales price one year later and $D_{next\ year}$ is the size of the dividend payment, we can say:

$$P_{today} \quad \frac{D_{next\ year}}{(1\quad i)} \quad \frac{P_{Next\ year}}{(1\quad i)}$$

- What if investor plans to hold stock for two years?

$$P_{today} \quad \frac{D_{next\ year}}{(1\quad i)} \quad \frac{D_{In\ two}}{(1\quad i)^2} \quad \frac{P_{In\ two}}{(1\quad i)^2}$$

- Generalizing for n years:

$$P_{today} \quad \frac{D_{next\ year}}{(1\ \ i)} \quad \frac{D_{in\ two\ years}}{(1\ \ i)^2} \quad \ldots\ldots$$

$$\frac{D_{n\ years\ from\ now}}{(1\ \ i)^n} \quad \frac{P_{n\ years\ from\ now}}{(1\ \ i)^n}$$

- If a stock does not pay dividends the calculation can still be performed; a value of zero is used for the dividend payments
- Future dividend payments can be estimated assuming that current dividends will grow at a constant rate of g per year.

$$D_{next_year} \quad D_{today}(1\ \ g)$$

- For multiple periods:

$$D_{n\ years\ from\ now} \quad D_{today}(1\ \ g)^n$$

- Price equation can now be re-written as:

$$P_{today} \quad \frac{D_{today}(1\ \ g)}{(1\ \ i)} \quad \frac{D_{today}(1\ \ g)^2}{(1\ \ i)^2} \quad \ldots\ldots$$

$$\frac{D_{today}(1\ \ g)^n}{(1\ \ i)^n} \quad \frac{P_{n\ \ years\ \ from\ \ now}}{(1\ \ i)^n}$$

- Assuming that the firm pays dividends forever solves the problem of knowing the selling price of the stock; the assumption allows us to treat the stock as we did a consol

$$P_{today} \quad \frac{D_{today}}{i\ \ g}$$

- This relationship is the dividend discount model
- The model tells us that stock price should be high when
- Dividends are high
- Dividend growth is rapid, or
- Interest rate is low

Why stocks are risky?

- Stockholders receive profits only after the firm has paid everyone else, including bondholders
- It is as if the stockholders bought the firm by putting up some of their own wealth and borrowing the rest
- This borrowing creates leverage, and leverage creates risk
- Imagine a software business that needs only one computer costing $1,000 and purchase can be financed by any combination of stocks (equity) and bonds (debt). Interest rate on bonds is 10%. Company earns $160 in good years and $80 in bad years with equal probability

Table: Returns distributed to debt and equity holders under different financing assumptions						
Percent Equity (%)	**Percent Debt (%)**	**Required payments on 10% bonds**	**Payment to equity holders**	**Equity Return (%)**	**Expected Equity Return (%)**	**St. Dev. of Equity Return**
100%	0	0	$80-160	8-16%	12%	4%
50%	50%	$50	$30-110	6-22%	14%	8%
30%	70%	$70	$10-90	3.3-30%	16.67%	13.3%
20%	80%	$80	$0-80	0-40%	20%	20%

- If the firm were only 10% equity financed, shareholders' liability could come into play.
- Issuing $900 worth of bonds means $90 for interest payments.
- If the business turned out to be bad, the $80 revenue would not be enough to pay the interest
- Without their limited liability, stockholders will be liable for $10 shortfall. But actually, they will lose only $100 investment and not more and the firm goes bankrupt.
- Stocks are risky because the shareholders are residual claimants. Since they are paid last, they never know for sure how much their return will be.
- Any variation in the firm's revenue flows through to stockholders dollar for dollar, making their returns highly volatile

Lesson 20

RISK AND VALUE OF STOCKS

- Stocks
- Risk and the Value of Stocks
- Theory of Efficient Markets
- Investing in Stocks for Long Run
- Stock Markets' Role in the Economy
- Financial Intermediation
- Role of Financial Intermediaries

Risk and value of stocks

- The dividend-discount model must be adjusted to include compensation for a stock's risk
- Return to Holding Stock for One Year =

$$\frac{D_{next\ year}}{P_{today}} \quad \frac{P_{next\ year} \quad P_{today}}{P_{today}}$$

- Since the ultimate future sale price is unknown the stock is risky,
- The investor will require compensation in the form of a risk premium
- Required Stock Return (i) = Risk-free Return (r_f) + Risk Premium (r_p)
- The risk-free rate can be thought of as the interest rate on a treasury security with a maturity of several months
- Our dividend discount model becomes:

$$P_{today} \quad \frac{D_{today}}{rf \quad rp \quad g}$$

Risk and value of stocks

- Stock Prices are high when
- Current dividends are high (D_{today} is high)
- Dividends are expected to grow quickly (g is high)
- The risk-free rate is low (r_f is low)
- The risk premium on equity is low (r_p is low)
- The S&P 500 index finished the year 2003 at just over 1,100. was this level warranted by fundamentals?
- Risk free real interest rate is about 2% or $r_f = 0.02$
- Risk premium is assumed to be 4% or $r_p = 0.04$
- Dividend growth rate is around 2% or $g = 0.02$
- The owner of a $1,000 portfolio would have received $30 in dividends during 2003
- Substituting the information in our adjusted dividend discount model:

$$P_{today} \quad \frac{\$30}{0.02 \quad 0.04 \quad 0.02} \quad \$$$

- But the actual stock prices were substantially higher than this calculated figure
- This may be due to wrong assumption on risk premium. The investors may have been demanding lower risk premium in 2003.
- To compute it, we use the same equation

$$1{,}100 \quad \frac{\$30}{(0.02\ r \quad 0.02}$$

- The answer is approximately 2.75%

The Theory of Efficient Markets

- The basis for the theory of efficient markets is the notion that the prices of all financial instruments, including stocks, reflect all available information
- As a result, markets adjust immediately and continuously to changes in fundamental values
- When markets are efficient, the prices at which stocks currently trade reflect all available information, so that future price movements are unpredictable.
- If the theory is correct then no one can consistently beat the market average; active portfolio management will not yield a return that is higher than that of a broad stock-market index
- If managers claim to exceed the market average year after year, it may be because
- They must be taking on risk,
- They are lucky,
- They have private information (which is illegal), or
- Markets are not efficient

Investing in Stocks for the Long Run

- Stocks appear to be risky, and yet many people hold substantial proportions of their wealth in the form of stock
- This is due to the difference between the short term and the long term;
- Investing in stocks is risky only if you hold them for a short time
- In fact, when held for the long term, stocks are less risky than bonds.

Figure: S&P 1-Year Stock Returns, 1871 to 2003(Returns are Real, Adjusted for Inflation using the CPI)

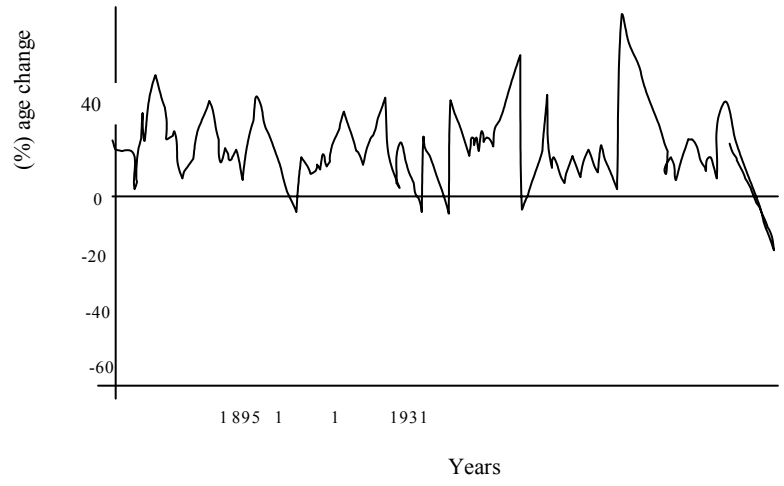
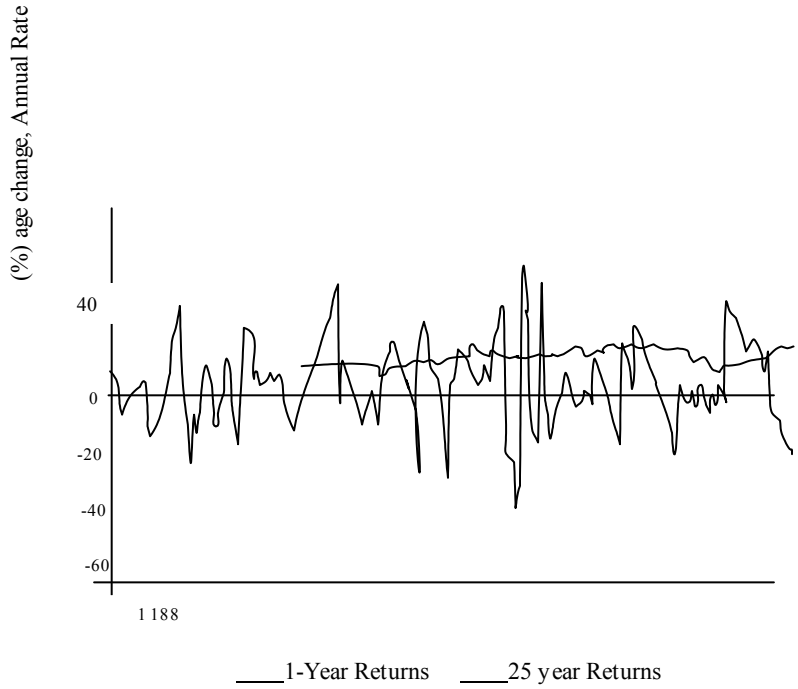


Figure: S&P Long-Run Stock Returns, 1871 to 2003(Returns are Real, adjusted for inflation using the CPI)



The Stock Market's Role in the Economy

- The stock market plays a crucial role in every modern capitalist economy.
- The prices determined there tell us the market value of companies, which determines the allocation of resources.
- Firms with a high stock market value are the ones investors' prize, so they have an easier time garnering the resources they need to grow.
- In contrast, firms whose stock value is low have difficulty financing their operations
- So long as stock prices accurately reflect fundamental values, this resource allocation mechanism works well.
- At times, however, stock prices deviate significantly from the fundamentals and prices move in ways that are difficult to attribute to changes in the real interest rate, the risk premium, or the growth rate of future dividends.

The Stock Market's Role in the Economy

- Shifts in investor psychology may distort prices; both euphoria and depression are contagious
- When investors become unjustifiably exuberant about the market's future prospects, prices rise regardless of the fundamentals, and such mass enthusiasm creates bubbles.

Bubbles

- Bubbles are persistent and expanding gaps between actual stock prices and those warranted by the fundamentals.
- These bubbles inevitably burst, creating crashes.
- They affect all of us because they distort the economic decisions companies and consumers make
- If bubbles result in real investment that is both excessive and inefficiently distributed, crashes do the opposite; the shift to excessive pessimism causes a collapse in investment and economic growth
- When bubbles grow large enough and result in crashes the stock market can destabilize the real economy

Financial Intermediation

- Economic well-being is essentially tied to the health of the financial intermediaries that make up the financial system.
- We know that financial intermediaries are the businesses whose assets and liabilities are primarily financial instruments.
- Various sorts of banks, brokerage firms, investment companies, insurance companies, and pension funds all fall into this category.
- These are the institutions that pool funds from people and firms who save and lend them to people and firms who need to borrow
- Financial intermediaries funnel savers' surplus resources into home mortgages, business loans, and investments.
- They are involved in both
- Direct finance—in which borrowers sell securities directly to lenders in the financial markets
- Indirect finance—in which a third party stands between those who provide funds and those who use them
- Intermediaries investigate the financial condition of the individuals and firms who want financing to figure out which have the best investment opportunities.
- As providers of indirect finance, banks want to make loans only to the highest-quality borrowers.
- When they do their job correctly, financial intermediaries increase investment and economic growth at the same time that they reduce investment risk and economic volatility

Role of Financial Intermediaries

- As a general rule, indirect finance through financial intermediaries is much more important than direct finance through the stock and bond markets
- In virtually every country for which we have comprehensive data, credit extended by financial intermediaries is larger as a percentage of GDP than stocks and bonds combined
- Around the world, firms and individuals draw their financing primarily from banks and other financial intermediaries
- The reason for this is information;
- Just think of an online store
- You can buy virtually EVERYTHING – from $5 dinner plates to $300,000 sports car
- But you will notice an absence of financial products, like student loans, car loans, credit cards or home mortgages
- You can not bonds on which issuer is still making payments, nor can you have the services of checking account.
- Why such online store does not deal in mortgages?
- Suppose a company needs a mortgage of $100,000 and the store can (if at all) establish a system in which 100 people sign up to lend $1,000 each to the company
- But the store has to do more
- Collecting the payments
- Figuring out how to repay the lenders
- Writing legal contracts
- Evaluating the creditworthiness of the company and feasibility of the mortgaged project
- Can it do it all?
- Financial intermediaries exist so that individual lenders don't have to worry about getting answers to all of the important questions concerning a loan and a borrower
- Lending and borrowing involve transactions costs and information costs, and financial intermediaries exist to reduce these costs
- Financial intermediaries perform five functions:
    1. They pool the resources of small savers;
    2. They provide safekeeping and accounting services as well as access to the payments system;
    3. They supply liquidity;
    4. They provide ways to diversify risk; and
    5. They collect and process information in ways that reduce information costs

ROLE OF FINANCIAL INTERMEDIARIES

Role of Financial Intermediaries:

- Pool Savings
- Safekeeping, accounting services and access to the payments system
- Liquidity
- Risk diversification
- Information Services

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- They provide safekeeping and accounting services as well as access to the payments system;
- They supply liquidity;
- They provide ways to diversify risk; and
- They collect and process information in ways that reduce information costs
- International banks handle transactions that cross borders, which may mean converting currencies
- Taking deposits from savers in one country and providing them to investors in another country
- Converting currencies to facilitate transactions for customers who do business or travel

Pooling Savings

- The most straightforward economic function of a financial intermediary is to pool the resources of many small savers
- To succeed in this endeavor the intermediary must attract substantial numbers of savers
- This is the essence of indirect finance, and it means convincing potential depositors of the soundness of the institution
- Banks rely on their reputations and government guarantees like deposit insurance to make sure customers feel that their funds will be safe

Safekeeping, Payments System Access, and Accounting

- Goldsmiths were the original bankers;
- People asked the goldsmiths to store gold in their vaults in return for a receipt to prove it was there
- People soon realized that trading the receipts was easier than trading the gold itself.
- Eventually the goldsmiths noticed that there was gold left in the vaults at the end of the day, so it could safely be lent to others
- Today, banks are the places where we put things for safekeeping;
- We deposit our paychecks and entrust our savings to a bank or other financial institution because we believe it will keep our resources safe until we need them
- Banks also provide other services, like ATMs, checkbooks, and monthly statements, giving people access to the payments system
- Financial intermediaries also reduce the cost of transactions and so promote specialization and

- According to the principle of comparative advantage, people and companies concentrate on the activities
- At which they are the best and
- For which their opportunity cost is lower
- This leads to specialization in a particular activity
- More specialization => more trading => more financial transaction => calls for low cost of transaction
- The bookkeeping and accounting services that financial intermediaries provide help us to manage our finances
- Pay-Cheques
- House-rents
- Utility bills
- Loan payments
- Food clothing and other expenses
- Savings and retirement plans
- Providing safekeeping and accounting services as well as access to the payments system forces financial intermediaries to write legal contracts, which are standardized
- Much of what financial intermediaries do takes advantage of economies of scale,
- The average cost of producing a good or service falls as the quantity produced increases
- Information is also subject to economies of scale

ROLE OF FINANCIAL INTERMEDIARIES (CONTINUED)

Role of Financial Intermediaries (cont)

- Liquidity;
- Risk diversification
- Information Services
- Information Asymmetry and Information Costs
- Adverse Selection
- Moral Hazards

Providing Liquidity

- Liquidity is a measure of the ease and cost with which an asset can be turned into a means of payment
- Financial intermediaries offer us the ability to transform assets into money at relatively low cost (ATMs are an example)
- Financial intermediaries provide liquidity in a way that is efficient and beneficial to all of us
- By collecting funds from a large number of small investors, a bank can reduce the cost of their combined investment, offering the individual investor both liquidity and high rates of return
- Financial intermediaries offer depositors something they can't get from financial markets on their own
- Financial intermediaries offer both individuals and businesses lines of credit, which are pre-approved loans that can be drawn on whenever a customer needs funds

Diversifying Risk

- Financial intermediaries enable us to diversify our investments and reduce risk
- While investing, don'tputallyoureggsinonebasket
- Putting $1 in 100 stocks is better than investing $100 in just one stock
- Financial institutions enable us to diversify our investment and reduce risk.
- Banks mitigate risk by taking deposits from a large number of individuals and make thousands of loans with them, thus giving each depositor a small stake in each of the loans
- Bank may collect $1,000 from each of one million depositors and then use $1 billion to make 10,000 loans of $100,000 each
- Thus each has a 1/1,000,000 share in each of the 10,000 loans. This is diversification!
- And since bank are expert at this game, it can minimize the cost of all such transactions
- All financial intermediaries provide a low-cost way for individuals to diversify their investments
- Mutual funds

Information Services

- One of the biggest problems individual savers face is figuring out which potential borrowers are trustworthy and which are not
- There is an information asymmetry because the borrower knows whether or not he or she is trustworthy, but the lender faces substantial costs to obtain the same information
- Financial intermediaries reduce the problems created by information asymmetries by collecting and processing standardized information
- Screen loan applications to guarantee the creditworthiness
- Monitor loan recipients to ensure proper usage of funds

Information Asymmetries and Information Costs

- Information plays a central role in the structure of financial markets and financial institutions
- Markets require sophisticated information in order to work well, and when the cost of obtaining information is too high, markets cease to function

Asymmetric information

- Issuers of financial instruments – borrowers who want to issue bonds and firms that want to issue stock – know much more about their business prospects and their willingness to work than potential lenders or investors
- Solving this problem is one key to making our financial system work as well as it does
- Lets take up our online store example
- Buyers must believe that item has been described accurately and they must be sure that the seller will send the item in exchange for their payment
- Here sellers have much more information than buyers have, creating an information asymmetry
- To resolve this issue,
- Induct an insurance system
- Devise an information system collecting data of purchases and delivery
- Asymmetric information poses two obstacles to the smooth flow of funds from savers to investors:
- Adverse selection, - involves being able to distinguish good credit risks from bad before the transaction;
- Moral hazard, - arises after the transaction and involves finding out whether borrowers will use the proceeds of a loan as they claim they will.

Adverse Selection

- Potential borrowers know more about the projects they wish to finance than prospective lenders
- **Used Cars and the Market for Lemons:**
- In a market in which there are good cars ("peaches") and bad cars ("lemons") for sale, buyers are willing to pay only the average value of all the cars in the market.
- This is less than the sellers of the "peaches" want, so those cars disappear from the markets and only the "lemons" are left
- To solve this problem caused by asymmetric information, companies like Consumer Reports provide information about the reliability and safety of different models, and car dealers will certify the used cars they sell
- **Adverse Selection in Financial Markets:**
- Information asymmetries can drive good stocks and bonds out of the financial market
- If you can't tell the difference between a firm with a good prospects and a firm with bad prospects, you will be willing to pay a price based only on their average qualities
- The stocks of the good company will be undervalued so the mangers of these companies will keep the stocks away from the market
- This leaves only the firms with bad prospects in the market
- The same happens in the bond market
- If a lender can not tell whether a borrower is a good or a bad credit risk, the demand for a risk premium will be based on the average risk
- Borrowers having good credit risk will not pay higher risk premiums and would withdraw from the market
- Only bad credit risk bonds are left in the market
- **Solving the Adverse Selection Problem:**
- The adverse selection problem resulting in good investments not to be undertaken, the economy will not grow as rapidly as it could.
- So there must be some way of distinguishing good firms from the bad ones
- Disclosure of Information
- Collateral and Net Worth
- **Disclosure of Information:**
- Generating more information is one obvious way to solve the problem created by asymmetric information
- This can be done through government required disclosure and the private collection and production of information
- E.g. Securities and Exchange Commission regulations
- Reports from private sources such as rating agencies, brokerage companies and financial analysts
- The cost and credibility of such information are to be kept in mind

- **Collateral and Net Worth:**
- Collateral is something of a value pledged by a borrower to the lender in the event of borrower's default
- Lenders can be compensated even if borrowers default, and if the loan is so insured then the borrower is not a bad credit risk
- Net worth is the owner's stake in the firm, the value of the firm minus the vale of its liabilities
- If a firm defaults on loan, the lender can make a claim against the firm's net worth
- The same is true for home loans
- The importance of net worth in reducing adverse selection is the reason owners of new businesses have so much difficulty borrowing money

Moral Hazards

- Moral hazard arises when we cannot observe people's actions, and so cannot judge whether a poor outcome was intentional or just a result of bad luck
- Moral Hazard in Equity Finance
- While purchasing stocks of a company, are you sure that it will use the funds in a way that is best for you?
- Principal-agent problem
- The separation of ownership from control
- When the managers of a company are the owners, the problem of moral hazard in equity financing disappears.
- Moral Hazard in Debt Finance
- Because debt contracts allow owners to keep all the profits in excess of the loan payments, they encourage risk taking
- A good legal contract can solve the moral hazard problem that is inherent in debt finance.
- Bonds and loans often carry restrictive covenants

The Negative Consequences of Information Costs

1. **Adverse Selection:**

- Lenders can't distinguish good from bad credit risks, which discourages transactions from taking place.
- Solutionsinclude
- Government-required information disclosure
- Private collection of information
- The pledging of collateral to insure lenders against the borrower's default
- Requiring borrowers to invest substantial resources of their own

2. **Moral Hazard:**

- Lenders can't tell whether borrowers will do what they claim they will do with the borrowed resources; borrowers may take too many risks.
  Solutionsinclude
- Forced reporting of managers to owners
- Requiring managers to invest substantial resources of their own
- Covenants that restrict what borrowers can do with borrowed funds

Financial Intermediaries and Information Costs

- The problems of adverse selection and moral hazard make direct finance expensive and difficult to get.
- These drawbacks lead us immediately to indirect finance and the role of financial institutions.
- Much of the information that financial intermediaries collect is used to reduce information costs and minimize the effects of adverse selection and moral hazard
- Screening and Certifying to Reduce Adverse Selection
- Monitoring to Reduce Moral Hazard

BANKING

- Banking
- Types of banks
- Balance Sheet of Commercial Banks
- Assets
- Liabilities

Banking

- Banking is a combination of businesses designed to deliver the services
- Pool the savings of and making loans
- Diversification
- Access to the payments system
- Accounting and record-keeping
- The intent of banks is to profit from each of these lines of business
- There are three basic types of depository institutions:
- Commercial banks,
- Savings institutions
- Credit unions
- Commercial banks .
- They accept deposits and use the proceeds to make consumer, commercial and real estate loans.
- Community banks
- Small local banks focused on serving consumers and small business
- Regional and Super-regional banks
- They make consumer, residential, commercial and industrial loans
- Money center bank
- These banks rely more on borrowing for their funding
- Saving Institutions
- Financial intermediaries to serve households and individuals
- Provide mortgage and lending as well as saving deposit services
- Credit Unions
- Nonprofit depository institutions that are owned by people with a common bond
- These unions specialize in making small consumer loans

The Balance Sheet of Commercial Banks

- **Balance Sheet Identity**

Total Bank Assets = Total Bank Liabilities + Bank Capital

- Banks obtain funds from individual depositors and business as well as by borrowing from other financial institutions and through the financial markets.
- They use these funds to make loans, purchase marketable securities and hold cash.
- The difference between a bank's assets and liabilities is the bank's capital or Net Worth
- The bank's profits come both from service fees and the difference between interest earned and interest paid.

ITEMS	2005 (Rs.000)	2004 (Rs.000)
ASSETS		
Cash and balances with treasury banks	23,665,549	23,833,253
Balances with other banks	1,469,333	5,708,323
Lendings to financial institutions	9,998,828	10,965,297
Investments – net	69,481,487	67,194,971
Advances – net Other	180,322,753	137,317,773
assets – net Operating	5,464,426	6,154,370
fixed assets Deferred tax	8,182,454	7,999,821
assets - net	191,967	
	298,776,797	**259,173,808**
LIABILITIES		
Bills payable	8,536,674	7,566,684
Borrowings from financial institutions	27,377,502	7,590,864
Deposits and other accounts	229,345,178	221,069,158
Sub-ordinated loan	1,598,080	1,598,720
Liabilities against assets subject to finance lease	-----	----
Other liabilities	8,611,600	6,525,999
Deferred tax liabilities - net		269,499
	275,469,034	**244,620,924**
NET ASSETS	**23,307,763**	**14,552,884**
REPRESENTED BY:		
Share capital Reserves	4,265,327	3,371,800
Unappropriated profit	13,408,005	5,661,553
	210,662	165,208
	17,883,994	**9,198,561**
Surplus on revaluation of assets - net of tax	5,423,769	5,354,323
	23,307,763	**14,552,884**

Balance Sheet of U.S Commercial Banks, August 2004		
Assets in billions of dollars(numbers in parentheses are %age of total assets)		
Cash items (including reserves)	321.6	(4.1)
Securities	1,893.5	(23.9)
o U.S. Government and agency	1,1707.7	(14.8)
o State and local government and other	722.8	(9.1)
Loans	5,044.6	(63.7)
o Commercial and industrial	887.1	(11.2)
o Real estate (including mortgage)	2,411.6	(30.5)
o Consumer	672.3	(8.5)
o Interbank	364.7	(4.6)
o Other	708.9	(9.0)
Other assets	655.1	(8.3)
Total Commercial Bank Assets	**7,914.8**	
Liabilities in billions of dollars (numbers in parentheses are %age of total liabilities)		
Checkable deposits	645.0	(8.9)
Nontransactions deposits	4,487.7	(62.3)
o Savings deposits and time deposits	3,340.9	(46.3)
o Large, negotiable time deposits	1,146.8	(15.9)
Borrowings	1,589.0	(22.0)
o From banks in U.S.	459.1	(6.4)
o From nonbanks in U.S.	1,129.9	(15.7)
Other liabilities	487.4	(6.8)
Total Commercial Bank Liabilities	**7,209.1**	
Bank assets – Bank Liabilities = Bank Capital	**705.7**	

Assets: Uses of Funds

- Cash Items
- Reserves
- Cash items in process of collection
- Vault cash
- Securities
- Secondary reserves
- Loans

- **Cash Items**
- **Reserves**
- Includes cash in the bank's vault and its deposits at the central bank
- Held to meet customers' withdrawal requests
- Cash items in the process of collections
- Uncollected funds the bank expects to receive
- The balances of accounts that banks hold at other banks (correspondent banking)
- Because cash earns no interest, it has a high opportunity cost. So banks minimize the amount of cash holding
- **Securities:**
- Stocks
- T-Bills
- Government and corporate bonds
- Securities are sometimes called secondary reserves because they are highly liquid and can be sold quickly if the bank needs cash.
- **Loans:**
- The primary asset of modern commercial banks;
- Business loans (commercial and industrial loans),
- Real estate loans,
- Consumer loans,
- Inter-bank loans,
- Loans for the purchase of other securities
- The primary difference among the various types of depository institutions is in the composition of their loan portfolios
- Commercial banks make loans primarily to business
- Savings and loans provide mortgages to individuals
- Credit unions specialize in consumer loans

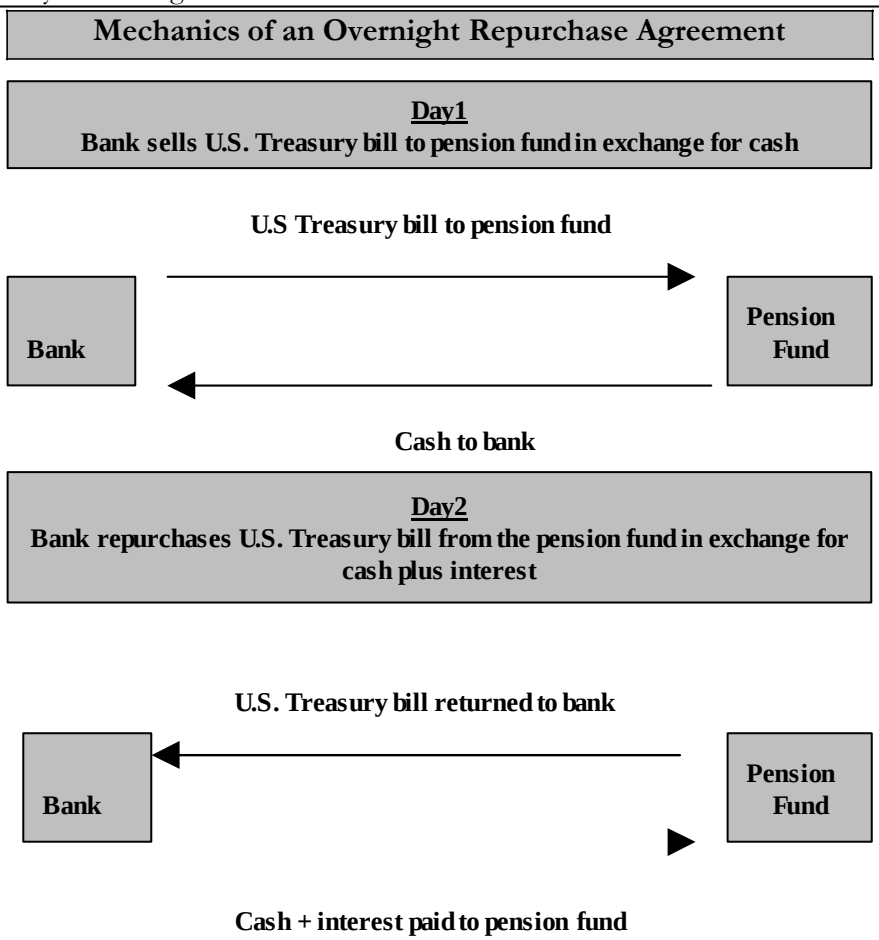
BALANCE SHEET OF COMMERCIAL BANKS

- Balance Sheet of Commercial Banks
- Assets: uses of funds
- Bank Capital and Profitability
- Off-Balance-Sheet Activities
- Bank Risk
- Liquidity Risk
- Credit Risk
- Interest Rate Risk
- Trading Risk
- Other Risks

Liabilities: Sources of Funds

- Checkable Deposits
- Non-transactions Deposits
- Borrowings
- Discount loans
- Federal funds market

- **Checkable deposits:**
- A typical bank will offer 6 or more types of checking accounts.
- In recent decades these deposits have declined because the accounts pay low interest rates
- **Nontransactions Deposits:**
- These include savings and time deposits and account for nearly two-thirds of all commercial bank liabilities.
- When you place your savings in a Certificate of Deposit (CD) at the bank, it is as if you are buying a bond issued by that bank
- CDs can vary in terms of their value, the large ones can be bought and sold in financial markets
- **Borrowings:**
- Banks borrow from the central bank (discount loans)
- They can borrow from other banks with excessive reserves in the inter-bank money market.
- Banks can also borrow by using a repurchase agreement or repo, which is a short-term collateralized loan
- A security is exchanged for cash, with the agreement that the parties will reverse the transaction on a specific future date (might be as soon as the next day)



Bank Capital and Profitability

- The net worth of banks is called bank capital; it is the owners' stake in the bank
- Capital is the cushion that banks have against a sudden drop in the value of their assets or an unexpected withdrawal of liabilities
- An important component of bank capital is loan loss reserves, an amount the bank sets aside to cover potential losses from defaulted loans
- It is reduced by the defaulted loans written-off
- There are several basic measures of bank profitability
- Return on Assets,

- **ROA = $\frac{\text{Net profit after taxes}}{\text{Total bank assets}}$**

- It is a measure of how efficiently a particular bank uses its assets
- A manager can compare the performance of bank's various lines of businesses by looking at different units' ROA
- The bank's return to its owners is measured by the Return on Equity

- **ROE = $\frac{\text{Net profit after taxes}}{\text{Bank capital}}$**

- ROA and ROE are related to leverage
- A measure of leverage is the ratio of bank assets to bank capital. Multiplying ROA by this ratio yields ROE
- **ROA x $\frac{\text{Bank Assets}}{\text{Bank Capital}}$**

= Netprofitaftertaxes x BankAssets
Total bank assets Bank Capital

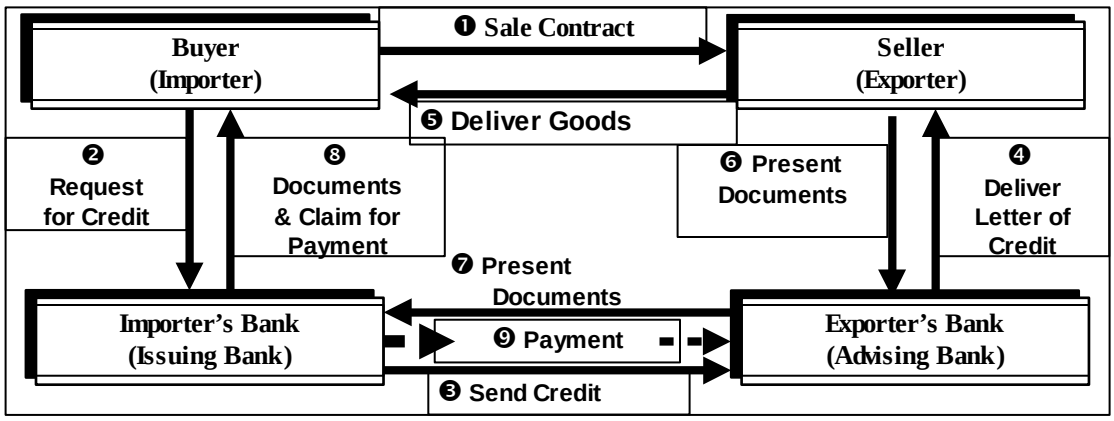
= Netprofitaftertaxes = ROE
Bank Capital

- Return on equity tends to be higher for larger banks, suggesting the existence of economies of scale
- Net interest income is another measure of profitability;
- It is the difference between the interest the bank pays and what it receives
- It can also be expressed as a percentage of total assets to yield (net interest margin). It is the bank's interest rate spread
- Well run banks have 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.

Table: Profitability of U.S. Commercial Banks(in millions of $, except bottom four rows)			
Items	**1991**	**1996**	**2001**
A. Interest income-interest expense (Net interest income)	$121,,288	$161,172	$210,809
B. Other revenue	58,482	92,515	153,734
C. Operating costs	124,233	159,241	218,706
D. Gross profit (A+B-C)	55,537	94,446	145,837
E. Loan losses(provisions)	34,128	15,483	41,008
F. Net operating profit (D-E)	21,409	78,963	104,829
G. Realized capital gains from sale of real estate	2,971	530	4,434
H. Net profits before taxes (F+G)	24,380	79,493	109,263
I. Assets	3,420,381	4,554,234	6,454,543
Net interest margin (A/I)	0.0355%	0.0354%	0.0327%
Return on assets (H/I) (ROA)	0.0071	0.0175	0.0169
Return on equity (ROE)	0.1258	0.2147	0.1860
Net interest income/ Total income [A/(A+B)]	0.6747	0.6353	0.5782

Off-Balance-Sheet Activities

- Banks engage in these activities in order to generate fee income; these activities include providing trusted customers with lines of credit
- Letters of credit are another important off-balance-sheet activity; they guarantee that a customer will be able to make a promised payment.
- In so doing, the bank, in exchange for a fee, substitutes its own guarantee for that of the customer and enables a transaction to go forward



- A standby letter of credit is a form of insurance; the bank promises that it will repay the lender should the borrower default
- Off-balance-sheet activities create risk for financial institutions and so have come under increasing scrutiny in recent years

BANK RISK

- Bank Risk
- Liquidity Risk
- Credit Risk
- Interest Rate Risk
- Trading Risk
- Other Risks

Bank Risk

- Banking is risky because depository institutions are highly leveraged and because what they do
- In all the lines of banking trades, the goal of every bank is to pay less for the deposits the bank receives than for the loan it makes and the securities it buys.

Liquidity Risk

- Liquidity risk is the risk of a sudden demand for funds and it can come from both sides of a bank's balance sheet (deposit withdrawal on one side and the funds needed for its off-balance sheet activities on the liabilities side
- If a bank cannot meet customers' requests for immediate funds it runs the risk of failure; even with a positive net worth, illiquidity can drive it out of business

Table: Balance sheet of a bank holding $5 million in excess reserves			
Assets		**Liabilities**	
Reserves	$15million	Deposits	$100million
Loans	$100million	Borrowed funds	$30million
Securities	$35million	Bank capital	$20million

- One way to manage liquidity risk is to hold sufficient excess reserves (beyond the required reserves mandated by the central bank) to accommodate customers' withdrawals.
- However, this is expensive (interest is foregone)
- Two other ways to manage liquidity risk are:
- Adjusting assets
- Adjusting liabilities

Table: Balance sheet of a bank holding no excess reserves			
Assets		**Liabilities**	
Reserves	$10million	Deposits	$100 million
Loans	$100 million	Borrowed funds	$30 million
Securities	$40 million	Bank capital	$20 million

- If a customer makes a $5 million withdrawal, the bank can't simply deduct it from reserves.
- Rather it will adjust another part of balance sheet
- A bank can adjust its assets by
- Selling a portion of its securities portfolio,
- Or by selling some of its loans,
- Or by refusing to renew a customer loan that has come due

Table: Balance sheet of a bank following a $5 million withdrawal and asset adjustment			
Withdrawal is met by selling securities			
Assets		**Liabilities**	
Reserves	$10million	Deposits	$95 million
Loans	$100 million	Borrowed funds	$30 million
Securities	$35 million	Bank capital	$20 million
Withdrawal is met by reducing loans			
Assets		**liabilities**	
Reserves	$10 million	Deposits	$95 million
Loans	$95 million	Borrowed funds	$30 million
Securities	$40 million	Bank capital	$20 million

- Banks do not like to meet their deposit outflows by contracting the asset side of the balance sheet because doing so shrinks the size of the bank
- Banks can use liability management to obtain additional funds by
- Borrowing (from the central bank or from another bank) or
- By attracting additional deposits (by issuing large CDs)

Table: Balance sheet of a bank following a $5 million withdrawal and liability adjustment			
Withdrawal is met by borrowing			
Assets		**Liabilities**	
Reserves	$10million	Deposits	$95 million
Loans	$100 million	Borrowed funds	$35 million
Securities	$40 million	Bank capital	$20 million
Withdrawal is met by attracting deposits			
Assets		**liabilities**	
Reserves	$10 million	Deposits	$100 million
Loans	$100million	Borrowed funds	$30 million
Securities	$40 million	Bank capital	$20 million

Credit Risk

- This is the risk that loans will not be repaid and it can be managed through diversification and credit-risk analysis
- Diversification can be difficult for banks, especially those that focus on certain kinds of lending
- Credit-risk analysis produces information that is very similar to the bond-rating systems and is done using a combination of statistical models and information specific to the loan applicant
- Lending is plagued by adverse selection and moral hazard, and financial institutions use a variety of methods to mitigate these problems
- Screen loan application
- Monitor borrowers after they have received loan
- Collateral or high net-worth demand
- Developing long term relationships

Interest-Rate Risk

- The two sides of a bank's balance sheet often do not match up because liabilities tend to be short-term while assets tend to be long-term; this creates interest-rate risk
- In order to manage interest-rate risk, the bank must determine how sensitive its balance sheet (assets and liabilities) is to a change in interest rates;
- If we think of bank's assets and liabilities as bonds, the change in interest rate will affect the value of these bonds, more importantly due to the term of bonds
- So if interest rate rises, the bank face the risk that the value of their assets may fall more than the value of their liabilities (reducing the bank's capital)
- Suppose 20% of bank's assets fall into the category of assets sensitive to changes in the interest rate. While rest of 80%are not sensitive to changes in interest rate

- If interest rate is stable 5%, then each $100 yields $5 in interest
- Now suppose 50% of bank's deposits (liabilities) are interest rate sensitive and 50% are not
- Half of the liabilities are deposits that earn variable returns so costs vary with market rate
- For making profit, interest rate on liabilities must be lower than the interest rate on assets.
- The difference is the bank's margin!
- Assuming interest rate on liabilities is 3%, the net interest margin is 5 – 3 = 2%
- What happens as interest rate rises by 1%

Table: An example of interest rate risk		
The impact of an interest rate increase on bank profits (per $100 of assets)		
Items	**Assets**	**Liabilities**
Interest rate sensitive	$20	$50
Not interest rate sensitive	$80	$50
Initial interest rate	5%	3%
New interest rate on interest rate sensitive assets and liabilities	6%	4%
	Revenue from assets	**Cost of liabilities**
At initial interest rate	(0.05×$20)+(0.05×$80)=$5.00	(0.03×$50)+(0.03×$50)=$3.00
After interest rate change	(0.06×$20)+(0.05×$80)=$5.20	(0.04×$50)+(0.03×$50)=$3.50
Profits at initial interest rate:	($5.00) – ($3.00) = $2.00 per $100 in assets	
Profits after interest rate change:	($5.20) – ($3.50) = $1.70 per $100 in assets	
Gap analysis		
Gap between interest rate sensitive assets and interest rate sensitive liabilities: (Interest rate sensitive assets of $20) – (Interest rate sensitive liabilities of $50) =(Gap of -$30)		

- When bank has more interest rate sensitive liabilities than does interest rate assets, an increase in interest rate will cut into the bank's profits.

INTEREST RATE RISK

- Bank Risk
- Interest Rate Risk (Cont.)
- Trading Risk
- Other Risks
- Globalization of Banking
- The Future of Banks
- Non-depository Institutions
- Insurance Companies
- Securities Firms
- Finance Companies
- Government Sponsored Enterprises

Interest-Rate Risk

- Gap analysis highlights the gap or difference between the yield on interest sensitive assets and the yield on interest-sensitive liabilities
- Multiplying the gap by the projected change in the interest rate yields the change in the bank's profit
- Gap analysis can be further refined to take account of differences in the maturity of assets and liabilities
- Banks can manage interest-rate risk by matching the interest-rate sensitivity of assets with the interest-rate sensitivity of liabilities,
- Purchase short term securities to match variable rate deposits
- Make long term loans at floating rates
- But this approach increases credit risk

Trading Risk

- Banks today hire traders to actively buy and sell securities, loans, and derivatives using a portion of the bank's capital in the hope of making additional profits
- However, trading such instruments is risky (the price may go down instead of up); this is called trading risk or market risk
- Managing trading risk is a major concern for today's banks, and bank risk managers place limits on the amount of risk any individual trader is allowed to assume
- Banks also need to hold more capital if there is more risk in their portfolio

Other Risks

- Banks that operate internationally will face
- Foreign exchange risk (the risk from unfavorable moves in the exchange rate)
- Sovereign risk (the risk from a government prohibiting the repayment of loans)
- Banks manage their foreign exchange risk by attracting deposits denominated in the same currency as the loans and by using foreign exchange futures and swaps to hedge the risk
- Banks manage sovereign risk by diversification, by refusing to do business in a particular country or set of countries, and by using derivatives to hedge the risk
- Banks also face operational risk, the risk that their computer system may fail or that their buildings may burn down
- To manage operational risk the bank must make sure that its computer systems and buildings are sufficiently robust to withstand potential disasters

The Globalization of Banking

- Toward the end of the 20th century, sharp rise in international trade increased the need for international financial services
- Banks can operate in other countries by

- Opening a foreign branch,
- Offer same services as in home country
- Creating an International Banking Facility (IBF)
- Accept deposits from and make loans to foreigners outside the country
- Creating an Edge Act subsidiary,
- Engage in international banking transactions
- Purchasing a controlling interest in a foreign bank
- Foreign banks can take advantage of similar options.
- The growth of international banking has had an economic impact, increasing the competition in and efficiency of banking markets
- A borrower from France, Brazil, Singapore or Pakistan can shop for loan virtually anywhere in the world, while a depositor seeking the highest return can do the same
- This phenomenon has made banking a tougher job
- Profits are harder to come by as borrowers and depositors have more options
- But overall the improved efficiency of financial system has enhanced growth everywhere
- One of the most important aspects of international banking is the Eurodollar market, in which dollar-denominated deposits in foreign banks are exchanged
- The Eurodollar market was created in response to restrictions on the movement of international capital imposed at the end of World War II with the creation of Bretton Woods system
- Today, the Eurodollar market in London is one of the biggest and most important financial markets in the world,
- The interest rate at which banks lend each other Eurodollars (the London Interbank Offered Rate or LIBOR) is the standard against which many private loan rates are measured

The Future of Banks

- Today's banks are bigger, fewer in number and more international than those of the past, and they offer more services
- Financial holding companies are a limited form of universal banks, firms that engage in non-financial as well as financial activities
- Banking, Insurance and securities
- The owners and managers of these financial firms cite three reasons to create them:
- They are well diversified,
- They are large enough to take advantage of economies of scale,
- They hope to benefit from economies of scope
- Offering many products under the same "brand" name can also reduce costs
- Individual firms provide the same services as more traditional intermediaries do
- Money market mutual funds provide liquidity
- Mortgage brokers help in borrowing for home purchase
- Leasing companies provide car, and consumer financing
- Discount brokers provide low cost access to financial markets
- Thanks to recent technological advances, almost every service traditionally provided by financial intermediaries can now be produced independently, without the help of a large organization
- Moreover, the production of information to mitigate the problems of adverse selection and moral hazard has become a business in and of itself
- As we survey the financial industry we can discern two opposite trends:
- Large firms are working hard to provide one-stop shopping for financial services
- Industry is splintering into a host of small firms, each of which serves a very specific purpose

NON- DEPOSITORY INSTITUTIONS

- Non-depository Institutions
- Insurance Companies
- Securities Firms
- Finance Companies
- Government Sponsored Enterprises

Non-depository Institutions

- Insurance Companies
- Securities Firms
- Brokerage firms
- Investment banks
- Mutual fund companies
- Finance Companies
- Government Sponsored Enterprises

Insurance Companies

- Insurance companies began hundreds of years ago with long sea voyages
- The most famous insurance company, Lloyd's of London, was established in 1688
- Besides insuring traditional assets like airplane and ships, it also insures singers' voices, pianists' fingers and even food critics' taste buds
- Underwriting process refers to the risk assessment and loss reimbursement guarantee by the individual risk experts of the relevant field joining together to form a syndicate.
- When an insurance contract is offered, these syndicates sign up for a certain portion of the risk in return for a portion of the risk premiums
- Insurance process
- Insurance companies accept premiums in exchange for the promise of compensation if certain event occurs
- A home owner pays premium in return for the promise that if the house burns down, the insurance company will pay to rebuild it
- So for individuals, insurance is way for transferring the risk
- In terms of financial system as whole, insurance companies:
- Pool small policies and make large investments
- Diversify risks across a large population
- Screen and monitor policyholders to mitigate the problem of asymmetric information
- Two Types of Insurance Company:
- Life insurance
- Property and casualty insurance

Type of Life insurance

- **Term life insurance**
- Which makes a payment to the insured's beneficiaries upon the death of the insured
- Group insurance is obtained through employers
- **Whole life insurance**
- Combination of term life insurance and a savings account
- A payment of a fixed premium over lifetime in return for a fixed benefit in case of death of policy holder
- The cash value can be refunded if the policyholder decides to discontinue the policy
- Over the years, the emphasis shifts from insurance to savings
- Property and casualty Insurance

- Auto insurance is a combination of property insurance on the car and casualty insurance on the driver
- The policyholder pays premium in exchange for protection
- Balance sheet
- Liabilities
- Promises to policyholders
- Assets
- Combination of bonds and stocks
- Short term money market instruments (in case of property and casualty insurance)
- The Role of Insurance Companies:
- Insurance companies pool risk to generate predictable payouts
- Adverse selection and moral hazard create problems in the insurance market that are worse than those in the stock and bond markets
- Cancer Patients
- Fire Insurance
- To deal with this, insurance companies carefully screen applicants before issuing them policies
- Medical Examination
- Driving Records
- Policies may also include restrictive covenants in order to reduce moral hazard
- Fire extinguishing system and training
- Careful
- The future of insurance must be considered in the light of advances in medical technology, particularly with regard to the decoding of the human genome.
- In the future, people with inherited tendencies toward certain diseases may not be able to get insurance

Securities Firms

- The broad class of securities firms includes brokerages, investment banks, and mutual fund companies.
- In one way or another, these are all financial intermediaries
- The primary services of brokerage firms are accounting and the provision of access to secondary markets.
- They also provide loans to customers who wish to purchase stock on margin, and they provide liquidity by offering check-writing privileges and by allowing investors to sell assets quickly
- All securities firms are very much in the business of producing information; but this is truly at the heart of the investment banking business

Lesson 28

NON- DEPOSITORY INSTITUTIONS (CONTINUED)

- Securities Firms
- Investment Banks
- Mutual Funds
- Finance Companies
- Government Sponsored Enterprises
- Banking Crisis
- Sources of Runs, Panics and Crisis
- Government Safety Net
- Government: Lender of Last Resort

Securities Firms

- Investment banks are the conduits through which firms raise funds in the capital markets
- Through their underwriting services, investment banks issue new stocks and a variety of other debt instruments
- In underwriting, the investment bank guarantees the price of a new issue and then sells it to investors at a higher price;
- However, this is not without risk, since the selling price may not in fact be higher than the price guaranteed to the firm issuing the security
- Information and reputation are central to the underwriting business;
- Underwriters collect information to determine the price of the new securities and then put their reputations on the line when they go out to sell the issues
- In addition to underwriting, investment banks provide advice to firms that wish to merge with or acquire other firms, for which advice they are paid a fee

Finance Companies

- Finance companies raise funds in the financial markets by issuing commercial paper and securities and use the funds to make loans to individuals and corporations
- These companies are largely concerned with reducing the transactions and information costs that are associated with intermediated finance
- Most finance companies specialize in one of three loan types:
- Consumer loans,
- Business loans,
- Sales loans (for example, the financing for a consumer to purchase a large-ticket item like an appliance)
- Some also provide commercial and home mortgages
- Business finance companies provide loans to businesses, for equipment leasing
- Business finance companies also provide short-term liquidity to firms by offering
- Inventory loans (so that firms can keep the shelves stocked)
- Accounts receivable loans (which provide immediate resources against anticipated revenue streams)

Government-Sponsored Enterprises

- The government is directly involved in the financial intermediation system through loan guarantees and in the chartering of financial institutions to provide specific types of financing
- Zarai Taraqiati Bank Limited (ZTBL)
- Small and Medium Enterprise (SME) Bank
- House Building Finance Corporation (HBFC)
- Khushhali Bank

Summary of the financial industry structure			
Financial intermediary	**Primary sources of funds (liabilities)**	**Primary uses of funds (assets)**	**Services provided**
Depository institution (Banks)	Checkable deposits Saving and time deposits Borrowing from other banks	Cash Loans securities	-Pooling of small savings to provide large loans -Diversified, liquid deposit accounts -Access to payments system Screening and monitoring of borrowers
Insurance Company **Securities Firm**	Expected claims Short term loans	Corporate bonds Government bonds Stocks Mortgages Commercial paper Bonds	-Pooling of risk -Screening and monitoring of policy holders -Management of asset pools -Clearing and settling trades
Investment Bank			-Immediate sale of assets -Access to spectrum of assets, allowing diversification -Evaluation of firms wishing to issue securities -Research and advice for investors
Mutual-Fund Company	Shares sold to customers	Commercial paper Bonds Mortgages Stocks Real estate	-Pooling of small savings to provide access to large, diversified portfolios, which can be liquid
Finance Company	Bonds Bank loans Commercial paper	Mortgages Consumer loans Business loans	-Screening and monitoring of borrowers
Government-Sponsored Enterprises	Commercial paper Bonds Loan guarantees	Mortgages Farm loans Student loans	-Access to financing for borrowers who cannot obtain it elsewhere

Banking Crisis

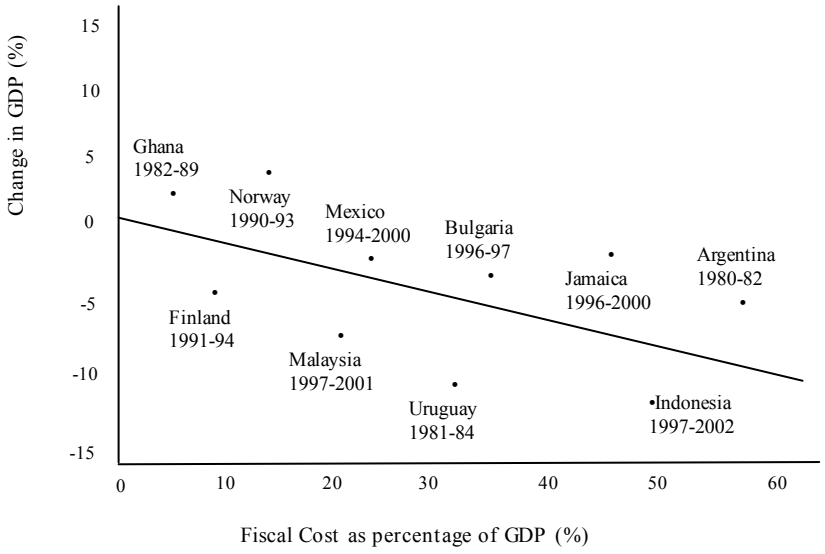
- Banking crises are not a new phenomena; the history of commercial banking over the last two centuries is replete with period of turmoil and failure.
- By their very nature, financial systems are fragile and vulnerable to crisis

Table: Worst Banking Crises since 1980

Country	Crises Dates	Estimated cost of Resolution (as %age of GDP)
Argentina	1980-82	55%
Indonesia	1997-98	55%
China	1990s	47%
Jamaica	1994	44%
Chile	1981-83	42%
Thailand	1997	35%
Macedonia	1993-94	32%
Israel	1977-83	30%
Turkey	2000	30%
Uruguay	1981-84	29%
Korea	1998	28%
Cote d'ivoire	1988-91	25%
Japan	1990s	24%
Uruguay	1981-84	24%
Malaysia	1997-98	20%

South Asian Crises

Figure: Relationship between size of a financial crises and change in GDP Growth



The Sources and Consequences of Runs, Panics, and Crises

- In a market based economy, the opportunity to succeed is also the opportunity to fail!
- Banks serve some essential functions in the economy
- Access to payment system
- Screen and monitor borrowers to reduce information problems
- So if bank fails, we lose ability to make financial transactions. Collectively, the economy is endangered.
- Banks' fragility arises from the fact that they provide liquidity to depositors, allowing them to withdraw their balances on demand, on a first-come, first-served basis
- If bank can not meet this promise of withdrawal, because of insufficient funds, it will fail
- Reports that a bank has become insolvent can spread fear that it will run out of cash and close its doors;

- Depositors will rush to convert their balances into cash
- Such a run on a bank can cause it to fail
- What matters during a bank run is not whether a bank is solvent but whether it is liquid
- Here solvency means that the value of the bank's assets exceeds its liabilities (positive net worth)
- Liquidity refers to the sufficient reserves of the bank to meet withdrawal demands
- False rumors that a bank is insolvent can lead to a run which renders it illiquid
- When a bank fails, depositors may lose some or all of their deposits, and information about borrowers' creditworthiness may disappear;
- For this reason, governments take steps to try to minimize the risk of failure
- A single bank failure can also turn into a system-wide panic; this is called contagion
- While banking panics and financial crises can result from false rumors, they can also occur for more concrete reasons;
- Anything that affects borrowers' ability to repay their loans or drives down the market price of securities has the potential to imperil the bank's finances
- Recessions have a clear negative impact on bank's balance sheet
- Low profitability of firm makes debt repayment much harder
- People lose jobs and cant pay their loan
- With the rise of default risk, bank's assets lose value and capital drops
- With less capital, banks are forced to contract the balance sheet making fewer loans.
- The overall business investment falls and bank failure is more possible
- Historically, downturns in the business cycle put pressure on banks, substantially increasing the risk of panics
- Financial disruptions can also occur whenever borrowers' net worth falls, as it does during deflation

THE GOVERNMENT SAFETY NET

- There are three reasons for the government to get involved in the financial system
- To protect investors
- To protect bank customers from monopolistic exploitation
- To ensure the stability of the financial system
- **Investor Protection**
- Small investors are unable to judge the soundness of financial institutions
- In practice only force of law ensure the bank's integrity, thus investors rely on government to protect them from mismanagement and malfeasance
- **Protection from monopolistic exploitation**
- Monopolists exploit their customers by raising prices to earn unwarranted profits
- Government intervenes to prevent firms in an industry from becoming too large. The same may apply to banks as well
- **Stability of financial system**
- Liquidity risk and information asymmetry indicate the instability of financial system
- Financial institution can create and destroy the value of its assets in a very short period, and a single firm's failure can bring down the whole system
- Government officials employ a combination of strategies to protect investors and ensure the stability of the financial system
- They provide the safety net to insure small depositors
- They operate as the lender of last resort

The Unique Role of Depository Institutions

- Depository institutions receive a disproportionate amount of attention from government regulators because
- They play a central role in the economy
- They face a unique set of problems
- We all rely heavily on banks for access to the payments system
- Banks are also prone to runs, as they hold illiquid assets to back their liquid liabilities, promising full and constant value to the depositors based on assets of uncertain value
- They are linked to each other both on their balance sheets and in their customers' minds;
- This interconnectedness of banks is almost unique to the financial industry

The Government as Lender of Last Resort

- The best way to stop a bank failure from turning into a panic is to make sure solvent institutions can meet their depositors' withdrawal demands
- The existence of a lender of last resort significantly reduces, but does not eliminate, contagion
- For the system to work, central bank officials who approve the loan applications must be able to distinguish an illiquid from an insolvent institution
- It is important for a lender of last resort to operate in a manner that minimizes the tendency for bankers to take too much risk in their operations

Problems Created by the Government Safety Net

- Protected depositors have no incentive to monitor their banks' behavior, and knowing this, banks take on more risk than they would normally
- In protecting depositors the government creates moral hazard
- Some banks are too big to fail, meaning that their failure would cause havoc in the financial system.
- The managers of such institutions know that if they begin to founder the government will have to bail them out
- The too-big-to-fail policy limits the extent of the market discipline that depositors can impose on banks and compounds the moral hazard problem

Regulation and Supervision of the Financial System

- Government officials employ three strategies to ensure that the risks created by the safety net are contained:
- Regulation establishes rules for bank managers to follow,
- Supervision provides general oversight of financial institutions,
- Examination provides detailed information on the firms' operations
- Regulatory requirements are designed to minimize the cost of failures to the tax-paying public
- One example of regulation is the requirement that banks obtain a charter in order to operate;
- This provides screening to make sure that the people who own and run banks will not be criminals.
- Once a bank is operating other regulations control the assets, the amount of capital, and makes information about the bank's balance sheet public
- Government supervisors enforce the regulations;
- They monitor, inspect, and examine banks to make sure that their business practices conform to regulatory requirements
- State Bank of Pakistan (SBP) is supreme regulatory authority for banking sector in Pakistan
- www.sbp.org.pk

Asset Holding Restrictions and Minimum Capital

- **Requirements**
- The simplest way to prevent bankers from exploiting their safety net is to restrict banks' balance sheets;
- This can be through restrictions on the kinds of assets banks can hold and requirements that they maintain minimum levels of capital
- The size of the loans a bank can make to particular borrowers is also limited
- Minimum capital requirements complement these limitations on bank assets
- Capital serves as a cushion against declines in the value of the bank's assets, lowering the likelihood of the bank's failure, and is a way to reduce the problem of moral hazard
- Capital requirements take two basic forms:
- The first requires banks to keep their ratio of capital to assets above some minimum level regardless of the structure of their balance sheets;
- The second requires banks to hold capital in proportion to the riskiness of their operations
- Banks must provide information to the financial markets about their balance sheets;

Supervision and Examination

- The government enforces banking rules and regulations through an elaborate oversight process called supervision, which relies on a combination of monitoring and inspection
- Supervision is done remotely, through an examination of the detailed reports banks must submit, as well as through on-site examination
- At the largest institutions, examiners are on site all the time; this is called continuous examination
- The most important part of a bank examination is the evaluation of past-due loans, to see if they should be declared in default
- Supervisors use the acronym CAMELS to describe the criteria used to evaluate the health of the bank:
- Capital adequacy,
- Asset quality,
- Management,
- Earnings,
- Liquidity,
- Sensitivity to risk
- Current practice is for examiners to act as consultants to banks, advising them on how to get the highest return possible while keeping risk at an acceptable level that ensures the bank will stay in business

THE GOVERNMENT'S BANK

- The central bank started out as the government's bank, originally created by rulers to finance wars
- However, the early examples are really the exceptions, as central banking is largely a 20th century phenomenon.
- The central bank occupies a privileged position: it has a monopoly on the issuance of currency
- The central bank creates money and thereby controls the availability of money and credit in a country's economy
- Most central banks go about this by adjusting short-term interest rates, an activity called monetary policy.
- In today's world, central banks use monetary policy to stabilize economic growth and inflation.
- An expansionary or accommodative policy (lower interest rates) raises growth and inflation; tighter or restrictive policy reduces them.
- Governments want to control the printing of money because it is a very profitable business; also, losing control of the amount of currency means losing control of inflation.

The Bankers' Bank

- The most important day-to-day jobs of the central bank are to:
- Provide loans during times of financial stress (the lender of last resort).
- Manage the payments system (settles interbank payments).
- Oversee commercial banks and the financial system (handles the sensitive information about institutions without conflicts of interest).
- By ensuring that sound banks and financial intermediaries can continue to operate, the central bank makes the whole financial system more stable.
- Central banks are the biggest and most powerful players in a country's financial and economic system and are supposed to use this power to stabilize the economy, making us all better off.
- However, central banks that are under extreme political pressure, or that are simply incompetent, can wreak havoc on the economic and financial systems.
- A central bank does not control:
- Securities markets
- The government's budget
- The common arrangement today is for the central bank to serve the government in the same way that a commercial bank serves a business or an individual.

Stability: The Primary Objective of All Central Banks

- When economic and financial systems are left on their own they are prone to episodes of extreme volatility; central bankers work to reduce that volatility
- Central bankers pursue five specific objectives:
- Low and stable inflation
- High and stable real growth, together with high employment
- Stable financial markets
- Stable interest rates
- A stable exchange rate
- Instability in any of those would pose an economy-wide economic risk that diversification could
- Not mitigate
- Thus the job of the central bank is to improve general economic welfare by managing and reducing systematic risk.
- It is probably impossible to achieve all five of these objectives simultaneously, and so tradeoffs must be made

Low, Stable Inflation

- Many central banks take as their primary job the maintenance of price stability; they strive to eliminate inflation.

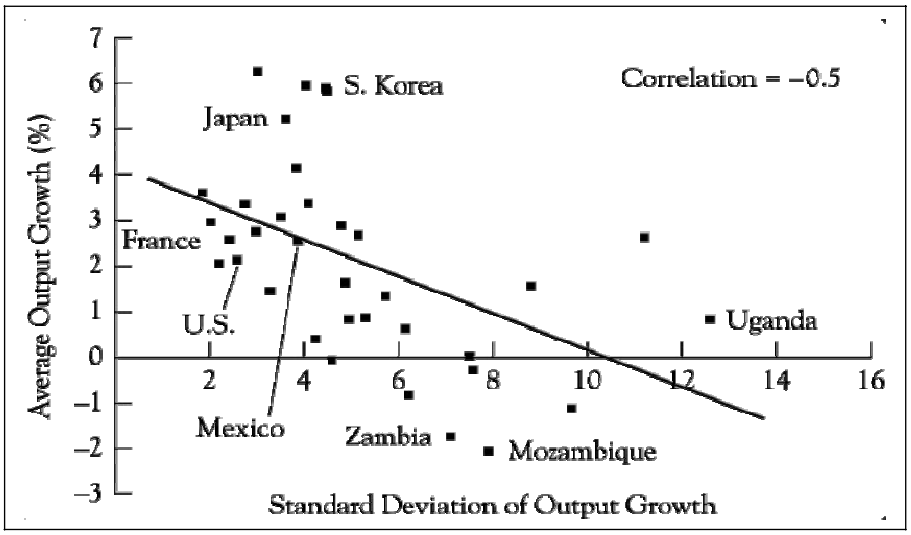
- The rationale for keeping the economy inflation-free is that money's usefulness as a unit of account and as a store of value is enhanced when its purchasing power is maintained.
- Inflation degrades the information content of prices and impedes the market's function of allocating resources to their best uses.
- The higher the inflation is, the less predictable it is, and the more systematic risk it creates.
- Also, high inflation is bad for growth.
- While there is agreement that low inflation should be the primary objective of monetary policy, there is no agreement on how low inflation should be.
- Zero inflation is too low, because it brings the risk of deflation (a drop in prices) which in turn results in increased defaults on loans and a threat to the health of banks.
- Furthermore, if inflation were zero, an employer wishing to cut labor costs would need to cut nominal wages, which is difficult to do.
- A small amount of inflation may actually make labor markets work better, at least from the employer's point of view.

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High, Stable Real Growth

- Central bankers work to dampen the fluctuations of the business cycle; booms are popular but recessions are not.
- Central bankers work to moderate these cycles and stabilize growth and employment by adjusting interest rates.
- Monetary policymakers can moderate recessions by lowering interest rates and can moderate booms by raising them (to keep growth at a sustainable level).
- Along with growth and employment, stability is also important, because fluctuation s in general business conditions are the primary source of systematic risk.



Financial System Stability

- Financial system stability is an integral part of every modern central banker's job.
- The possibility of a severe disruption in the financial markets is a type of systematic risk that central banks must control.

- **Interest Rate and Exchange Rate Stability**
- Interest rate stability and exchange rate stability are a means for achieving the ultimate goal of stabilizing the economy; they are not ends unto themselves.

- Interest rate volatility is a problem because:
- it makes output unstable as borrowing and expenditure fluctuate with changing rates.
- it means higher risk and a higher risk premium and makes financial decisions more difficult.
- Even though the exchange rate affects the prices of imports and exports, stabilizing exchange rates is the last item on the list of central bank objectives.
- Different countries have different priorities when it comes to the exchange rate;
- Stable exchange rates are more important in developing countries because imports and exports are central to their economies.

The objectives of a Modern Central Bank	
Low Stable Inflation	Inflation creates confusion and makes planning difficult. When inflation is high, growth is low
High Stable growth	Stable predictable growth is higher than unstable, unpredictable growth
Financial System Stability	A stable financial system is necessity for an economy to operate efficiently
Stable Interest Rates	Interest rate volatility creates risk for both lenders and borrowers
Stable Exchange Rates	Variable exchange rates make the revenues from foreign sales and the cost of purchasing imported goods hard to predict

Meeting the Challenge: Creating a Successful Central Bank

- The boom in the past decade with its associated decrease in volatility may have happened because technology sparked a boom just as central banks became better at their jobs.
- Policymakers realized that sustainable growth had gone up, so interest rates could be kept low without worrying about inflation, and central banks were redesigned.
- Today there is a clear consensus about the best way to design a central bank and what to tell policymakers to do.
- A central bank must be
- Independent of political pressure,
- Accountable to the public,
- Transparent in its policy actions,
- Clear in its communications with financial markets and the public

MEETING THE CHALLENGE: CREATING A SUCCESSFUL CENTRAL BANK

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- A central bank must be
- Independent of political pressure,
- Accountable to the public,
- Transparent in its policy actions,
- Clear in its communications with financial markets and the public.
- In addition, there is general agreement
- That policy decisions are better made by committee than by individuals,
- That everyone is well served when policymakers operate within an explicit framework that clearly states their goals and the tradeoffs among them.

The need for independence

- The idea that central banks should be independent of political pressure is a new one, because central banks originated as the governments' banks.
- Independence has two components:
- Monetary policymakers must be free to control their own budgets
- The bank's policies must not be reversible by people outside the central bank.
- Successful monetary policy requires a long time horizon, which is inconsistent with the need of politicians to focus on short-term goals.
- Given a choice, most politicians will choose monetary policies that are too accommodative, keeping interest rates low and money growth rates high.
- While this raises output and employment in the near term it may result in inflation over the longer term.
- To insulate policymakers from the daily pressures faced by politicians, governments have given central banks control of their own budgets, authority to make irreversible decisions, and appointed them to long terms.

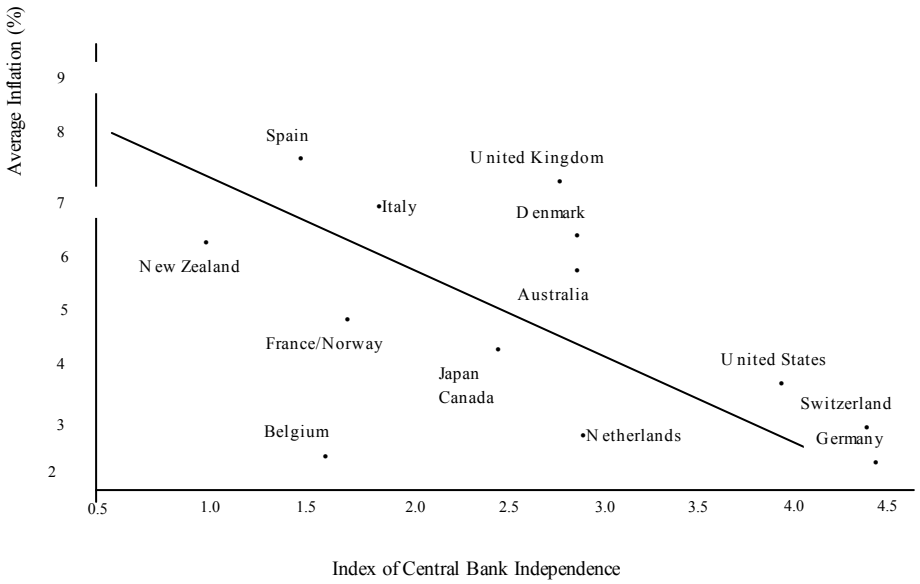
Decision-Making by Committee

- In the course of normal operations, it is better to rely on a committee than on an individual.
- Pooling the knowledge, experience, and opinions of a group of people reduces the risk that policy will be dictated by an individual's quirks, not to mention that in a democracy, vesting so much power in one individual poses a legitimacy problem.

The Need for Accountability and Transparency

- Central bank independence is inconsistent with representative democracy.
- To solve this problem, politicians have established a set of goals and require the policymakers to report their progress in pursuing these goals.
- Explicit goals foster accountability and disclosure requirements create transparency.
- The institutional means for assuring accountability and transparency differ from one country to the next;
- In some cases the government sets an explicit numerical target for inflation, while in others the central bank defines the target.
- Similar differences exist in the timing and content of information made public by central banks.

Figure: Inflation and Central Bank Independence 1973-1988



- Today it is understood that secrecy damages both the policymakers and the economies they are trying to manage, and that policymakers need to be as clear as possible about what they are trying to achieve and how they are going to achieve it.

The Policy Framework, Policy Trade-offs, and Credibility

- The monetary policy framework is made up of the objectives of central banks and the requirements that central banks be independent, accountable, and good communicators.
- The monetary policy framework exists to resolve the ambiguities that arise in the course of the central bank's work and also clarifies the likely responses when goals are in conflict with one another.
- Central bankers face the tradeoff between inflation and growth on a daily basis.
- Since policy goals often conflict, central bankers must make their priorities clear.
- A well-designed policy framework also helps policymakers establish credibility.

The Principles of Central Bank Design	
Independence	To keep inflation low, monetary decisions must be made free of political influence
Decision making by committee	Pooling the knowledge of a number of people yields better decisions than decision making by an individual
Accountability and transparency	Policy makers must be held accountable to the public they serve and clearly communicate their objectives, decisions and methods
Policy framework	Politicians must clearly state their policy goals and the tradeoffs among them

Fitting Everything Together:

- **Central Banks and Fiscal Policy**
- The central bank does not control the government's budget; fiscal policy (the decisions about taxes and spending) is the responsibility of elected officials
- While fiscal and monetary policymakers share the same ultimate goal of improving the well-being

- Funding needs create a natural conflict between monetary and fiscal policymakers.
- Fiscal policymakers also tend to ignore the long-term inflationary effects of their actions.
- Politicians often turn to borrowing (instead of taxes) as a way to finance some portion of their spending, but a country can issue only so much debt.
- Inflation is a real temptation to shortsighted fiscal policymakers because it is a way to get money in their hands and it's a way for governments to default on a portion of the debt they owe.
- Responsible fiscal policy is essential to the success of monetary policy.

The Central Bank's Balance Sheet

- The central bank engages in numerous financial transactions, all of which cause changes in its balance sheet.
- Central banks publish their balance sheets regularly. Publication is a crucial part of transparency

Table: The Central Bank's Balance Sheet		
	Assets	**Liabilities**
Government's bank	Securities Foreign exchange reserves	Currency Government's account
Banker's bank	Loans	Accounts of the commercial banks (reserves)

Assets

- The central bank's balance sheet shows three basic assets:
- Securities,
- Foreign exchange reserves,
- Loans
- **Securities:**
- The primary assets of most central banks;
- Independent central banks determine the quantity of securities that they purchase
- **Foreign Exchange Reserves:**
- The central bank's and government's balances of foreign currency are held as bonds issued by foreign governments.
- These reserves are used in foreign exchange market interventions.
- **Loans** are extended to commercial banks, and can fall into two categories: discount loans and float
- Discount loans: the loans the central bank makes when commercial banks need short-term cash.
- Float: a byproduct of the central bank's check-clearing business. The central bank credits the reserve account of the bank receiving the check before it debits the account of the bank on which the check was drawn and this creates float
- Through its holdings of Treasury securities the central bank controls the discount rate and the availability of money and credit.
- Gold reserves, while still an asset of many central banks, are virtually irrelevant these days.

Liabilities

- There are three major liabilities:
- Currency,
- The government's deposit account,
- The deposit accounts of the commercial banks.
- The first two items represent the central bank in its role as the government's bank, and the third shows it as the bankers' bank.
- **Currency:**
- Nearly all central banks have a monopoly on the issuance of currency, and currency accounts for over 90 percent of the central bank's liabilities.
- **Government's account:**
- The central bank provides the government with an account into which it deposits funds (primarily tax revenues) and from which it writes checks and makes payments.

- **Reserves:**
- Commercial bank reserves consist of cash in the bank's own vault and deposits at the central bank, which function like the commercial bank's checking account.
- Central banks run their monetary policy operations through changes in banking system reserves.

THE MONETARY BASE

- Currency in the hands of the public and the reserves of the banking system are the two components of the monetary base, also called high-powered money.
- Bank Reserves = Vault Cash plus Deposits at the central bank
- The central bank can control the size of the monetary base and therefore the quantity of money

Changing the Size and Composition of the Balance Sheet

- The central bank controls the size of its balance sheet. Policymakers can enlarge or reduce their assets and liabilities at will
- The central bank can buy things, like a bond, and create liabilities to pay for them. It can increase the size of its balance sheet as much as it wants.
- There are four specific types of transactions which can affect the balance sheets of both the central bank and the banking system:
- An open market operation, in which the central bank buys or sells a security;
- A foreign exchange intervention, in which the central bank buys or sells foreign currency reserves;
- The central bank's extension of a discount loan to a commercial bank;
- The decision by an individual to withdraw cash from a bank
- Open market operations, foreign exchange interventions, and discount loans, all affect the size of the central bank's balance sheet
- They change the size of the monetary base;
- Cash withdrawals by the public create shifts among the different components of the monetary base, changing the composition of the central bank's balance sheet but leaving its size unaffected
- One simple rule will help in understanding the impact of each of these four transactions on the central bank's balance sheet:
- When the value of an asset on the balance sheet increases, either the value of another asset decreases (so that the net change is zero) or the value of a liability rises by the same amount (and similarly for an increase in liabilities)

Open Market Operations

- OMO is when the central bank buys or sells securities in financial markets
- These purchases and sales have a straightforward impact on the central bank's balance sheet:
- Its assets and liabilities increase by the amount of a purchase, and the monetary base increases by the same amount

Table: Change in the Central Bank's Balance sheet following purchase of a Treasury Bond

Assets		Liabilities	
Securities(Treasury Bond)	+$1billion	Reserves	+$1billion

Table: Change in the Banking system's balance sheet following the Central Bank's purchase of a Treasury Bond

Assets		Liabilities
Reserves	+$1billion	
Securities (U.S. Treasury Bond)	-$1billion	

- In terms of the banking system's balance sheet, the purchase has no effect on the liabilities, and results in two counterbalancing changes on the asset side, so the net effect there is zero
- For an open market sale, the effects would be the same but in the opposite direction

Foreign Exchange Intervention

- The impact of a foreign exchange purchase is almost identical to that of an open market purchase:
- The central bank's assets and liabilities increase by the same amount, as does the monetary base.

- If the central bank buys from a commercial bank, the impact again is like the open market purchase, except the assets involved are different.

Table: change in the Central bank's Balance sheet following purchase of Euro-denominated German Government Bonds			
Assets		**Liabilities**	
Foreign exchange reserves (German government bonds in euros)	+$1billion	Reserves	+$1billion

Table: Change in the Banking system's Balance sheet following the Central bank's purchase of Euro-denominated German Government Bonds			
Assets		**Liabilities**	
Reserves	+$1billion		
Securities (German government bonds)	-$1billion		

Discount Loans

- The central bank does not force commercial banks to borrow money; the banks ask for loans and must provide collateral, usually a Treasury bond.
- When the central bank makes a loan it creates an asset and a matching increase in its reserve liabilities.

Table: Change in the Central Bank's Balance sheet following a Discount Loan			
Assets		**Liabilities**	
Discount loans	+$100million	Reserves	+$100million

Table: Change in the Banking System's Balance Sheet following a Discount Loan			
Assets		**Liabilities**	
Reserves	+$100million	Discount loans	+$100million

- The extension of credit to the banking system raises the level of reserves and expands the monetary base.
- The banking system balance sheet shows an increase in assets (reserves) and an increase in liabilities (the loan).

Cash Withdrawal

- Cash withdrawals affect only the composition, not the size, of the monetary base.
- When people withdraw cash they force a shift from reserves to currency on the central bank's balance sheet.

Table: Change in the Nonbank Public's Balance Sheet following a Cash Withdrawal			
Assets		**Liabilities**	
Currency	+$100		
Checkable deposits	-$100		

- The withdrawal reduces the banking system's reserves, which is a decrease in its assets, and if the funds come from a checking account, there is a matching decrease in liabilities.

Table: Change in the Banking system's Balance sheet following a Cash Withdrawal			
Assets		**Liabilities**	
Reserves	-$100	Checkable deposits	-$100

- On the central bank's balance sheet both currency and reserves are liabilities, so there is just a change between the two with a net effect of zero.

Table: Change in the Central Bank's Balance Sheet following a Cash Withdrawal		
Assets	**Liabilities**	
	Currency	+$100
	Reserves	-$100

Changes in Size and Composition of Central Bank's Balance Sheet and Monetary Base			
Transaction	**Initiated by**	**Typical action**	**Impact**
Open market operation	Central bank	Purchase of Treasury bond	Increases reserves, the size of central bank's balance sheet and Monetary base
Foreign Exchange Intervention	Central bank	Purchase of foreign govt. bonds	Increases reserves, the size of central bank's balance sheet and Monetary base
Discount Loans	Commercial bank	Extension of loan to commercial bank	Increases reserves, the size of central bank's balance sheet and Monetary base
Cash withdrawals	Nonbank public	Withdrawal of cash from ATM	Decreases reserves and increases currency, leaving size of central bank's balance sheet and Monetary base unchanged

DEPOSIT CREATION IN A SINGLE BANK

- If the central bank buys a security from a bank, the bank has excess reserves, which it will seek to lend
- The loan replaces the securities as an asset on the bank's balance sheet

Table: Change in First Bank's Balance Sheet following Central Bank's purchase of a Treasury bond			
Assets		**Liabilities**	
Reserves	+$100,000		
Securities	-$100,000		

- Assuming First bank has granted a loan of $100,000 to Office Builders Incorporated (OBI)

Table: Change in First Bank's Balance sheet following Central Bank's purchase of a Treasury bond and Extension of a loan			
Assets		**Liabilities**	
Reserves	+$100,000	OBI Checking account	+$100,000
Securities	-$100,000		
Loans	+$100,000		

- OBI paid off its employees and suppliers through checks worth $100,000

Table: Change in First Bank's balance sheet following Central Bank's purchase of a Treasury Bond, Extension of a loan, and withdrawal by the borrower			
Assets		**Liabilities**	
Reserves	$0	Checkable deposits	$0
Securities	-$100,000		
Loans	+$100,000		

Deposit Expansion in a System of Banks

- The loan that the First bank made was spent and as the checks cleared, reserves were transferred to other banks
- The banks that receive the reserves will seek to lend their excess reserves, and the process continues until all of the funds have ended up in required reserves

Types of Reserves

- Actual Reserves (R)
- Required Reserves ($RR=r_DD$)
- Excess Reserves (ER)
- Assume
- Bank holds no excess reserves.
- The reserve requirement ratio is 10%
- Currency holding does not change when deposits and loans change.
- When a borrower writes a check, none of the recipients of the funds deposit them back in the bank that initially made the loan.
- Let's say, OBI uses the $100,000 loan to pay its supplier American Steel Co (ASC), which it deposits in its bank the Second bank.

Table: Change in Second Bank's Balance sheet following American Steel's Deposit			
Assets		**Liabilities**	
Reserves	+$100,000	American Steel's checking account	+$100,000

Table: Change in Second Bank's Balance sheet following a Deposit and Extension of a loan			
Assuming a 10% reserve requirement, banks hold no excess reserves, and there are no changes in currency holdings.			
Assets		**liabilities**	
Reserves	+$10,000	American Steel's Checking account	+$100,000
Loan	+$90,000		

Table: Change in Third Bank's Balance Sheet following a Deposit and Extension of a loan			
Assuming a 10% reserve requirement, banks hold no excess reserves, and there are no changes in currency holdings.			
Assets		**Liabilities**	
Reserves	+$9,000	Checking account	+$90,000
Loan	+$81,000		

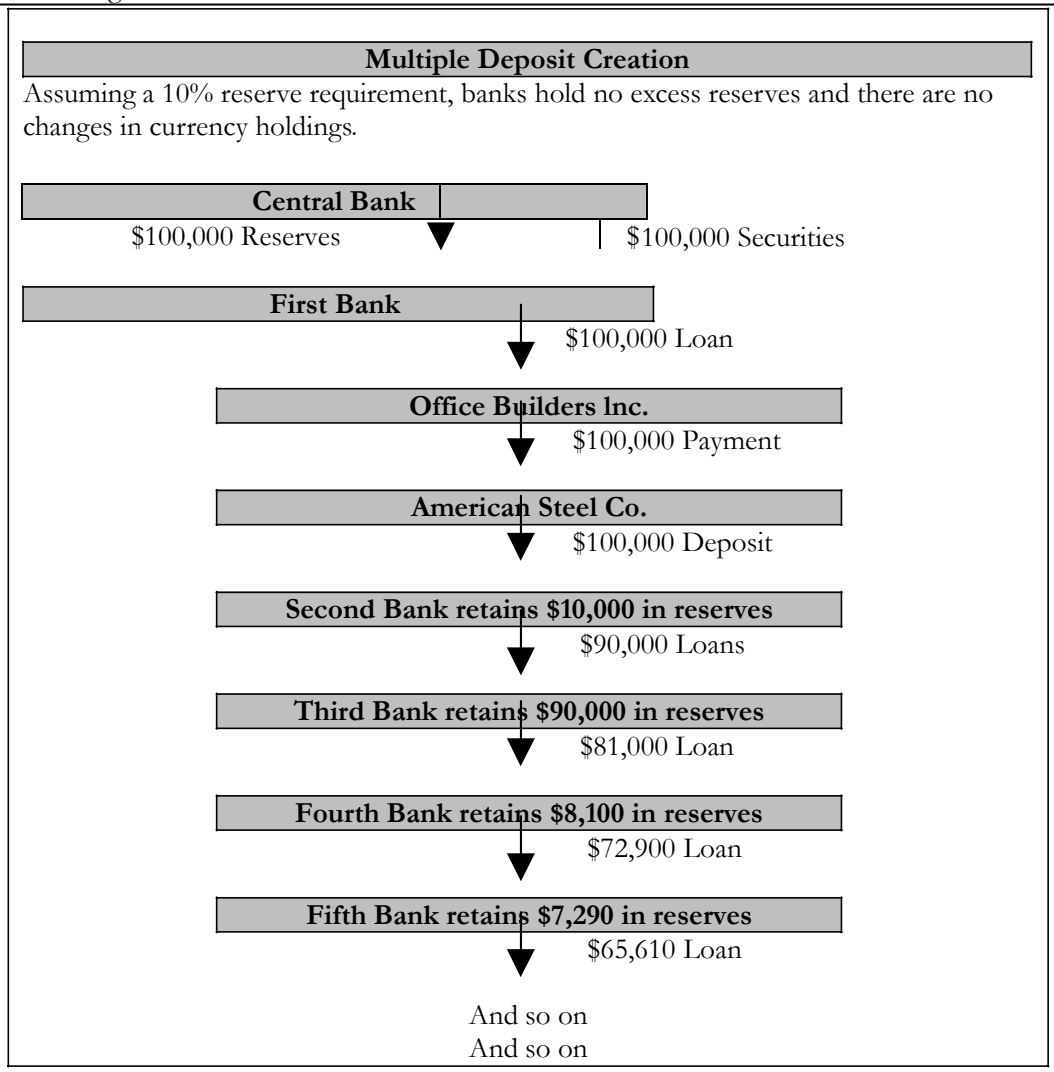


Table: Multiple Deposit Expansion following a $100,000 Open Market Purchase Assuming a 10% reserve requirement

Bank	Increase in Deposits	Increase in Loans	Increase in Reserves
First bank	$0	$100,000	$0
Second bank	$100,000	$90,000	$10,000
Third bank	$90,000	$81,000	$9,000
Fourth bank	$81,000	$72,900	$8,100
Fifth bank	$72,900	$65,610	$7,290
Sixth bank	$65,610	$59,049	$6,561
-	-	-	-
-	-	-	-
-	-	-	-
The Banking System	**$1,000,000**	**$1,000,000**	**$100,000**

Deposit Expansion Multiplier

- Assuming
- No excess reserves are held
- There are no changes in the amount of currency held by the public,
- The change in deposits will be the inverse of the required deposit reserve ratio (rD) times the change in required reserves, or

- $\Delta D = (1/rD)\ \Delta RR$
- Alternatively
- $RR = r_D D$ or $\Delta RR = r_D \Delta D$
- So for every dollar increase in reserves, deposits rise by $1/r_D$
- The term $(1/r_D)$ represents the simple deposit expansion multiplier.
- A decrease in reserves will generate a deposit contraction in a multiple amount too
- R_D=10% (0.10), and ΔRR=$100,000

- $\Delta D = \frac{1}{.1}\ \$100,000$

- ΔD= $1,000,000

Deposit Expansion with Excess Reserves and Cash Withdrawals

- The simple deposit expansion multiplier was derived assuming no excess reserves are held and that there is no change in currency holdings by the public.
- These assumptions are now relaxed as
- 5% withdraw of cash.
- Excess reserves of 5% of deposits
- Continuing with our previous example, if American Steel Co (ASC) removes 5% of its new funds in cash, which leaves $95,000 in the checking account and $95,000 in the Second bank's reserve account
- **Bank wishes to hold excessive reserves of 5% of deposits, it would keep reserves of 15% of $95,000 or $14,250 and making a loan of $80,750**

Table: Change in Second Bank's Balance sheet following a Deposit and Extension of a Loan			
Assuming excess reserves and cash holdings. Note: American Steel also has $5,000 in cash.			
Assets		**Liabilities**	
Required reserves	+$9,500	American Steel's checking account	+$95,000
Excess reserves	+$4,750		
Loan	+$80,750		

- The desire of banks to hold excess reserves and the desire of account holders to withdraw cash both reduce the impact of a given change in reserves on the total deposits in the system.
- The more excess reserves banks desire to hold, and the more cash that is withdrawn, the smaller the impact.

Money Multiplier

- The money multiplier shows how the quantity of money (checking account plus currency) is related to the monetary base (reserves in the banking system plus currency held by the nonbank public)
- Taking m for money multiplier and MB for monetary base, the Quantity of Money, M is

- M = m x MB

- (This is why the MB is called High Powered Money)
- Consider the following relationships
- Money = Currency + Checkable deposits

- M = C + D
- Monetary Base = Currency + Reserves

- MB = C +R
- Reserves = Req. Res. + Exc. Res
- R = RR + ER
- The amount of excess reserves a bank holds depends on the costs and benefits of holding them,
- The cost is the interest foregone
- The benefit is the safety from having the reserves in case there is an increase in withdrawals
- The higher the interest rate, the lower banks' excess reserves will be; the greater the concern over possible deposit withdrawals, the higher the excess reserves will be
- Introducing Excess Reserve Ratio {ER/D}
- R = RR + ER
- $= r_D D + \{ER/D\}\ D$
- $= (r_D + \{ER/D\})\ D$

Lesson 35

MONEY MULTIPLIER

- Remember, we discussed that
- Assuming
- No excess reserves are held
- There are no changes in the amount of currency held by the public,
- The change in deposits will be the inverse of the required deposit reserve ratio (r_D) times the change in required reserves, or $\Delta D = (1/r_D)\ \Delta RR$
- Alternatively
- $RR = r_D D$ or $\Delta RR = r_D \Delta D$
- For every dollar increase in reserves, deposits increase by $1/\ r_D$
- The term $(1/r_D)$ represents the simple deposit expansion multiplier.
- A decrease in reserves will generate a deposit contraction in a multiple amount too
- The money multiplier shows how the quantity of money (checking account plus currency) is related to the monetary base (reserves in the banking system plus currency held by the Nonbank public)
- Taking m for money multiplier and MB for monetary base, the Quantity of Money, M is
- $M = m \times MB$
- (This is why the MB is called High Powered Money)
- Consider the following relationships
- Money = Currency + Checkable deposits
- $M = C + D$
- Monetary Base = Currency + Reserves
- $MB = C + R$
- Reserves = Req. Res. + Exc. Res
- $R = RR + ER$
- The amount of excess reserves a bank holds depends on the costs and benefits of holding them,
- The cost is the interest foregone
- The benefit is the safety from having the reserves in case there is an increase in withdrawals
- The higher the interest rate, the lower banks' excess reserves will be; the greater the concern over possible deposit withdrawals, the higher the excess reserves will be.

Introducing Excess Reserve Ratio {ER/D}

- $R = RR + ER$
- $= r_D D + \{ER/D\}\ D$
- $= (r_D + \{ER/D\})\ D$
- The decision of how much currency to hold depends on the costs and benefits, where the cost is the interest foregone and the benefit is the lower risk and greater liquidity of currency.
- As interest rates rise cash becomes less desirable, but if the riskiness of alternative holdings rises or liquidity falls, then it becomes more desirable
- **Now taking Currency Ratio as {C/D}**
- $MB = C + R$

- = {C/D} D + (r_D + {ER/D}) D
- = ({C/D} + r_D + {ER/D}) D
- This shows that monetary base has three uses
- Required reserves
- Excessive reserves
- Cash in the hands of nonbank public

- **Deposit Expansion with Excess Reserves and Cash Withdraws**

$$D \quad \frac{1}{\{C/D\} \quad r_D \quad \{ER/D\}} \times MB$$

$$M \quad \frac{\{C/D\} \quad 1}{\{C/D\} \quad r_D \quad \{ER/D\}} \times MB$$

The Quantity of Money (M) Depends on:

- The Monetary base (MB), Controlled by the central bank
- Reserve Requirements
- Bank's desired to hold excess reserves
- The public's demand for currency
- The quantity of money changes directly with the base, and for a given amount of the base, an increase in either the reserve requirement or the holdings of excess reserves will decrease the quantity of money.
- But currency holdings affect both the numerator and the denominator of the multiplier, so the effect is not immediately obvious. Logic tells us that an increase in currency decreases reserves and so decreases the money supply.

Table: Factors Affecting the Quantity of Money

Factors	Who controls it	Change	Impact on M
Monetary Base	Central bank	Increase	Increase
Required reserve-to-deposit ratio	Bank regulators	Increase	Decrease
Excess reserve-to-deposit ratio	Commercial banks	Increase	Decrease
Currency-to-deposit ratio	Nonbank public	Increase	Decrease

The Central Bank's Monetary Policy Toolbox

- Central bank controls the quantity of reserves that commercial banks hold
- Besides the quantity of reserves, the central bank can control either the size of the monetary base or the price of its components
- The two prices it concentrates on are
- Interest rate at which banks borrow and lend reserves overnight (the federal funds rate)
- Interest rate at which banks can borrow reserves from the central bank (the discount rate)
- The central bank has three monetary policy tools, or instruments:
- The target federal funds rate,
- The discount rate, and
- The reserve requirement

The Target Federal Funds Rate and Open Market Operations

- The target federal funds rate is the central bank's primary policy instrument.
- The federal funds rate is determined in the market, rather than being controlled by the central bank.
- The name "federal funds" comes from the fact that the funds banks trade their deposit balances at

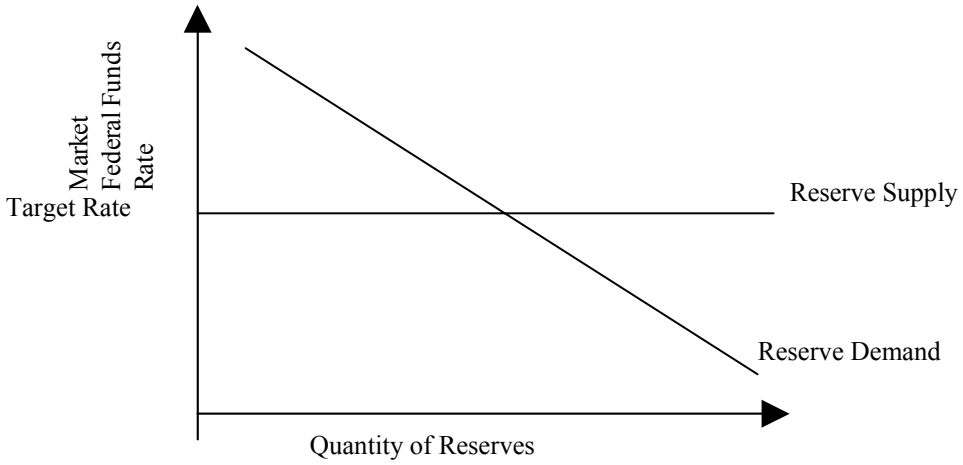
- Central bank holds the capacity to force the market federal funds rate to equal the target rate all the time by participating directly in the market for overnight reserves, both as a borrower and as a lender.
- As a lender, the central bank would need to make unsecured loans to commercial banks, and as a borrower, the central bank would in effect be paying interest on excess reserves
- The central bank chooses to control the federal funds rate by manipulating the quantity of reserves through open market operations: the central bank buys or sells securities to add or drain reserves as required.

Lesson 36

TARGET FEDERAL FUNDS RATE AND OPEN MARKET OPERATION

- The central bank chooses to control the federal funds rate by manipulating the quantity of reserves through open market operations: the central bank buys or sells securities to add or drain reserves as required.

Figure: The Market for Bank Reserves



Discount Lending, the Lender of Last Resort and Crisis Management

- Lending to commercial banks is not an important part of the central bank's day-to-day monetary policy.
- However, such lending is the central bank's primary tool for ensuring short-term financial stability, for eliminating bank panics and preventing the sudden collapse of institutions that are experiencing financial difficulties.
- The central bank is the lender of last resort, making loans to banks when no one else can or will, but a bank must show that it is sound to get a loan in a crisis.
- The current discount lending procedures also help the central bank meet its interest-rate stability objective.
- The central bank makes three types of loans:
- Primary credit,
- Secondary credit,
- Seasonal credit
- Primary credit is extended on a very short-term basis, usually overnight, to sound institutions.
- It is designed to provide additional reserves at times when the day's reserve supply falls short of the banking system's demand.
- The system provides liquidity in times of crisis, ensures financial stability, and restricts the range over which the market federal funds rate can move (helping to maintain interest-rate stability).
- Secondary credit is available to institutions that are not sufficiently sound to qualify for primary credit.
- Banks may seek secondary credit due to a temporary shortfall in reserves or because they have longer-term problems that they need to work out.
- Seasonal credit is used primarily by small agricultural banks to help in managing the cyclical nature of farmers' loans and deposits

Reserve Requirements

- By adjusting the reserve requirement, the central bank can influence economic activity because changes in the requirement affect deposit expansion.
- Unfortunately, the reserve requirement turns out not to be very useful because small changes in the reserve requirement have large (really too large) impacts on the level of deposits.
- Today, the reserve requirement exists primarily to stabilize the demand for reserves and help the Central bank to maintain the market federal funds rate close to target; it is not used as a direct tool of monetary policy.

The central bank's Monetary Policy Toolbox

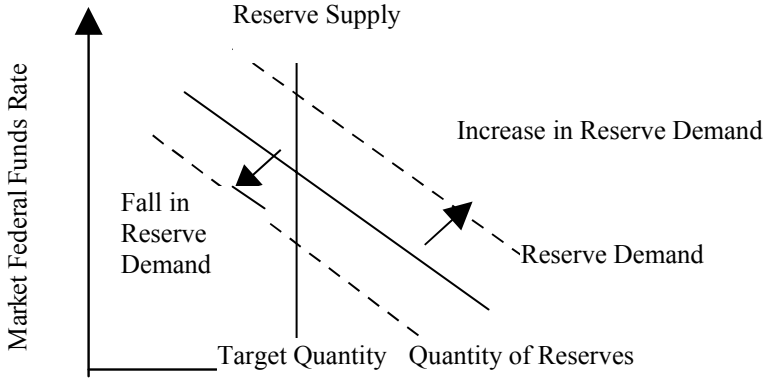
The Tools of Monetary Policy			
	What is it?	**How is it controlled?**	**What is its impact?**
Target Federal Funds Rate	Interest rate charged on overnight loans between banks	Supply of reserves adjusted through open market operations to meet expected demand at the target rate	Changes interest rates throughout the economy
Discount rate	Interest rate charged by the central bank on loans to commercial banks	Set as a premium over the target federal funds rate	Provides short-term liquidity to bank in times of crisis and aids in controlling the federal funds rate
Reserve requirement	Fraction of deposits that bank must keep either on deposit at the central bank or as cash in their vaults	Set by the central bank within a liquidity imposed range	Stabilizes the demand for reserves

Linking Tools to Objectives

- Desirable Features of a Policy Instrument
- Easily observable by everyone
- Controllable and quickly changed
- Tightly linked to the policymakers' objectives
- These requirements leave policymakers with few choices, and over the years central banks have switched between controlling the quantity and controlling the prices.

Figure: The Market for Bank Reserves when the central bank targets the quantity of reserves

When central bank targets the quantity of reserves, a shift in reserve demand causes the market federal funds rate to move. An increase in reserve demand forces the interest rate up, while a fall in reserve demand forces the interest rate down.



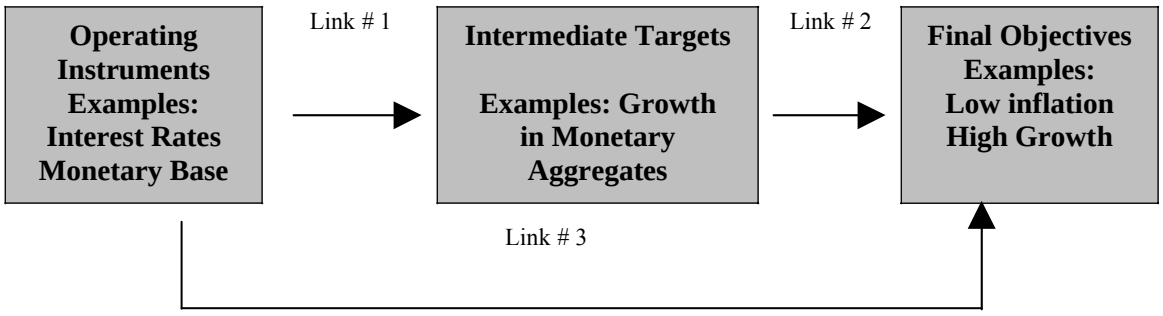
Targets and Instruments

- Operating instruments refer to actual tools of policy, instruments that the central bank controls directly.

- Intermediate target refers to instruments that are not directly under the control of the central bank but that lie between their policymaking tools and their objectives.
- Over the last two centuries, central bankers largely abandoned intermediate targets, having realized that they didn't make much sense.
- Instead, policymakers focus on how their actions directly affect their target objectives

Instruments, Targets and Objectives

Using policy instruments to target objectives directly



Lesson 37

WHY DO WE CARE ABOUT MONETARY AGGREGATES?

- Every country with high inflation has high money growth; thus to avoid sustained episodes of high inflation, a central bank must be concerned with money growth.
- It is impossible to have high, sustained inflation without monetary accommodation.

Monetary Aggregates

Figure: Inflation and Money Growth: Moderate-Inflation Countries, 1981-2003

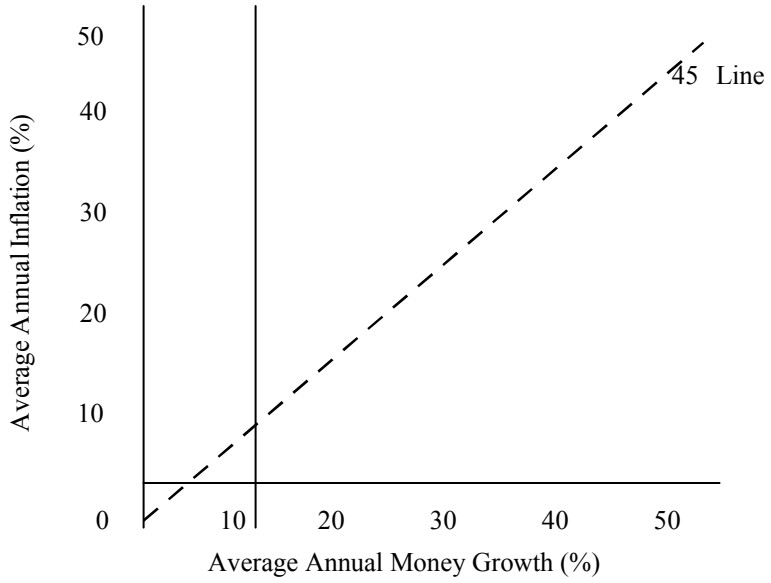
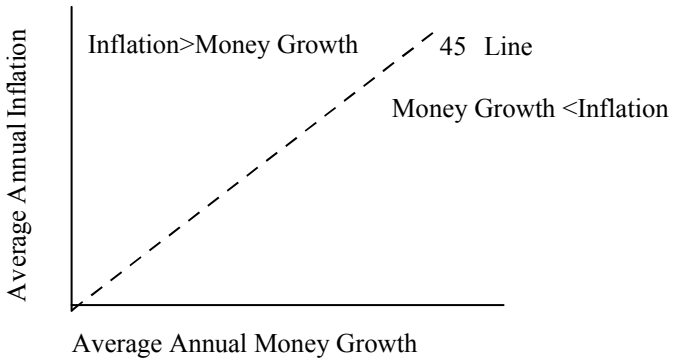


Figure: Money, Growth and Inflation



- When the currency that people are holding loses value much rapidly, they will work to spend what they have as quickly as possible
- This will have the same effect on inflation as an increase in money growth
- It is impossible to have high, sustained inflation without monetary accommodation.
- Something beyond just differences in money growth accounts for the differences in inflation across countries.

Velocity and the Equation of Exchange

- To understand the relationship between inflation and money growth we need to focus on money as a means of payment.

- Ali has Rs. 100 in cash
- Bilal has a Rs. 100 calculator
- Chohan has 2 tickets worth Rs. 50 each for a cricket match
- Dilawer has a set of 25 drawing pencils worth Rs. 4 each
- Ali needs a calculator which he buys from Bilal.
- Bilal wishes to see the match so he buys the tickets from Chohan
- Chohan uses the proceeds to purchase the drawing pencils from Dilawer
- Total Value of the transactions is
- (Rs. 100 x 1 calculator) + (Rs. 50 x 2 tickets) + (Rs. 4 x 25 pencils) = Rs. 300
- Generally
- No. of Rupees x No. of time each Re is used = Rs. Value of Transactions
- The number of times each rupee is used (per unit of time) in making payments is called the velocity of money; the more frequently each rupee is used, the higher the velocity of money
- Applying to economy wide transactions:
- Quantity of Money x Velocity of Money = Nominal GDP
- Using data on the quantity of money and nominal GDP we can compute the velocity of money; each monetary aggregate has its own velocity
- If we represent
- Money with M
- Velocity with V
- Price level with P
- Real GDP with Y
- Nominal GDP = P x Y
- Substituting, we get

- M x V = P x Y
- The equation of exchange, MV=PY provides the link between money and prices if we rewrite it in terms of percentage changes

The Quantity Theory and the Velocity of Money

$$MV \quad PY$$

or

$$\%M \quad \%V \quad \%P \quad \%Y$$

- Money Growth + Velocity Growth = Inflation + Output Growth

- In the early 20th century, Irving Fisher wrote down the equation of exchange and derived the implication that
- Money growth + velocity growth = inflation + real growth
- Assuming
- No important changes occur in payment methods or the cost of holding money,
- Real output is determined solely by economic resources and production technology,
- Then changes in the aggregate price level are caused solely by changes in the quantity of money.
- In other words
- Assume that $\%\Delta V = 0$ and $\%\Delta Y = 0$.
- Doubling the quantity of money doubles the price level.
- Inflation is a monetary phenomenon (Milton Friedman).
- In our example of four students, number of rupees needed equaled total rupee value of the transaction divided by no. of times each rupee was used
- Money demand = Total $\frac{\text{valueoftransaction}}{\text{Velocity of Money}}$
- For the economy as a whole,

- Money demand = $\frac{\text{NominalGDP}}{\text{Velocity}}$

- $M^d = 1/V \times PY$
- Money Supply (M^s) is determined by central bank and the behavior of the banking system
- Equilibrium means $M^d = M^s = M$
- Rearranging the Money demand function gives $MV = PY$
- The quantity theory of money tells us why high inflation and high money growth go together, and explains why countries can have money growth that is higher than inflation (because they are experiencing real growth).

The Facts about Velocity

- Fisher's logic led Milton Friedman to conclude that central banks should simply set money growth at a constant rate.
- Policymakers should strive to ensure that the monetary aggregates grow at a rate equal to the rate of real growth plus the desired level of inflation.

THE FACTS ABOUT VELOCITY

- Fisher's logic led Milton Friedman to conclude that central banks should simply set money growth at a constant rate.
- Policymakers should strive to ensure that the monetary aggregates grow at a rate equal to the rate of real growth plus the desired level of inflation.
- Knowing that the multiplier is a variable, Friedman suggested changes in regulations that would
- Limit banks' discretion in creating money
- Tighten the relationship between the monetary aggregates and the monetary base.
- However, even with Friedman's recommendations, the central bank would stabilize inflation by keeping money growth constant only if velocity were constant.
- In the long run, the velocity of money is stable, though there can be significant short-run variations.
- From the point of view of policymakers, these fluctuations in velocity are enormous.
- Assuming that central bank can accurately control the growth rate of M2 as well as accurately forecast real growth.

Money Growth + Velocity Growth = Inflation + Real Growth

- With an inflation objective of 2% and a real growth forecast of 3.5%, equation of exchange tells us that policy makers should set money growth 5.5% minus the growth rate of velocity.
- If velocity increases by 3% then money growth needs to be 2.5%
- If it falls by 3% then money growth needs to be 8.5%
- When inflation is low, short run velocity growth can be several times the policy makers' inflation objectives.
- So to use money growth targets to stabilize inflation, policy makers must understand how velocity changes
- Fluctuations in velocity are tied to changes in people's desire to hold money and so in order to understand and predict changes in velocity; policymakers must understand the demand for money.

Figure: Velocity of M1 and M2 (on the same vertical scale)

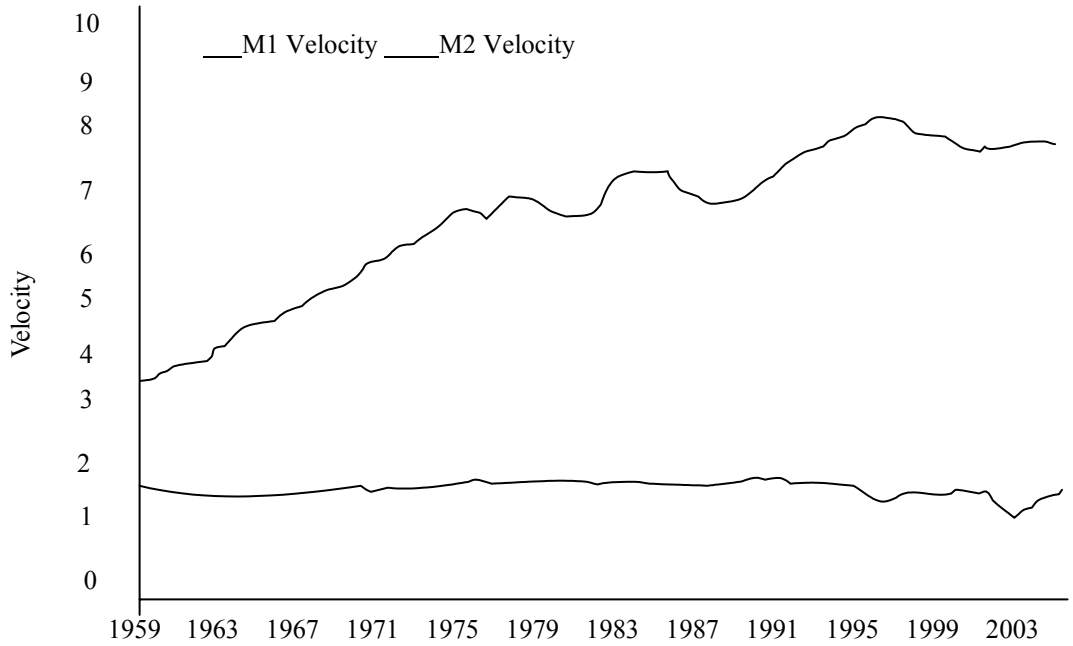


Figure: Velocity of M2 (on its own scale)

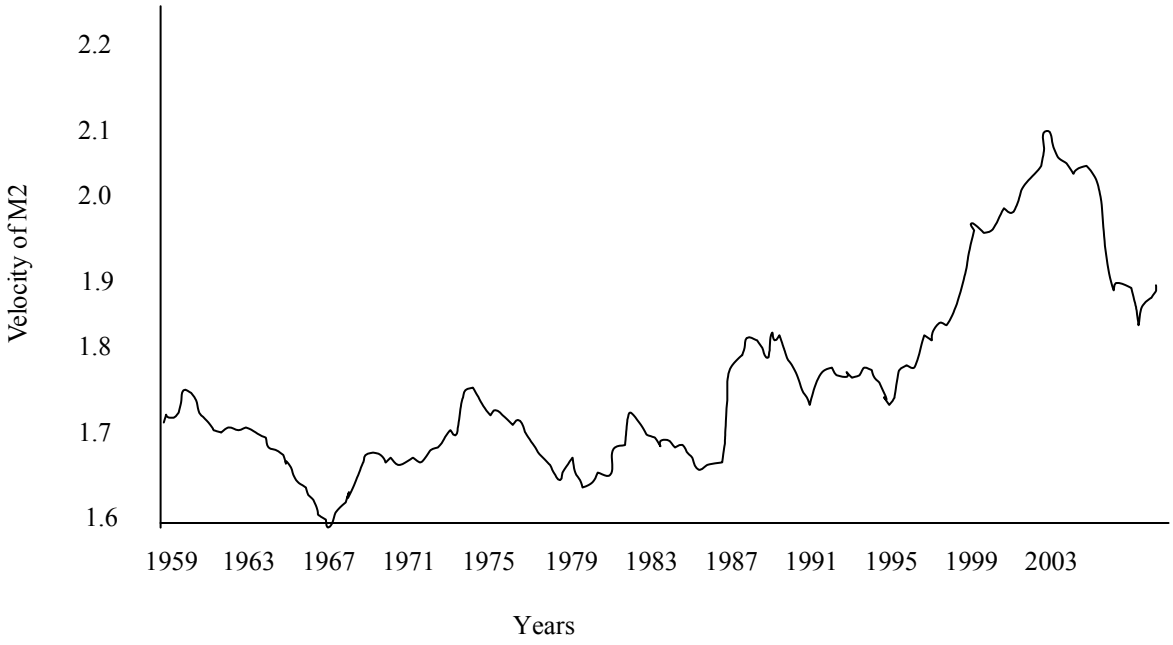
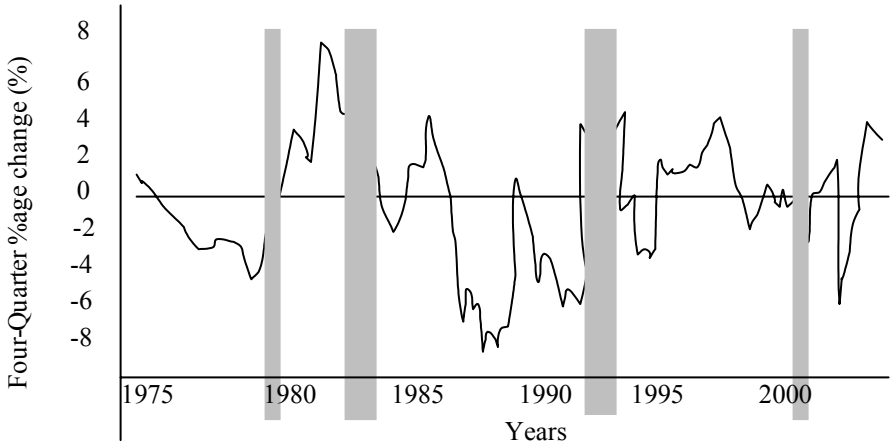


Figure: Percentage change in the short-run velocity of M2, 1960-2004



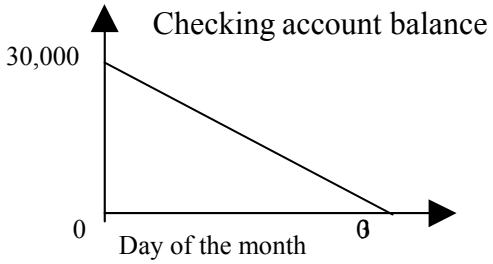
The Transactions Demand for Money

- The quantity of money people hold for transactions purposes depends on
- Their nominal income,
- The cost of holding money,
- The availability of substitutes
- Nominal money demand rises with nominal income, as more income means more spending, which requires more money
- Holding money allows people to make payments, but has cost of interest foregone.
- There may also be costs in switching between interest-bearing assets and money.
- **Example**
- If your monthly earning is Rs.30, 000 (deposited in bank each month) and assuming you spend Rs.1, 000 each day, after 15 days your checking account balance will decline to Rs.15, 000 and to zero on 30th day

- Your bank offers you a choice of leaving the entire 30,000 in the account or shifting funds back and forth between checking and a bond fund.
- The bond fund pays interest but adds a service charge of Rs.20 for each withdrawal.
- How would you manage your funds and what should be your frequency of shifting the funds between the bond fund and checking account?
- Consider the following alternatives.

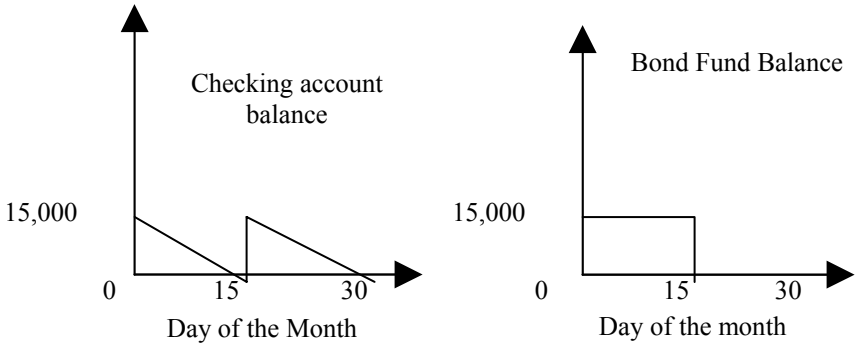
Two alternatives for managing your cash balance

Strategy 1: Leave entire balance in checking account



Bond fund balance is zero throughout the month.

Strategy 2: Transfer half to bond fund, then transfer back at mid-month



- Your choice depends upon the interest rate you receive on the bond fund
- If interest income is at least as much as the service charge then you will split your pay check at the beginning of the month.
- Otherwise you will not want to invest in bond fund.
- If you shift half your funds once , at the middle of the month, you'll have Rs.15,000 in bond fund during the first half of the month and Rs.0 during the second half, so your average balance will be Rs.7,500.
- Making shift will cost you Rs.20 so if the interest on Rs.7, 500 is greater than 20, you should make the shift.
- At monthly interest rate of 0.27%, Rs.7, 500 will produce an income of Rs.20
- (20 / 7500= 0.0027)
- So if bond fund offers a higher rate you should make the shift.
- As the nominal interest rate rises, people reduce their checking account balances, which allow us to predict that velocity will change with the interest rate.
- Higher the nominal interest rate, the less money individuals will hold for a given level of transactions, and higher the velocity of money
- The transactions demand for money is also affected by technology, as financial innovation allows people to limit the amount of money they hold.
- The lower the cost of shifting money between accounts, the lower the money holdings and the higher the velocity.

- Suppose your bank offers free automatic transfer account. You sign up for it but continue using your old check and debit account
- Your take home pay is the same Rs.30, 000. Each time you make a purchase, your bank automatically shifts the amount of purchase from your bond fund to your checking account where it remains for one day before being paid to your creditor.
- Spending your Rs.30,000 in 30 days, your average money holding will be Rs.1000 far below Rs.1,500 you would hold if you simply left the 30,000 in your checking account and spent it at a rate of Rs.1,000 per day
- So lower the cost of shifting funds from your bond fund to your checking account, the lower your money holdings at a given level of income and the higher the velocity of your money
- An increase in the liquidity of stocks, bonds, or any other asset reduces the transactions demand for money.
- People also hold money to ensure against unexpected expenses; this is called the precautionary demand for money and can be included with the transactions demand.
- The higher the level of uncertainty about the future, the higher the demand for money and the lower the velocity of money

The Portfolio Demand for Money

- Money is just one of many financial instruments that we can hold in our investment portfolios.
- Expectations that interest rates will change in the future are related to the expected return on a bond and also affect the demand for money.

Lesson 39

THE PORTFOLIO DEMAND FOR MONEY

- Money is just one of many financial instruments that we can hold in our investment portfolios.
- Expectations that interest rates will change in the future are related to the expected return on a bond and also affect the demand for money.
- When interest rates are expected to rise, money demand goes up as people switch from holding bonds into holding money.
- The demand for money will also be affected by changes in the riskiness of other assets; as their risk increases so does the demand for money.
- Money demand will increase if other assets become less liquid.

Determinants of Money Demand: Factors that cause individuals to hold more money	
Transactions Demand for Money	
National Income	The higher nominal income, the higher the demand for money
Interest rates	The lower interest rates, the higher the demand for money
Availability of alternative means of payment	The less available alternatives means of payment, the higher the demand for money
Portfolio Demand for Money	
Wealth	As wealth rises, the demand for money goes up
Return relative to alternatives	As the return on alternatives falls, the demand for money goes up
Expected future interest rates	As expected future interest rates rise, the demand for money goes up
Risk relative to alternatives	As the riskiness of alternatives rises, the demand for money goes up
Liquidity relative	As the liquidity of alternatives falls, the demand for money goes up

Targeting Money Growth in a Low-Inflation Environment

- In the long run, inflation is tied to money growth.
- In a high-inflation environment moderate variations in the growth of velocity are a mere annoyance.
- The only solution to inflation in a high inflation environment is to reduce money growth.
- In a low-inflation environment, the ability to use money growth as a policy guide depends on the stability of the velocity of money.
- Two criteria for the use of money growth as a direct monetary policy target:
- A stable link between the monetary base and the quantity of money
- A predictable relationship between the quantity of money and inflation
- These allow policymakers to Predict the impact of changes in the central bank's balance sheet on the quantity of money
- Translate changes in money growth into changes in inflation.

Output and Inflation in the Long Run

- **Potential Output**
- Potential output is what the economy is capable of producing when its resources are used at normal rates.
- Potential output is not a fixed level, because the amount of labor and capital in an economy can grow, and improved technology can increase the efficiency of the production process
- Unexpected events can push current output away from potential output, creating an output gap
- In the long run, current output equals potential output.
- **Long-Run Inflation**
- In the long run, since current output equals potential output, real growth must equal growth in potential output.
- Ignoring changes in velocity, in the long run, inflation equals money growth minus growth in potential output.

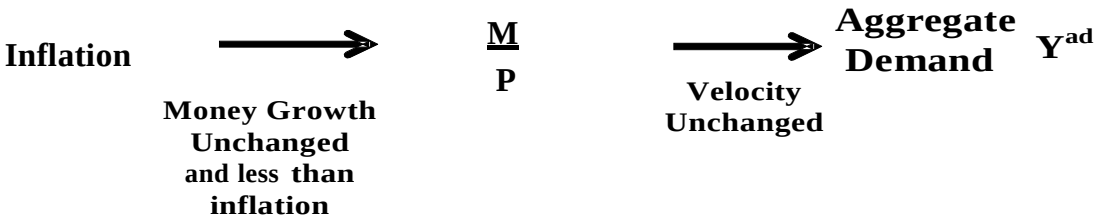
- Though central banks focus on controlling short term nominal interest rates, they keep an eye on money growth
- When they try to adjust level of reserves in banking system to maintain interest rate, it affects money growth. Which in turn determines inflation

Money Growth, Inflation, and Aggregate Demand

- Aggregate demand tells us how spending (demand) by households, firms, the government, and foreigners changes as inflation goes up and down.
- The level of aggregate demand is tied to monetary policy through the equation of exchange (MV=PY) because the amount of money in the economy limits the ability to make payments.
- Rearranging the equation of exchange

$$Y^{ad} \qquad \frac{MV}{P}$$

- Where Y^{ad} = aggregate demand,
- M = the quantity of money,
- V = the velocity of money, and
- P = the price level.
- From this expression it is clear that an increase in the price level reduces the purchasing power of money, which means less purchases are made, pushing down aggregate demand

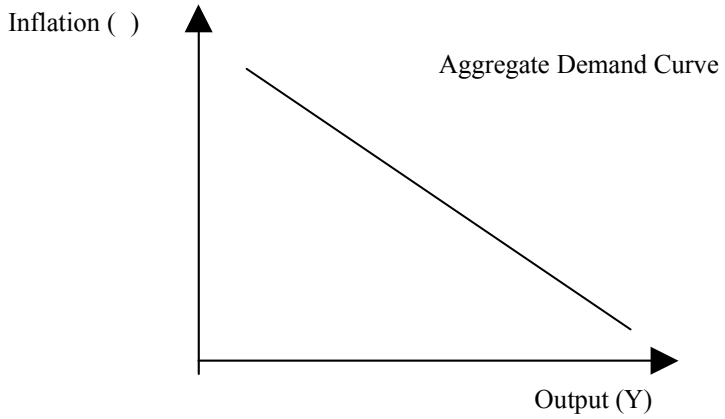


Lesson 40

MONEY GROWTH, INFLATION, AND AGGREGATE DEMAND

- To shift the focus to inflation, we need to look at changes in the price level.
- Suppose that inflation exceeds money growth (with velocity held constant). Real money balances will fall and so will aggregate demand

Figure: The Aggregate Demand Curve
At higher level of inflation, real money balances fall, resulting in a lower level of aggregate demand.



- Because real money balances fall at higher levels of inflation, resulting in a lower level of aggregate demand, the aggregate demand curve is downward sloping.
- Changes in the interest rate also provide a mechanism for aggregate demand to slope down

Monetary Policy and the Real Interest Rate

- Central bankers control short-term nominal interest rates by controlling the market for reserves.
- But the economic decisions of households and firms depend on the real interest rate;
- To alter the course of the economy, central banks must influence the real interest rate as well
- In the short run, because inflation is slow to respond, when monetary policymakers change the nominal interest rate they change the real interest rate.
- The real interest rate, then, is the lever through which monetary policymakers influence the real economy.
- In changing real interest rates, they influence aggregate demand.

Aggregate Demand and the Real Interest Rate

- Aggregate demand is divided into four components:
- Consumption,
- Investment,
- Government purchases,
- Net exports
- Aggregate Govt.'s Net Demand = Consumption + Investment + Purchases + Exports

$$Yad = C + I + G + NX$$

- It is helpful to think of aggregate demand as having two parts, one that is sensitive to real interest rate changes and one that is not
- Investment is the most important of the components of aggregate demand that are sensitive to changes in the real interest rate.

- Consumption and net exports also respond to the real interest rate;
- Consumption decisions often rely on borrowing, and the alternative to consumption is saving (higher rates mean more saving).
- As for net exports, when the real interest rate in a country rises, her financial assets become attractive to foreigners, causing local currency to appreciate, which in turn means more imports and fewer exports (lower net exports)
- While changes in real interest rate may have an impact on the government's budget by raising the cost of borrowing, the effect is likely to be small and ignorable.
- Thus, considering consumption, investment, and net exports, an increase in the real interest rate reduces aggregate demand (the effect on the 4th component, government spending, is small enough to be ignored).

Impact of rise in the Real interest rate on Components of Aggregate Demand		
Components of Aggregate Demand	**Effect of a rise in the real interest rate**	**Impact on component of Aggregate Demand**
Consumption *(C)*	Reward to saving rises	Consumption falls
Investment *(I)*	Cost of financing rises	Investment falls
Net Exports *(NX)*	Demand for domestic assets rises, causing a currency appreciation, raising the price of exports and reducing the cost of imports	Exports fall; imports rises; net exports fall
Aggregate Demand (Y^{ad})	**C, I and NX all fall**	**Aggregate demand falls**

The Long-Run Real Interest Rate

- There must be some level of the real interest rate at which aggregate demand equals potential output; this is the long-run real interest rate.
- The long-run real interest rate equates aggregate demand with potential output.
- The rate will change if a component of aggregate demand that is not sensitive to the real interest rate goes up (or down) or if potential output changes.
- For example, an increase in government purchases (all else held constant) will raise aggregate demand at every level of the real interest rate.
- To remain in equilibrium, one of the interest-sensitive components of aggregate demand must fall, and for that to happen, the long-run real interest rate must rise.
- The same would be true for increases in other components of aggregate demand that are not interest sensitive.
- A change in potential output has an inverse effect on the long-run real interest rate;
- When potential output rises, aggregate demand must rise with it, which requires a decrease in the real interest rate

Inflation, the Real Interest Rate, and the Monetary Policy Reaction Curve

- Policymakers set their short-run nominal interest rate targets in response to economic conditions in general and inflation in particular.
- When current inflation is high or current output is running above potential output, central bankers will raise nominal interest rates; when current inflation is low or current output is well below potential, they will lower interest rates
- While they state their policies in terms of nominal rates they do so knowing that changes in the nominal interest rate will eventually translate into changes in the real interest rate, and it is those changes that influence the economic decisions of firms and households
- Experts agree that any (coherent) monetary policy can be written as an inflation target plus a response to supply shocks

Lesson 41

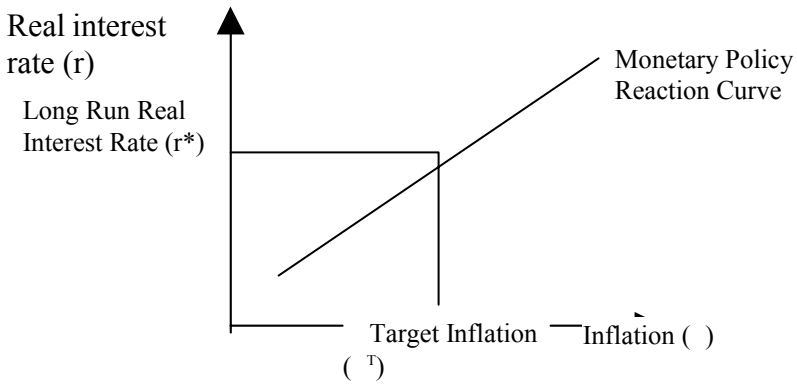
DERIVING THE MONETARY POLICY REACTION CURVE

- To ensure that deviations of inflation from the target are only temporary, monetary policymakers respond to change in inflation by changing the real interest rate in the same direction.
- The monetary policy reaction curve is set so that when current inflation equals target inflation, the real interest rate equals the long-run real interest rate.
- The slope of the curve depends on policymakers' objectives;
- When central bankers decide how aggressively to pursue their inflation target, and how willing they are to tolerate temporary changes in inflation, they determine the slope of the curve

Figure: The Monetary Policy Reaction Curve

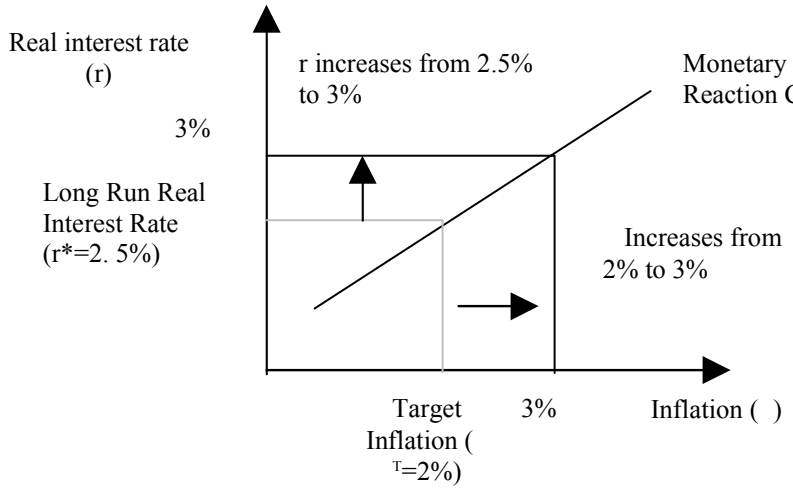
A. The Monetary Policy Reaction Curve

Monetary policy makers react to changes in current inflation by changing the real interest rate. Increases in current inflation lead them to raise the real interest rate, while decreases lead them to lower it. The monetary policy reaction curve is located so that the central bank's target inflation is consistent with the long-run real interest rate, which equates aggregate demand with potential output.



B. Movements along the Monetary Policy Reaction Curve

The long run real interest rate in an economy is roughly 2.5% and the central bank's implicit inflation target is approximately 2%. The monetary policy reaction curve implies that a 1%age point increase in inflation calls for a half %age point increase in the real interest rate--- a movement along the monetary policy reaction curve. That means that an increase in inflation from 2 to 3 % calls for an increase in the real interest rate from 2.5 to 3 %.



Shifting the Monetary Policy Reaction Curve

- Policymakers who are aggressive in keeping current inflation near target will have a steep curve, meaning that a small change in inflation will be met with a large change in the real interest rate
- A relatively flat curve means that central bankers are less concerned than they might be with keeping current inflation near target over the short term.
- The monetary policy reaction curve is set so that when current inflation equals target inflation, the
- Real interest rate equals the long-run real interest rate.
- r = r* when = T.
- When policymakers adjust the real interest rate they are either moving along a fixed monetary policy reaction curve or shifting the curve.
- A movement along the curve is a reaction to a change in current inflation; a shift in the curve represents a change in the level of the real interest rate at every level of inflation.

Figure A: Monetary Policy Reaction Curve

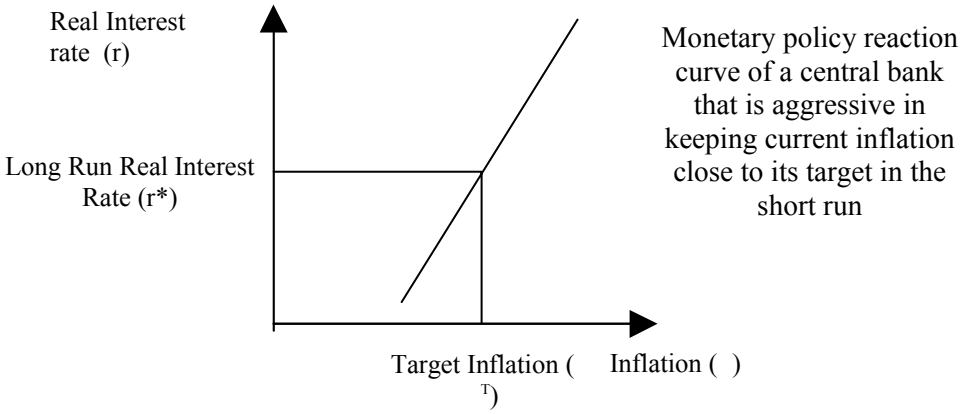
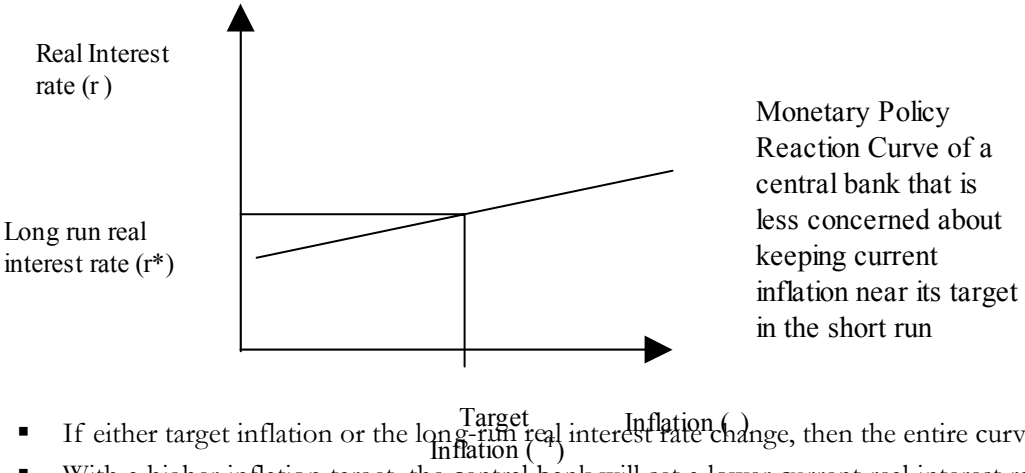


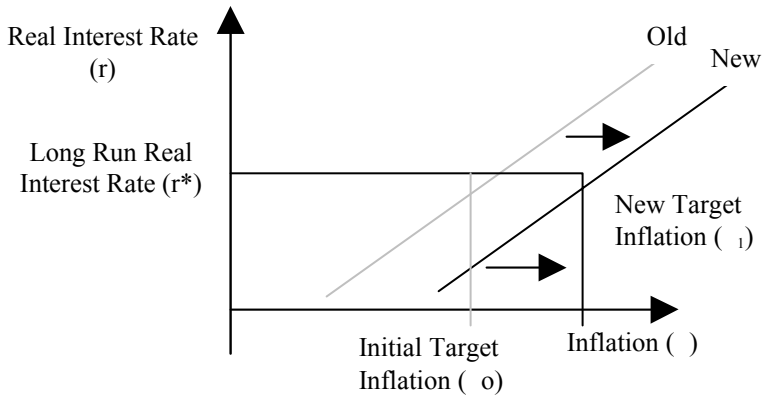
Figure B: Monetary Policy Reaction Curve



- If either target inflation or the long-run real interest rate change, then the entire curve will shift
- With a higher inflation target, the central bank will set a lower current real interest rate at every level of current inflation, shifting the monetary policy reaction curve to the right (a reduction would have the opposite effect).

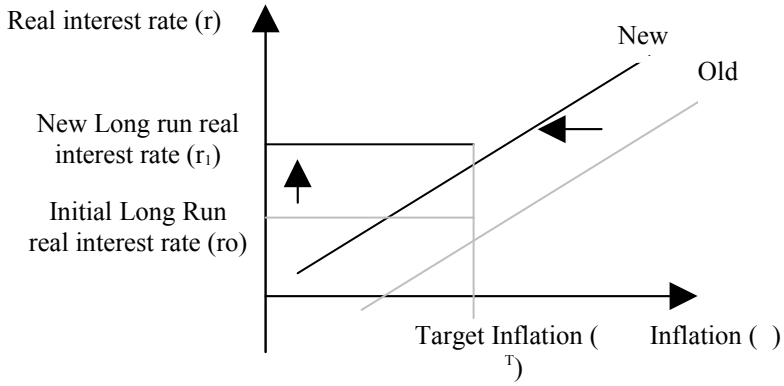
Figure A: An increase in the Central Bank's Inflation Target

An increase in the central bank's inflation target from an initial level of $_o$ to the new level of $_1$ shifts the monetary policy reaction curve to the right, lowering the real interest rate at every level of current inflation.



- The long-run real interest rate is determined by the structure of the economy;
- If it were to rise as a result of an increase in government purchases (or some other component of aggregate demand that is not sensitive to the real interest rate) then the monetary policy reaction curve would shift left

Figure B: An increase in the Long-run real interest rate
An increase in the economy's long run real interest rate from r_o to r_1 shifts the monetary policy reaction curve to the left, raising the real interest rate at every level of current inflation



- Any shift in the monetary policy reaction curve can be characterized as either a change in target inflation or a shift in the long-run real interest rate

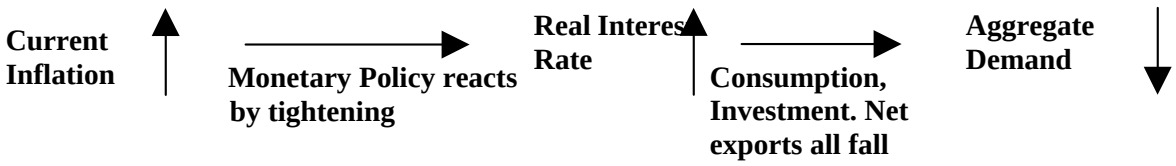
The Monetary Policy Reaction Curve	
What is it?	The relationship between current inflation and the real interest rate set by monetary policy makers
What determines its location?	Drawn so that, when current inflation equals target inflation, policymakers will set the real interest rate equal to the long run real interest rate
What determines its slope?	Policymaker's attitude toward inflation. The more aggressive policymakers are in keeping current inflation close to target level, and the less tolerant they are of temporary changes in inflation, the steeper the slopes
When does it shift?	In response to changes in either the long run real interest rate or the central bank's inflation target. An increase in the long run real interest rate shifts the curve to the left. An increase in the inflation target shifts the curve to the right.

The Aggregate Demand Curve

- When current inflation rises
- Monetary policymakers raise the real interest rate, moving upward along the monetary policy reaction curve
- The higher real interest rate reduces consumption, investment, and net exports causing aggregate demand (output) to fall.

The link between Current Inflation and Aggregate Demand

When current inflation rises , policy makers react by raising the real interest rate, which reduces consumption, investment, and net exports. The result is a reduction in aggregate demand.



- Changes in current inflation move the economy along a downward-sloping aggregate demand curve
- This is in addition to the effect of higher inflation on real money balances noted earlier
- The slope of the aggregate demand curve tells us how sensitive current output is to a given change in current inflation.
- The aggregate demand curve will be relatively
- Flat if current output is very sensitive to inflation (a change in current inflation causes a large movement in current output)
- Steep if current output is not very sensitive to inflation

Figure A: When the monetary policy reaction curve is steep, the central bank is aggressive in keeping current inflation near its target level; the aggressive demand curve is flat.

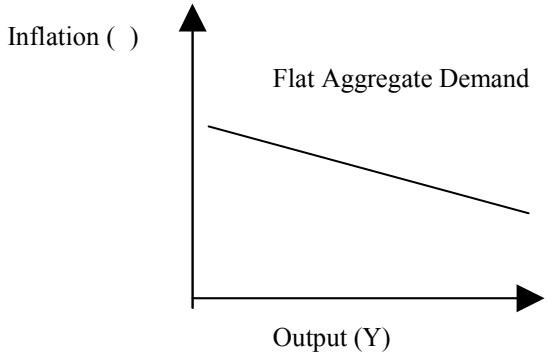
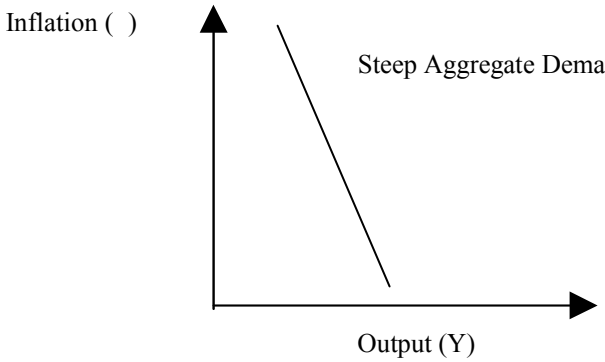


Figure B: When the monetary policy reaction curve is flat, the central bank is less concerned about keeping current inflation near its target level; the aggressive demand curve is steep.



- Three factors influence the sensitivity of current output to inflation:
- The strength of the effect of inflation on real money balances,
- The extent to which monetary policymakers react to a change in current inflation,
- The size of the response of aggregate demand to changes in the interest rate
- The second factor relates to the slope of the monetary policy reaction curve
- If policymakers react aggressively to a movement of current inflation away from its target level with a large change in the real interest rate, the monetary policy reaction curve will be steep and the aggregate demand curve is flat
- If policymakers respond more cautiously, the monetary policy reaction curve is flat and the aggregate demand curve is steep
- The slope of the aggregate demand curve depends in part on the preferences of the central bank;
- How aggressive policymakers are in responding to deviations of inflation from the target level

THE AGGREGATE DEMAND CURVE

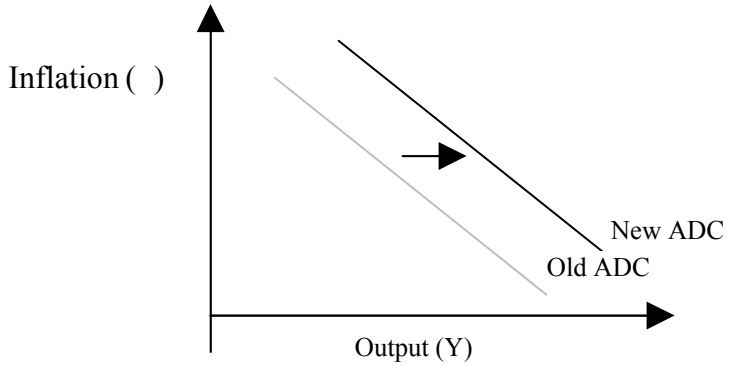
- The slope of the aggregate demand curve tells us how sensitive current output is to a given change in current inflation.
- The aggregate demand curve will be relatively
- Flat if current output is very sensitive to inflation (a change in current inflation causes a large movement in current output)
- Steep if current output is not very sensitive to inflation
- Three factors influence the sensitivity of current output to inflation:
- The strength of the effect of inflation on real money balances,
- The extent to which monetary policymakers react to a change in current inflation,
- The size of the response of aggregate demand to changes in the interest rate
- The second factor relates to the slope of the monetary policy reaction curve
- If policymakers react aggressively to a movement of current inflation away from its target level with a large change in the real interest rate, the monetary policy reaction curve will be steep and the aggregate demand curve is flat
- If policymakers respond more cautiously, the monetary policy reaction curve is flat and the aggregate demand curve is steep
- The slope of the aggregate demand curve depends in part on the preferences of the central bank; how aggressive policymakers are in responding to deviations of inflation from the target level
- **There are two reasons why the aggregate demand curve slopes down:**
- First, because higher inflation reduces real money balances (thus reducing purchases),
- Second, because higher inflation induces policymakers to raise the real interest rate, depressing various components of aggregate demand
- Rising inflation also reduces wealth, which lowers consumption and drives down aggregate demand.
- In addition, as inflation rises the uncertainty about inflation rises, which makes equities a more risky investment and drops their value, also reducing wealth
- Another reason is that inflation can have a greater impact on the poor than it does on the wealthy, redistributing income to those who are better off
- People may also save more as a result of the increased risk associated with inflation.
- Also, rising inflation makes foreign goods cheaper in relation to domestic goods, driving imports up and net exports down.

Shifting the Aggregate Demand Curve

- In our derivation of the aggregate demand curve, we held constant both the location of the monetary policy reaction curve and those components of aggregate demand that do not respond to the real interest rate.
- Changes in any of those components, as well as changes in the location of the monetary policy reaction curve, will shift the aggregate demand curve.
- Shifts in the Monetary Policy Reaction Curve
- Whenever the monetary policy reaction curve shifts, the aggregate demand curve will shift as well
- Changes in the long-run real interest rate, which is a consequence of the structure of the economy, will also shift aggregate demand

Figure: Shifting the Aggregate Demand Curve (ADC)

Increases in aggregate Demand arising from a change in monetary policy, such as a higher inflation target, will shift the aggregate demand curve to the right. Increases in interest rate intensive components of aggregate demand, such as government purchases, will also shift the aggregate demand curve to the right.



- Either a fall in target inflation or a rise in the long-run real interest rate will shift the monetary policy reaction curve to the left and the aggregate demand curve to the left.
- **Changes in the Components of Aggregate Demand**
- Any change in a component of aggregate demand that is caused by a factor other than a change in the real interest rate will shift the aggregate demand curve.
- When firms become more optimistic about the future, or consumer confidence increases, investment or consumption will increase and aggregate demand will shift to the right.
- **Changes in the Components of Aggregate Demand**
- Increases in government purchases will increase aggregate demand, as will decreases in taxes.
- Increases in net exports that are unrelated to changes in real interest rates will shift the aggregate demand curve to the right
- **Changes that shift the Components of Aggregate Demand to the right:**
- An increase in consumption that is unrelated to a change in the real interest rate.
- An increase in investment that is unrelated to a change in the real interest rate.
- An increase in government purchases
- A decrease in taxes
- An increase in net exports that is unrelated to a change in the real interest rate
- Because shifts in the monetary policy reaction curve can shift the aggregate demand curve, it is possible that monetary policy can cause recessions.
- If policymakers can cause recessions, they can probably avoid them as well by neutralizing shifts in aggregate demand that arise from other sources.
- The analysis up to this point has assumed that inflation does not change over time; but in reality
- Inflation and output are jointly determined, and monetary policy plays a role in the short-run Movements of both.

Lesson 43

THE AGGREGATE SUPPLY CURVE

- The aggregate supply curve tells us where on the aggregate demand curve the economy will end up, explaining the relationship between inflation and real output in the process.
- The short run aggregate supply curve tells us where the economy will settle at any particular time
- Long run curve tells us the levels of inflation and output the economy is moving toward.
- Inflation persistence
- Inflation tends to change slowly; when it is low one year it tends to be low the next year, and when it is high it tends to stay high. This is called inflation persistence
- If inflation remains steady over shorter periods, while real output adjusts, then the short-run aggregate supply curve must be flat at the current level of inflation

Figure: Inflation Statistics of Pakistan

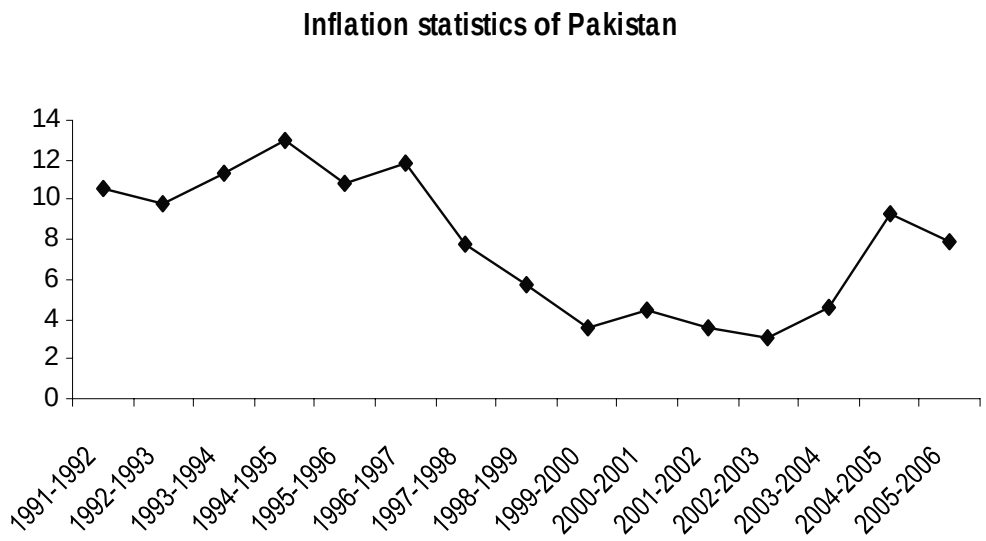
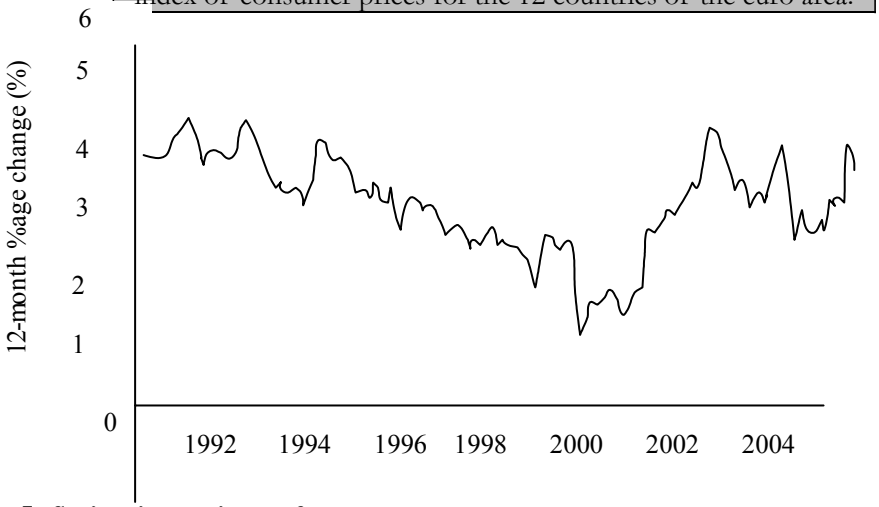


Figure: Inflation in the Euro Area, 1991-2004

This figure shows the 12-month change in the harmonized index of consumer prices for the 12 countries of the euro area.

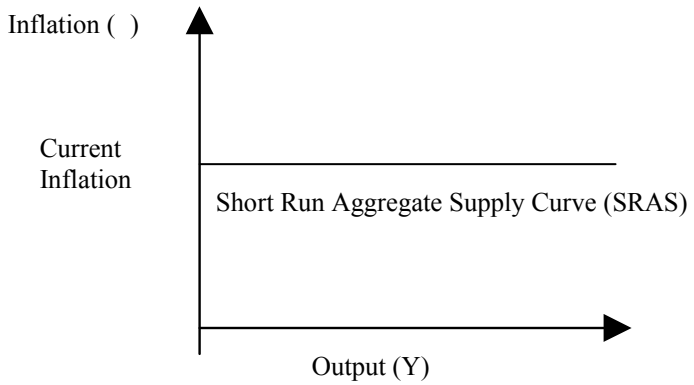


- **Inflation is persistent for two reasons**
- First, when people expect inflation to continue, they adjust their prices and wages accordingly.

- When people expect inflation in the near future they raise wages and prices in a way that causes the inflation they expect to occur.
- Therefore, current inflation is at least partially determined by expected inflation
- **Inflation is persistent for two reasons**
- Second, not all wage and price decisions are made at the same time.
- Price and wage adjustments are staggered, and this slows down the adjustment process causing persistence in inflation
- The fact that inflation is persistent means that it is fixed in the short run, so the short-run aggregate supply curve is horizontal at the current level of inflation.

Figure: Short Run Aggregate Supply Curve

Inflation persistence means the short run aggregate supply curve is horizontal.



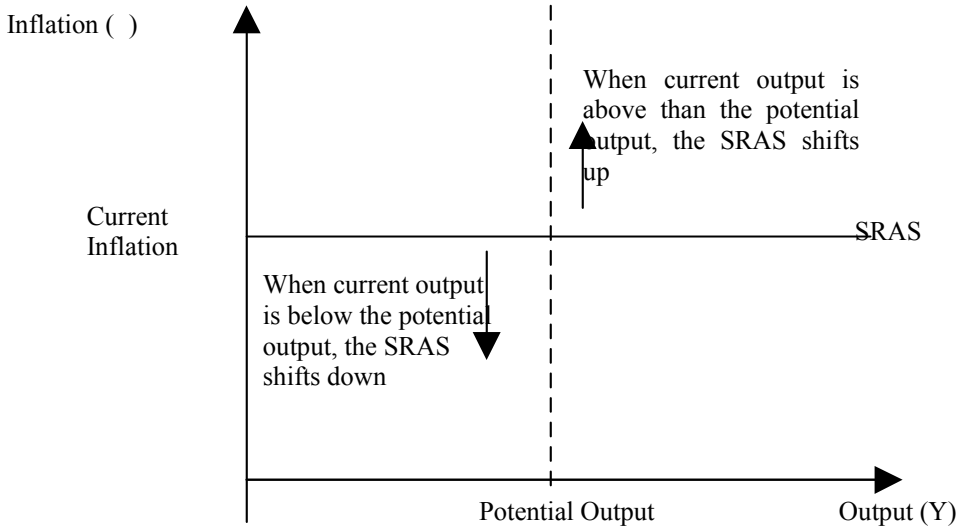
- Firms simply do not adjust the rate of their price increases in the short run; instead, they adjust the quantities they produce and sell.
- Over periods of several years or more, inflation does change, shifting the short-run aggregate supply curve up or down

Shifts in the Short-Run Aggregate Supply Curve

- There are two reasons why the short run aggregate supply curve can shift
- Deviations of current output from potential output, causing changes in inflation
- Changes in external factors driving production costs
- **Output Gaps**
- When current output equals potential output so that there is no output gap, the short-run aggregate supply curve remains stable
- But when current output rises above or falls below potential output, so that an output gap develops, inflation will rise or fall.

Figure: Shifts in the Short Run Aggregate Supply Curve Response to an Output Gap

When current output rises above potential output, creating an expansionary output gap, the short run aggregate supply curve shifts upward. When current output falls below potential output, creating a recessionary output gap, the short run aggregate supply curve shifts downward.



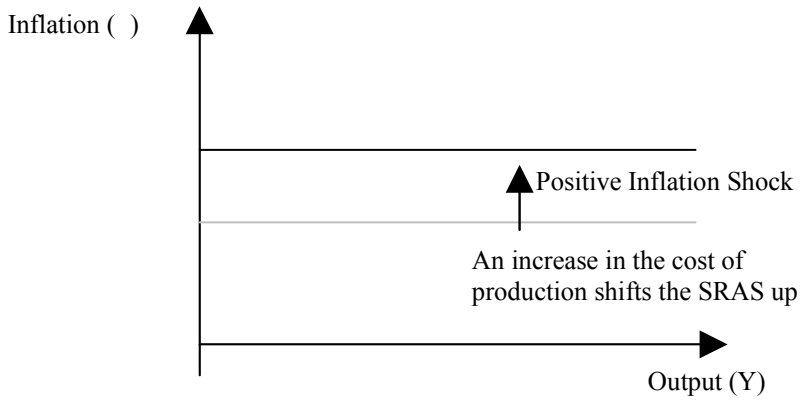
- When current output is below potential output, part of the economy's capacity is idle, and firms tend to raise their prices and wages less than they did when current output equaled potential output.
- When current output exceeds potential output, the opposite happens; firms increase their prices and wages more than they would if they were operating at normal levels
- Thus when current output deviates from potential output, inflation adjusts, and the effect takes time to be felt.
- Economists have differing views on how quickly inflation reacts and the short-run aggregate supply curve shifts.
- Those who believe in flexible prices think it happens quickly,
- While those who emphasize that many price and wage decisions involve long-term contracts think the adjustment is sluggish.

Inflation Shocks

- An inflation shock is a change in the cost of producing output and causes the short-run aggregate supply curve to shift.
- This can be the result of changes in the cost of raw materials or labor, or (as is most common) a change in the price of energy.
- A positive inflation shock causes the short-run aggregate supply curve to shift upward, causing inflation to rise

Figure: Shifts in the Short-Run Aggregate Supply Curve
Response to an inflation shock

A rise in labor costs, the prices of raw materials or expected future level of inflation creates an inflation shock that shifts the SRAS upward, causing inflation to rise.

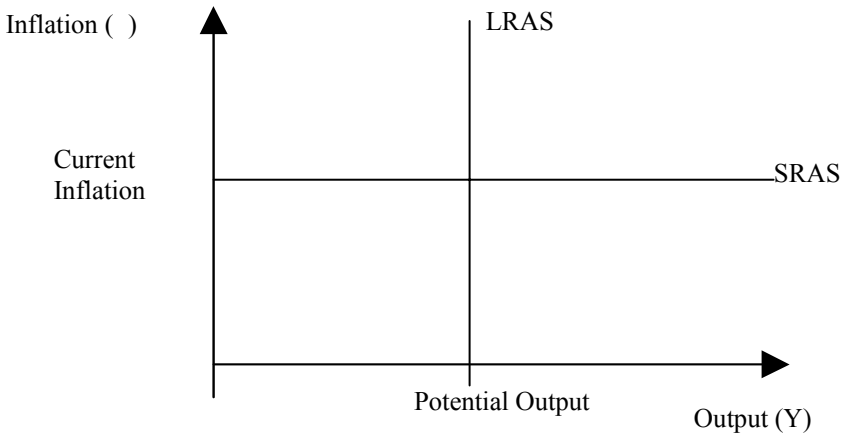


The Long-Run Aggregate Supply Curve

- In the long run the economy moves to the point where current output equals potential output, while inflation is determined by money growth
- The long-run aggregate supply curve is vertical at the point where current output equals potential output.

Figure: The Long Run and Short Run Aggregate Supply Curves

The long run aggregate supply curve is vertical at the point where current output equals the potential output.



- Changes in expected inflation operate like cost shocks, shifting the short-run aggregate supply curve up and down.
- For the economy to remain in long-run equilibrium, then, in addition to current output equaling potential output, current inflation must equal expected inflation
- At any point along the long-run aggregate supply curve, current output equals potential output and current inflation equals expected inflation
- Potential output is constantly rising as a result of investment and technological improvements (the sources of economic growth), which increase the normal output level.
- Changes in the economy's productive capacity will shift the long-run aggregate supply curve; increases will shift it right and decreases will shift it left.

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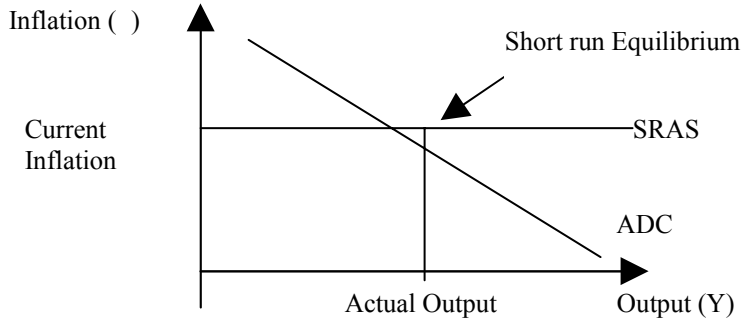
EQUILIBRIUM AND THE DETERMINATION OF OUTPUT AND INFLATION

Short-Run Equilibrium

- Short-run equilibrium is determined by the intersection of the aggregate demand curve with the short-run aggregate supply curve.

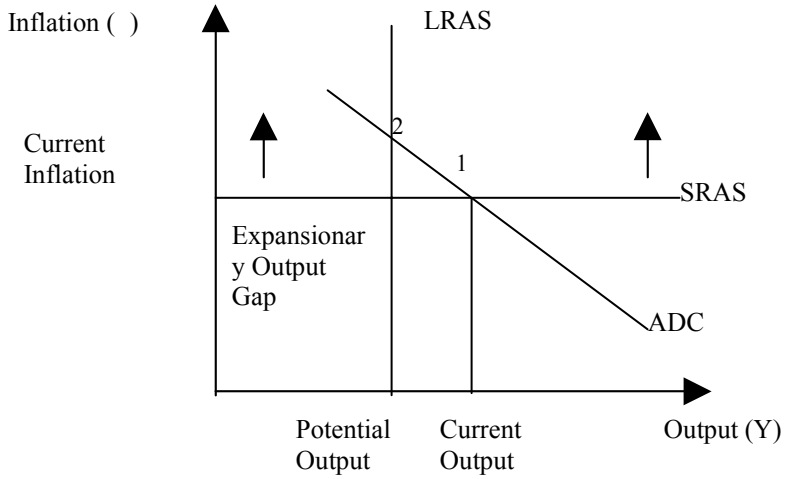
Figure: Short Run Equilibrium of Output and Inflation

Inflation and actual output are determined by the intersection of the SRAS curve with the ADC

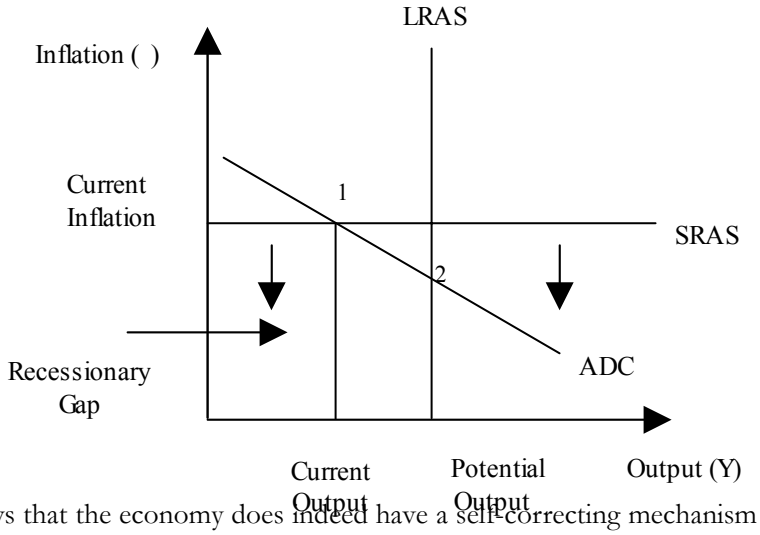


Adjustment to Long-Run Equilibrium

- When current output exceeds potential, the resulting expansionary gap exerts upward pressure on inflation, shifting the short-run aggregate supply curve upward, a process that continues until output returns to potential; at this point inflation stops changing.



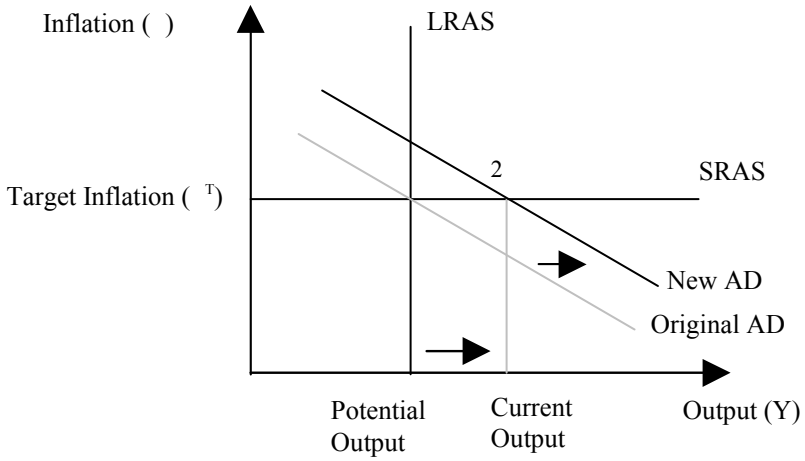
- If current output is lower than potential output, the resulting recessionary gap places downward pressure on inflation, causing the short-run aggregate supply curve to shift downward, and once again the process continues until current output returns to potential



- This shows that the economy does indeed have a self-correcting mechanism and that the manner in which the short-run aggregate supply curve shifts in response to output gaps reinforces our conclusion that the long-run aggregate supply curve is vertical
- In long-run equilibrium, current output equals potential output and current inflation is steady and equal to target inflation, which equals expected inflation

The Impact of Shifts in Aggregate Demand on Output and Inflation

- Suppose aggregate demand shifted right as a result of an increase in government purchases.
- At first, current output rises but inflation does not change.
- But the higher level of output creates an expansionary gap and the short-run aggregate supply curve starts to shift upward and inflation rises



Short-Run Equilibrium Inflation and Output Following an Increase in Aggregate Demand

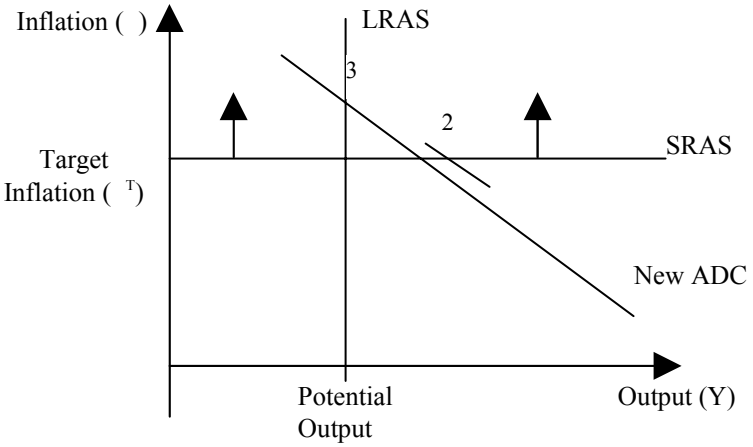
1. **StartatLong-RunEquilibrium**

- Y = Potential Output
- = Target Inflation

2. **AggregateDemandShiftsRight**

- Original AD shifts to New AD
- Y > Potential Output
- Inflation Is Unchanged

- Short-run equilibrium moves from point 1 to point 2
- Higher inflation moves policymakers along their reaction curve, leading them to raise the real interest rate and moving the economy upward along the new aggregate demand curve. Output then begins to fall back toward its long-run equilibrium level.
- The economy will settle at the point at which the new aggregate demand curve crosses the long-run aggregate supply curve and current output again equals potential output



Adjustment of Short-Run Equilibrium Inflation and Output Following an Increase in Aggregate Demand

- **Adjustment:**
- At the Short-Run Equilibrium point 2:
- Y > Potential Output
- SRAS begins to shift up
- Output begins to fall
- Inflation begins to rise as economy moves along New AD
- With no policy response, economy moves to point 3, where Current inflation >Target inflation
- If central bankers simply sit and watch as the aggregate demand curve shifts to the right, inflation will rise
- So long as monetary policymakers remain committed to their original inflation target, they will need to do something to get the economy back to the point where it began—point "1"
- An increase in government purchases raises the long-term real interest rate.
- Policymakers will compensate by shifting their monetary policy reaction curve to the left, increasing the real interest rate at every level of inflation
- When the monetary policy reaction curve shifts, the aggregate demand curve shifts with it.
- The aggregate demand curve will shift to the left, bringing the economy back to long-run equilibrium.
- An increase in aggregate demand causes a temporary increase in both output and inflation.
- A decline in aggregate demand causes a temporary decline in both output and inflation
- This discussion implies that whenever we see a permanent increase in inflation, it must be the result of monetary policy.
- That is, if inflation goes up or down and remains at its new level, the only explanation is that central banker must be allowing it to happen.
- They have changed their inflation target, whether or not they acknowledge the change explicitly.

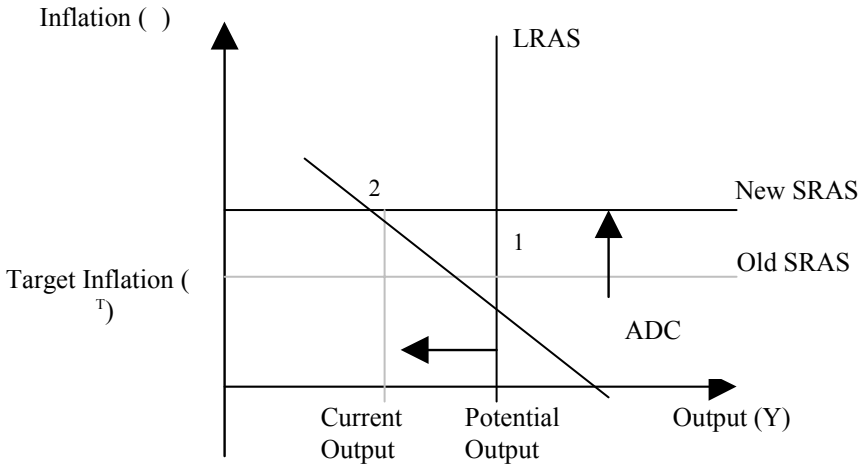
The Impact of Inflation Shocks on Output and Inflation

- An inflation shock shifts the short-run aggregate supply curve (such as an oil price increase)

- A positive shock moves it to a higher level, and the result is higher inflation and lower output, a situation called "stagflation".

Figure: The Effects of a Positive Inflation Shock on Short-Run Equilibrium

A positive inflation shock shifts the short-run aggregate supply curve upward, moving short run equilibrium from point 1 to point 2. Inflation rises and output falls.



- But the decline in output exerts downward pressure on inflation, causing the short-run aggregate supply curve to shift down
- Inflation falls and output rises until the economy returns to the point where current output equals potential output and inflation equals the central bank's target.
- An inflation shock has no affect on the economy's long-run equilibrium point; only a change in
- Potential output or a change in the central bank's inflation target can accomplish that.

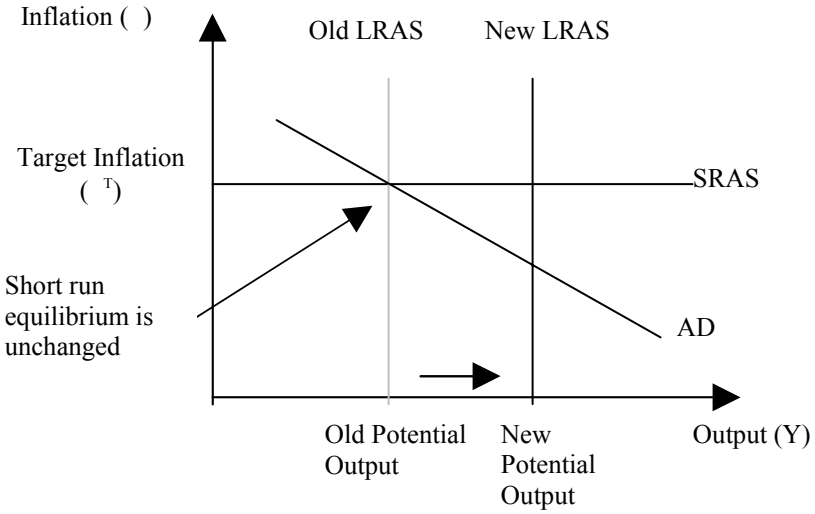
Lesson 45

SHIFTS IN POTENTIAL OUTPUT AND REAL BUSINESS CYCLE THEORY

- Changes in potential output shift the long-run aggregate supply curve
- At first the shift has no impact on the short-run aggregate supply curve, so inflation and output remain stable
- But with time, the increase in potential output will mean that current output is now below potential output, creating a recessionary output gap, which puts downward pressure on inflation, shifting the short-run aggregate supply curve downward

Figure: The Effects of an increase in potential Output on Inflation and Output

An increase in potential output shifts the LRAS curve to the right. In the short run, current output remains unchanged. But since current output is now below potential output, the resulting recessionary gap places downward pressure on inflation and output eventually begin to rise.



- What happens next depends on what policymakers do; they can:
- Take advantage of the downward pressure on inflation to reduce their inflation target
- Initiate actions that ensure that inflation does not fall.
- In either case, notice that the higher level of potential output means a lower long-term real interest rate.
- Business cycle fluctuations can therefore be explained in terms of shifts in aggregate demand that change its point of intersection with a flat short-run aggregate supply curve
- An alternative explanation for business cycle fluctuations focuses on shifts in potential output, a view called real business cycle theory.

Real business cycle theory

- Real business cycle theory starts with the assumption that prices and wages are flexible, so that inflation adjusts rapidly (the short-run aggregate supply curve shifts quickly in response to deviations of current output from potential output).
- This assumption implies that the short-run aggregate supply curve is irrelevant: equilibrium output and inflation are determined by the point on the aggregate demand curve where current output equals potential output
- Any shift in the aggregate demand curve, regardless of its source, will change inflation but not output

- Real business cycle theorists explain recessions and booms by looking at fluctuations in potential output, focusing on changes in productivity and their impact on GDP

The Impact of a Shift in Aggregate Demand and Aggregate Supply on Output and Inflation

	Increase in Aggregate Demand	Positive Inflation Shock	Increase in Potential Output
Source	Consumer Confidence up Business Optimism up Govt. Purchases up Taxes Down Exchange Rate Depreciates	Labor Costs up Raw Material Prices up Expected Inflation up	Capital in Production up Labor in Production up Productivity up
Short-Run Effects	Y Increases Is unchanged	Y falls rises	Y unchanged Unchanged
Path of Adjustment	1. Expansionary output gap puts upward pressure on inflation 2. As Inflation begins to rise, output begins to fall	1. Recessionary output gap puts downward pressure on inflation 2. As Inflation begins to fall, output begins to rise	Recessionary output gap puts downward pressure on inflation As Inflation begins to fall, output begins to rise
Long-Run Effects	Y = original potential output = target (may change)	Y = original potential output = target (may change)	Y = new potential output = target (may change)
Effects of Monetary Policy	Inflation will rise temporarily unless the central bank changes its inflation target.	Inflation will rise temporarily unless the central bank changes its inflation target.	Inflation will fall temporarily unless the central bank changes its inflation target.

Stabilization Policy

- **Monetary Policy**
- Policymakers can shift the aggregate demand curve by shifting their monetary policy reaction curve, but they cannot shift the short-run aggregate supply curve
- They can neutralize movements in aggregate demand, but they cannot eliminate the effects of an inflation shock
- **Shifts in Aggregate Demand**
- If households and businesses become more pessimistic, driving down aggregate demand, the economy moves into a recession as the new short-run equilibrium point is at a current output less than potential output.
- Policymakers will conclude that the long-run real interest rate has gone down and will shift their monetary policy reaction curve to the right, reducing the level of the real interest rate at every level of inflation
- This shifts the aggregate demand curve back to its initial position

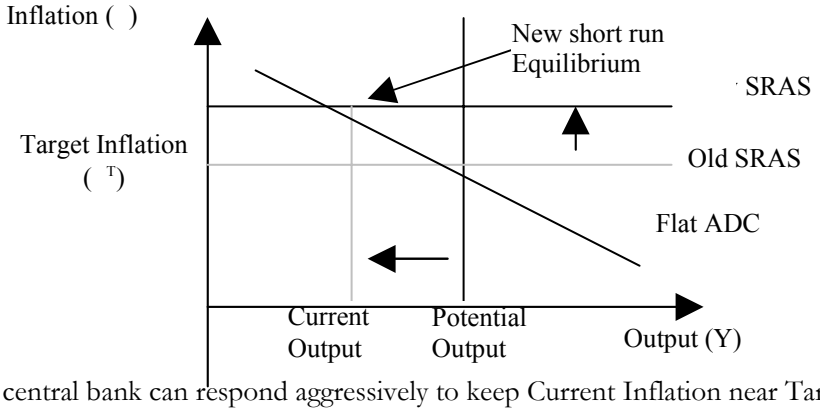
Figure: Stabilizing a shift in Aggregate Demand

Following a drop in consumer or business confidence, ADC shifts to the left. to stabilize the economy, the central bank can ease the policy, shifting the monetary policy reaction curve to the right. This reduces the real interest rate at every level of inflation and shifts the aggregate demand curve back to where it started. Their action leaves current output and inflation unchanged.

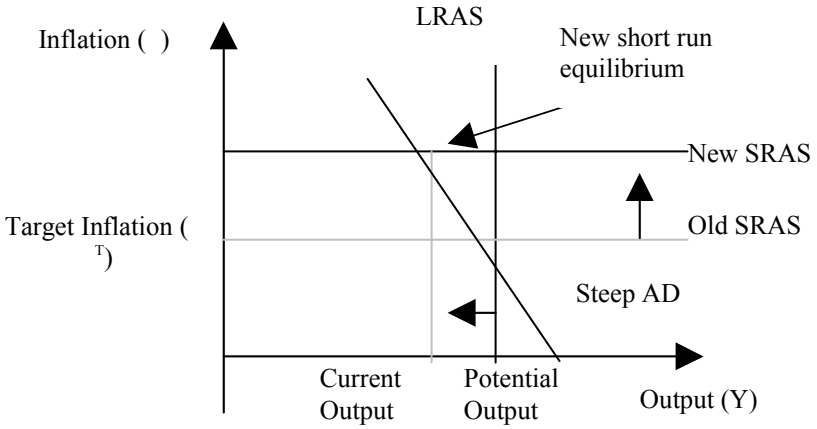
- In the absence of a policy response, output would fall; instead, output remains steady along with inflation.
- Policymakers have neutralized the shift in aggregate demand, keeping current output equal to potential output and current inflation equal to target inflation.

Inflation Shocks and the Policy Tradeoff

- For policymakers, an inflation shock is an entirely different story.
- A positive inflation shock drives down output and drives up inflation.
- Policymakers can shift the monetary policy reaction curve and so shift the aggregate demand curve, relying on the economy's natural response to an output gap to bring inflation back to target



- The central bank can respond aggressively to keep Current Inflation near Target
- But this tool cannot be used to bring the economy back to its original long-run equilibrium point, because monetary policy can shift the aggregate demand curve but not the short-run aggregate supply curve
- However, monetary policymakers can choose the slope of their monetary policy reaction curve and so affect the slope of the aggregate demand curve, and in this way monetary policymakers can choose the extent to which inflation shocks translate into changes in output or changes in inflation
- By reacting aggressively to inflation shocks, policymakers force current inflation back to target quickly, but at a cost of substantial decreases in output



- The central bank can respond cautiously to Minimize Deviations of Current Output from Potential Output
- When choosing how aggressively to respond to inflation shocks, central bankers decide how to conduct stabilization policy; they can stabilize output or inflation, but not both

Opportunities Created by Increased Productivity

- When productivity rises, potential output increases. This shifts the long-run aggregate supply curve to the right, eventually creating a recessionary gap, which exerts downward pressure on inflation.
- This gives policymakers the opportunity to guide the economy to a new, lower inflation target without inducing a recession

- Since the increase in potential output lowers the long-run real interest rate, rather than reducing their inflation target, policymakers can shift their monetary policy reaction curve to the right, shifting aggregate demand to the right.
- This will increase current output quickly, leaving inflation unchanged at the target level

Fiscal Policy

- The people who control the government's tax and expenditure policies can stabilize output and inflation too.
- Fiscal policy can be used just like monetary policy to neutralize shocks to aggregate demand and stabilize output and inflation.
- Fiscal policy has two defects: it works slowly and it is almost impossible to implement effectively
- Most recessions are short, data is available only with a lag, and it takes time for Congress to pass legislation.
- Economics collides with politics where fiscal stimulus is concerned as politicians design stimulus packages based more on political calculation than economic logic.
- Under most circumstances, then, stabilization policy should be left to the central bankers; fiscal policy does have a role but only after monetary policy has run its course

THE END