

# ESC3701 Monetary Economics III

## Part 1

### Chapter 1: Why study money, banking and financial markets.

- A security or financial instrument is a claim on the issuer's future income or assets (which is any financial claim or piece of property that is subject to ownership).
- A bond is a debt security that promises to make payments periodically for a specified period of time.
- An interest rate is the cost of borrowing or the price paid for the rental of funds.
- Financial Crises is a major disruption in the financial markets characterised by a sharp decline in asset prices and the failure of many financial and non-financial firms.
- GDP (aggregate output) is the market value of all final goods and services produced in a country during the course of the year, which excludes purchase of goods that have been produced in the past and excludes purchase of stocks or bonds. Intermediate goods are not counted.
- Aggregate income is the total income of factors of production from producing goods and services per country per year. **GDP = Aggregate Income.**
- When GDP is calculate with current prices it is called nominal GDP.
- GDP measured with constant prices is referred to as real GDP. Therefore values only change if actual production changed.
- 3 Aggregate price levels, expressed as price index against base year 100.

$$1) \text{ GDP deflator} = \frac{\text{nominal GDP}}{\text{real GDP}}$$

$$2) \text{ PCE deflator} = \frac{\text{nominal personal consumption expenditures}}{\text{real personal consumption expenditures}}$$

3) Consumer Price Index measured by pricing a basket of goods and services brought by a typical urban household.

- To convert nominal to real divide by price index. Annualised basis is a basis converted to a year.

### Meaning of a security and how it facilitates direct lending and borrowing

- A security or financial instrument is a claim on the issuer's future income or assets.
- To facilitate direct lending securities are sold in financial markets where the lender-savers channel funds to the borrower-spenders.
- Common securities include bonds or stocks.
- Securities are assets to the lender-savers and liabilities to the borrower-spenders.
- Securities facilitate moving funds from people with an excess to the people who have profitable opportunities.
- SA the major instrument of monetary policy is the control of an interest rate called the repo rate. → SARB – sets the repo rate.
- The repo rate in South Africa is the equivalent of the federal funds rate in the USA.
- The repo rate is a short-term interest rate which represents an interest rate paid by commercial banks to the SARB to obtain reserve funding (i.e. borrowing money from the SARB), yet it impacts on all interest rates in the economy. Thus changes in the repo rate impact the economy at large.

## Common stock, its purpose and how it affects business investment decisions.

- A common stock represents a share of ownership in a company.
- It is a security, and is a claim on the earnings and assets of the corporation.
- Selling stock is way to raise funds for financing the companies activities.
- It affects business decisions as higher stocks prices in the stock market mean that the company will be able to raise more finance through selling stock at higher prices.

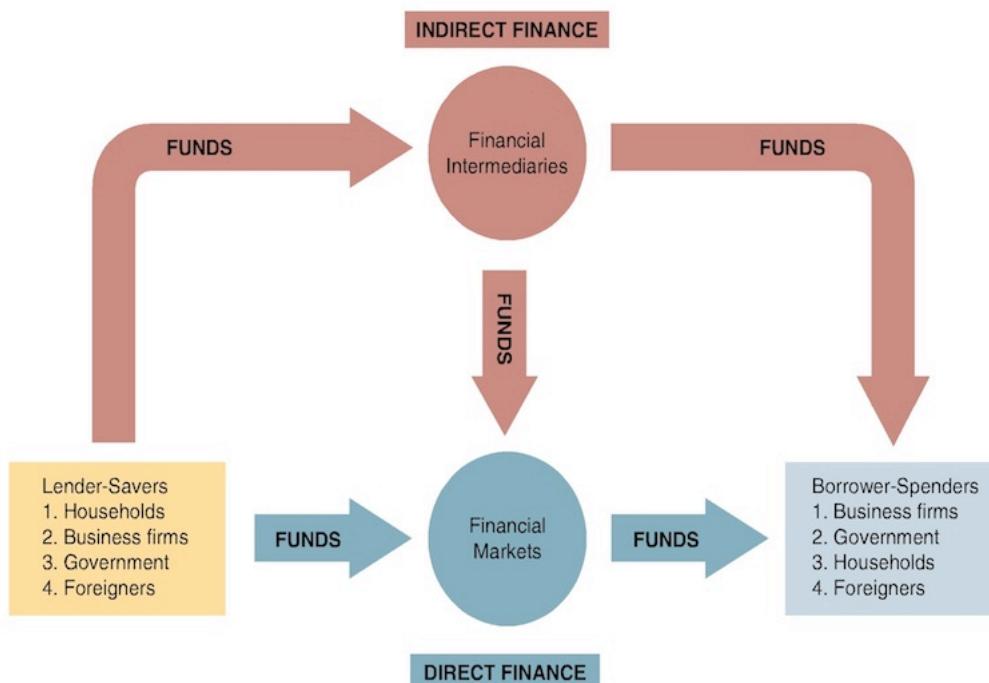
## List two ways in which the quantity of money may affect the economy

- 1) Through the aggregate price level
- 2) Through interest rates.

## Difference between nominal and real GDP and their uses

- Nominal GDP is when the total value of final goods and services is calculated using current prices.
  - Real GDP is calculated with constant prices, given at a base year.
- Nominal GDP can be misleading as an increase could be due to a rise in the price level or an actual increase in final good and services.
- An increase in Real GDP can only be from an increase in final goods and services and not an increase in prices.

## Chapter 2: Overview of financial system



- Direct finance: borrowers borrow funds directly from financial markets by selling securities
- Indirect finance: a financial intermediary borrows funds from lender-savers and then uses these funds to make loans to borrower-spenders.
- Financial markets are critical for producing an efficient allocation of capital which contributes to higher production and efficiency for the economy as a whole.
- Structure of financial markets
  - 1) Debt and Equity Markets
    - Short-term less than a year. 1-10 years are intermediate. > 10 is long-term

- Firms or individuals can obtain funds through issuing debt instruments (bonds/mortgage) or issue equities (stock)
- A disadvantage of equities is the holder is a residual claimant, the firm must pay debt holders first before its equity holders.
- A advantage to holding equities is the direct benefit of increased firm profits versus the fixed amounts of debt, because of ownership rights of equities.
- Brokers are agents of investors who match buyers with sellers, dealers link buyers and sellers by buying and selling at stated prices.
- 2) Primary and Secondary Markets
  - Primary market for initial issues of securities (Investment banks).
  - Secondary markets (JSE) make securities more liquid, also set benchmark prices for the primary market.
- 3) Exchange and OTC markets
  - Secondary markets.
  - Exchanges, central location where buyers and sellers of securities conduct trades
  - OTC dealers at different locations sell securities to anyone willing to pay their prices. Similarly competitive to exchanges due to technology.
- 4) Money and Capital Markets
  - Money market: short-term securities
  - Capital markets: 1 year or greater.<sup>1</sup>

## Financial market instruments

- Money market short-term debt instruments.
- 1) US Treasury Bills. Short-term, no interest payments, set payment at maturity, sold at a discount. Most liquid and safest. Mainly held by banks.
- 2) Negotiable Bank Certificates of Deposit: a certificate of deposit (CD) is a debt instrument sold by a bank to depositors that pays annual interest of a given amount and at maturity pays back the original price. Negotiable CD's are traded in secondary markets. Big source of funds for banks.
- 3) Commercial Paper is a short-term debt instrument issued by large banks and well-known corporations.
- 4) Repurchase agreements are effectively short-term loans less than 2 weeks for which Treasury bills serve as collateral. Big source of funds for banks. Issued mainly by corporations.
- 5) Federal Funds, overnight loans between banks using their deposits at the Federal reserve.
- Capital Market for longer term debt.(Riskier than money market)
  - 1) Stocks. Largest security in capital market, Held by households and institutions.
  - 2) Mortgages are loans to households or firms to purchase housing, land or real structures that serve as collateral. Largest debt market in US.
    - Mortgage back security is a bond like instrument backed by a bundle of individual mortgages whose interest and principle payments are collectively paid to the holder-of the security.
  - 3) Corporate Bonds. Issued by corporations with strong credit ratings. Convertible bonds can be changed into stock anytime up till maturity. Principle buyers are life insurance, pension funds households and other large holders. Not as liquid as government securities. Larger than new stock issues.
  - 4) US Government Securities. Most liquid security.
  - 5) US Government Agency Securities

- 6) State and Local Government Bonds (Municipal bonds). Issued by state and local governments for big projects, exempt for income tax. Banks largest holders.
- 7) Consumer and Bank Commercial Loans.

## Indirect finance and 4 financial intermediary functions

- The basic function of financial markets is to channel funds from savers who have excess funds to spenders who have a shortage of funds.
- Direct finance is when borrowers borrow funds directly from lenders by selling them securities
- The process of indirect finance using financial intermediaries is call financial intermediation.
- More important source of funds for corporations than securities markets.
- Financial intermediaries are financial institutions that acquire funds by issuing liabilities and, in turn use those funds to acquire assets by purchasing securities or making loans.
- Indirect finance involves an intermediary that stands between lenders and borrows and helps transfer funds from one to the other.

## Transaction Costs / Liquidity services

- Time and money spent in carrying out financial transactions.
- Intermediaries can reduce transaction because they benefit from economies of scale due to expertise and size.
- Intermediaries provide liquidity services that make it easier for customers to conduct transactions.  
e.g Checking accounts to pay bills.

## Risk sharing

- They sell less risky investment and then use the funds to purchase more risky investments.
- They earn profit on the difference between the returns on risky assets they bought and the payments made on assets they sold. Also called asset transformation.
- They help individuals to diversify and thereby lower the amount of risk through low costs and assets pooling.

## Asymmetric information

- One party does not know enough about the other party to make accurate decisions.
- Intermediaries are better equipped and can alleviate asymmetric information problems.
- Two forms
  - 1) Adverse selection
    - Occurs before the transaction
    - Potential borrowers who are the mostly like to produce an undesirable outcome are the ones who most actively seek out a loan and are thus most likely to be selected.
    - Results in fewer loans to all as lenders hesitate to lend at all.
  - 2) Moral hazard
    - Occurs after the transaction.
    - The risk that the borrower will engage in activities undesirable to the lender hence increase in chance of default.
    - Reduces loans for all due hesitation to lend.
    - If there were no asymmetric information there could still be a moral hazard problem because the lender knows there might be a default and reducing such risk is too costly, therefore still a moral hazard.

- Intermediaries are better equipped to screen out bad risk (reduce adverse selection) and monitor borrowers (reduce moral hazard)

## Economies of scope

- Lowering the cost of information production for each service by applying one information resource to many different services.
- Credit risk evaluation on corporation for loan and then sale of the corporation's bonds to the public.
- Creates conflict of interest (moral hazard problem) due to offering multiple services, and by information being concealed or misleading.

## Type of financial intermediates

Primary Assets and Liabilities of Financial Intermediaries		
Type of Intermediary	Primary Liabilities (Sources of Funds)	Primary Assets (Uses of Funds)
<b>Depository institutions (banks)</b>		
Commercial banks <b>largest and most diversified</b>	Deposits	Business and consumer loans, mortgages, U.S. government securities, and municipal bonds
<b>Thrift institutions</b>		
Savings and loan associations	Deposits	Mortgages
Mutual savings banks	Deposits	Mortgages
Credit unions	Deposits	Consumer loans
<b>Contractual savings institutions</b>		
Life insurance companies	Premiums from policies	Corporate bonds and mortgages
Fire and casualty insurance companies <b>more liquid assets</b>	Premiums from policies	Municipal bonds, corporate bonds and stock, and U.S. government securities
Pension funds, government retirement funds	Employer and employee contributions	Corporate bonds and stock
<b>Investment intermediaries</b>		
Finance companies	Commercial paper, stocks, bonds	Consumer and business loans
Mutual funds <b>risky</b>	Shares	Stocks, bonds
Money market mutual funds	Shares	Money market instruments

## Investment banks

- Don't take deposits.
- Advises corporations on type of security to issue and then purchase the security at a predetermined price and resells on the market (underwriting).
- Act as deal makers and earn fees on mergers and acquisitions.

## Regulation of the financial system

- To reduce asymmetric information problems
- 1) Increase information available to investors
  - Provisions of information is improved by requiring companies issuing securities to report details about assets and liability, earnings, sales of stock
  - Preventing insider trading.
- 2) Ensure the soundness of the financial system.
  - Soundness is ensured by restrictions on entry, disclosure, restrictions on assets and activities, deposit insurance, limits on competition and restrictions on interest rates.

## Chapter 3: What is money

### Meaning of money

- Money is defined as anything that is generally accepted in payments for goods or services or in repayment of debts.
- It is measured as currency plus deposits. Money = Currency + Deposits
- Currency is paper money and coins
- Wealth is the total collection of pieces of property that serve to store value such as bonds, art, land, houses and cars.
- Income is the flow of earning per unit of time.
- Money is a stock variable.

### Functions of money

- 1) Medium of exchange
    - Solves the double coincidence of wants (finding some one who has what you want at the same time they want what you have), leads to high transaction costs.
    - Money promote efficiency by eliminating time spent exchanging goods and services
    - Encourages specialisation and division of labour.
    - Money reduces transaction costs.
  - 2) Unit of account
    - It is used to measure value in the economy
    - Lowers transaction costs by reducing the number of prices that need to be considered.
  - 3) Store of value
    - A repository of purchasing power over time and enables delayed purchasing.
    - Money is the most liquid asset of all because it is a medium of exchange as it does not need to be converted to anything else.
    - Not the most attractive store value and depends on the price level.
    - During inflation less money is held.
- For a commodity to function as money it must be:
- 1) Easily standardised to ascertain value.
  - 2) Widely accepted
  - 3) It must be divisible
  - 4) Easy to carry
  - 5) Not deteriorate quickly

## Evolutions of payment systems

- 1) Commodity money
  - Made up of precious metals such as gold and silver
  - From ancient times to several hundred years ago
  - Problem is the form of money is heavy and hard to transport
- 2) Fiat money
  - Paper currency decreed by governments as legal tender but not convertible into coins or precious metals.
  - Advantage is that it is lighter than coins or precious metal
  - Can be accepted as medium of exchange if there is trust in authorities and extremely difficult to counterfeit.
  - Easy to change currency due to the legal guarantee, e.g. Euro.
  - Disadvantages is easily stolen, and expensive to transport in large amounts because of bulk.
- 3) Checks
  - An instruction from your bank to transfer money from your account to another account when check is deposited.
  - Don't need to carry around large amounts of currency
  - Frequent back and forth payments cancel out.
  - Reduces transportation costs and improves economic efficiency.
  - Make large payments much easier
  - Reduced the possibility of theft because they proved receipts for purchases.
  - Takes time for checks to get from one place to another.
  - Takes a few days to clear payment in check account.
  - Processing checks is costly.
- 4) Electronic payment
  - Electronic transfer payments due to adoption of cheap computers and internet.
  - Allows recurring automated payments
  - Large cost savings over using checks.
- 5) E-money
  - Money that exist only in electronic form.
  - Debit cards allows consumers to purchase goods and services electronically.
  - Store-value card are repurchased for specific amounts.
  - Smart cards contain chips and are loaded with cash from a bank account when needed.
  - e-cash is used on the internet to purchase goods, and is money transferred to a PC from a bank and secured by cryptography..
  - Cryptocurrencies like bitcoin secured by cryptography and proof of work scripts.

## Notes on credit exclusion from $M = C + D$

- Not all forms of credit are counted as money.
- Two forms of credit.
  - 1) Credit cards held by consumers.
    - Credit cards normally provide credit up to some limit
    - The credit provided only have to be settled at a later stage
  - 2) Trade credit.
    - Trade credit is when firms sell their products to the trade sector, on condition that payment for the goods is made at a future date

- Credit in both these two forms serves as a medium of exchange, but these forms of credit do not lead to an increase in cash or deposits, and the money stock is not affected.
- Not included because of difficulties in measuring these forms of credit.
- The provision of trade credit, for example, may lead to indirect increases in money supply.

## Measuring money in SA

- Defined as currency plus deposits held by domestic, private nonbank sector at commercial banks.
- In South Africa currency is all the paper money and coins in circulation less cash held in bank vaults. →  $M = C + D$
- Deposits are all domestic private non-bank deposits in banks and excludes:
  - 1) Government deposits at commercial banks
  - 2) Foreign bank deposits at commercial banks
  - 3) Cash held by banks themselves (vault cash), Excluded because they are not available for spending by the private sector and cannot function as a medium exchange.
- Economic transactions in principle do not affect the money stock.
- The amount of currency in circulation is known since only the central bank issues currency.
- Because deposits are always held at banks, banks know the exact amount of deposits held by the non-bank (private) sector.
- Monetary authorities: SARB and the CPD (Corporation for public deposits)
- Commercial banks. Only registered banks and mutual banks, the Landbank and the Postbank are classified as other depository institutions.

## Monetary aggregates

- Stock variables measured at month end.
- 1) M1A
  - Consists of cash (coins and banknotes) + cheque and transmission deposits
  - Cheque and transmission deposits are no interest deposits mainly used to make payments.
  - If interest rate rises on medium to long-term deposits there will be a transfer into medium to long-term deposits.
  - In SA constituents small portion of M3
- 2) M1 Narrow definition.
  - M1A + other demand deposits by private sector.
  - Other demand deposits are monetary deposits other than transaction or chequeable deposits.
  - Other demand deposits are deposits that are convertible into cash on demand, and normally carry a payment facility.
  - High interest rates on other assets, means opportunity cost of keeping funds in monetary demand deposits is high, and funds are shifted to interest-bearing deposits.
  - In SA constituents large portion of M3
- 3) M2
  - a broader definition of money
  - M1 + plus deposits
  - Includes short-term (1 to 31 days) and medium-term deposits (32-180 days) such as savings deposits, savings bank certificates, "share" investments, negotiable certificates and promissory notes.

- Cannot be converted into cash on demand, but only after some time, does not carry a payment facility.
  - Near money, because terms are short and they are closely related and substitutes for demand monetary deposits in M1,
  - They are liquid.
  - In SA constituents large portion of M3
- 4) M3
- The most comprehensive measure of money
  - M2 + long-term deposits.
  - Includes all monetary and non-monetary deposit liabilities of the monetary banking sector.
  - Long term deposits are relatively liquid.
  - Because it involves considerable effort and cost to move funds between the components of M3 and financial assets that do not form part of M3, the M3 monetary aggregate is much more stable than its components, and is a much better indicator of domestic spending.
- What causes money stock to increase**
- 1) Bank loans to private nonbank sector (Most important)
  - 2) Transactions in financial assets between the banking sector (central and commercial banks) and the private nonbank sector
  - 3) Government transactions with the private nonbank sector
  - 4) Foreign exchange transactions
- Implications of the government printing money**
- Two types:
- 1) Printing banknotes and coins to finance expenditure.
    - Only SARB has the right to print money.
    - SARB prints money and sells it to banks (replaces old notes and for private sector cash requirements **Vault Cash**). The SARB profits (Income less costs) are then transferred to government bank accounts. No increase in money supply (Government deposit excluded).
    - Government then spends money and private sector deposits increase, therefore money supply increases.
    - Normally not a problem (cash component small proportion of total money stock) unless government is corrupt and abuses the processes creating excess money.
  - 2) Government forces the central bank to buy excessive issues of government securities
    - Monetisation of government debt.
    - Central banks are not independent enough
- MV+PY and therefore an increase in money stock causes an increase price level.
  - Hyperinflation occurs when, over the medium to long term, a vicious cycle of (money creation → inflation → money creation) occurs..
  - In Zimbabwe it destroyed both the financial sector and the economy, caused untold hardship and misery to the population, with the poor, being unable to protect themselves against the ravages of high inflation, suffering most.

## Part 2

# Chapter 4: Understanding interest rates

## Measuring Interest Rates

- Present value (PV) a dollar paid to you one year from now is less valuable than a dollar paid today because you can earn interest on a dollar today. Enables comparing the values of credit instruments with different payment timings.

## 4 types of credit market instruments

- 1) Simple loan such as many money market instruments. Borrowed funds repaid at maturity with additional interest payment.  
→ Simple interest rate equals yield to maturity = NPV.
- 2) Fixed-payment loan (fully amortised loan), same payment every month, which includes interest and principal, such as mortgages.  
→ Yield to maturity = IRR.
- 3) Coupon bond, pays a fixed coupon payment every year until maturity when face/par value is repaid, such as us treasury bonds, corporate bonds. Identified by 4 pieces of information: Face value, issuing agency, maturity date, coupon rate. Yield to maturity = IRR.  
→ Priced at face value, then yield to maturity = coupon rate.  
→ Price of a coupon bond and yield to maturity are negatively related, when the interest rate rises, the price of the bond falls.  
→ The yield to maturity is greater than the coupon rate when the bond price is below its face value.  
→ **Perpetuity (consol) bond**, has no maturity date and no repayment of principle, and that makes fixed coupon payments forever.  
→ Current Yield is yearly coupon payment divided by the price of the security.
- 4) Discount bond, (zero coupon bond) bought at a discount of its face-value and then repaid at face value at maturity, us treasury bills, savings bonds. No interest payments.  
→ Yield to maturity is the increase in price over the year divided by the initial price.  
→ Can have negative interest rates and purchasing power is not fully compensated.  
→ The yield to maturity is negatively related to the current bond price.

## Yield to maturity

- The interest rate that equates the present value of cash flow payments received from a debt instrument with its value today.
- Makes good economic sense and therefore most accurate measure of interest rates.

## The distinction between interest rates and returns

- Rate of capital gain is the change in the bond's price relative to the initial purchase price.
- Return on a bond is the current yield + rate of capital gain.
- Rate of return is defined as the payments to the owner plus the change in value, expressed as a fraction of its purchase price.
- The return on a bond will not necessarily equal the yield to maturity on that bond, due to price fluctuations giving higher or lower capital gains.
- Prices and returns for long-term bonds are more volatile than those of shorter term bonds.
- The only bond whose return equals the initial yield to maturity is one whose time to maturity is the same as the holding period.

- A rise in interest rates is associated with a fall in bond prices, resulting in capital losses on bonds whose terms to maturity are longer than the holding period.
- The more distant a bond's maturity, the lower the rate of return that occurs as a result of the increase in the interest rate.
- The more distant a bond's maturity, the greater the size of the percentage price change associated with an interest rate change.
- Paper loss if bond is not sold.

## Interest rate risk

- Prices and returns for long-term bonds are more volatile than those for shorter-term bonds due to the sensitivity of longer term bonds to interest rate changes.
- Due in large part to the term to maturity being more than the holding period.
- Bonds with a maturity that is as short as the holding periods have no interest rate risk.
- Reinvestment risk: when the holding period is longer than the term to maturity of a bond, due to uncertain future interest rates when reinvestment occurs.

## The distinction between real and nominal interest rates

- Real interest rate: nominal rate less expected inflation.  $r = i - \pi^e$
- Real interest rate reflects the real cost of borrowing.
- ex ante real interest rate is before the fact and ex post real interest rate is after the fact.
- When the real interest rate is low there are greater incentives to borrow and fewer incentives to lend.
- Real returns which indicate the amount of extra goods and services that can be purchased.
- Real interest rates are a more accurate indicator of the tightness of credit market conditions.

## Indexed bonds

- Interest and principal payments are adjusted for changes in the price level.
- Provide a direct measure of a real interest rate.
- They are useful because to monetary policy makers because subtracting their interest rates from a nominal rate on a non-indexed bond, they give insight into expected inflation.

## Chapter 5: The behaviour of interest rates

### Determinants of asset demand

- Wealth: total resources owned by an individual, including all assets.
- Expected Return: the return expected over the next period on one asset relative to another.
- Risk: the degree of uncertainty associated with the return on an asset relative to alternatives.
- Liquidity: the ease and speed with which an asset can be turned into cash relative to other assets.

### Theory of Portfolio choice

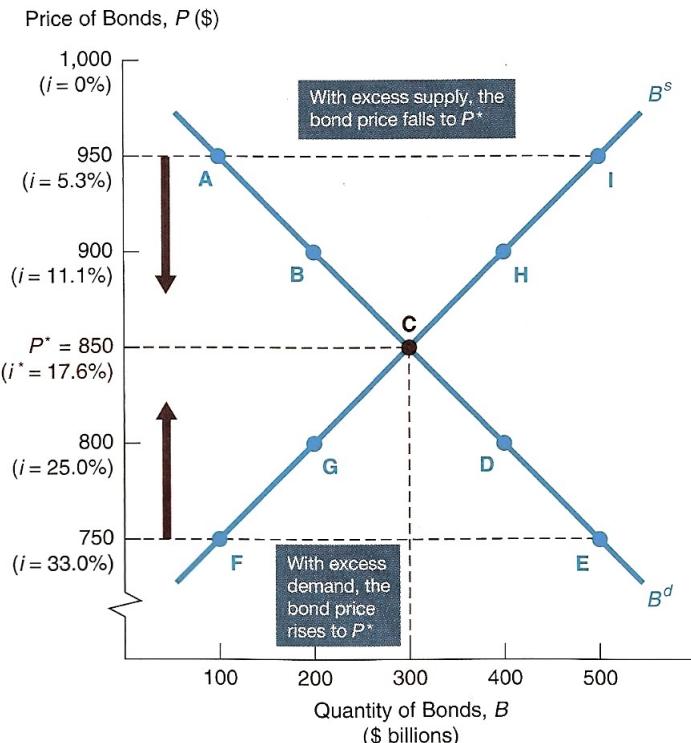
- How much of an asset people want to hold in their portfolios. An states the facts in the table below.

## Response of the Quantity of an Asset Demanded to Changes in Wealth, Expected Returns, Risk, and Liquidity

Variable	Change in Variable	Change in Quantity Demanded
Wealth	↑	↑
Expected return relative to other assets	↑	↑
Risk relative to other assets	↑	↓
Liquidity relative to other assets	↑	↑

## Supply and demand in the bond market

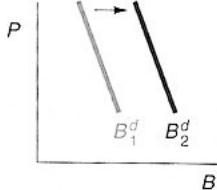
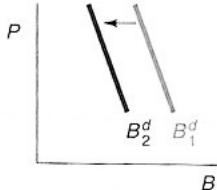
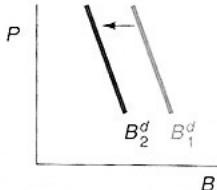
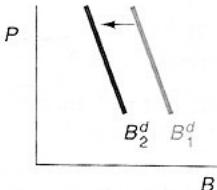
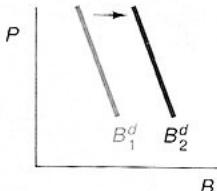
- Demand curve, relationship between quantity demanded and price or interest rate. It has a downward slope indicating lower prices for the bond the quantity demand is higher, ceteris paribus. Lenders of funds.
- Supply curve, relationship between quantity supplied and price, ceteris paribus. Higher prices means higher supply. Borrowers of funds. The higher the price of bonds, the more the borrower receives and the lower the interest rate which the borrower must pay.
- Market Equilibrium. Clearing price. Quantity of bonds demanded equals quantity of bonds supplied. The market head towards this point and settles.  $B^d = B^s$
- Excess supply, people want to sell more bonds than others want to buy.
- Excess demand, people want to buy more bonds than others want to sell.
- The asset market approach does demand and supply analysis in terms of stocks of assets and not flows, due to the inherit difficulty of flows especially in the face of inflation.
- If households save more, wealth increases.



## Changes in Equilibrium interest rates

→ Simpler analysis of effects from changes in inflation.

### Factors That Shift the Demand Curve for Bonds

Variable	Change in Variable	Change in Quantity Demanded at Each Bond Price	Shift in Demand Curve
Wealth	increase from business cycle expansion or increase in propensity to save.	↑	
Expected interest rate	higher expected interest rates lowers expected return and hence demand higher expected returns in other assets lowers demand for bonds.	↑ ↓	
Expected inflation	higher expected inflation leads to higher returns from other assets hence lower relative returns from bonds and hence lower demand higher expected inflation leads to lower real interest rates and lower relative bond returns	↑ ↓	
Riskiness of bonds relative to other assets		↑ ↓	
Liquidity of bonds relative to other assets		↑	

Note: Only increases in the variables are shown. The effect of decreases in the variables on the change in demand would be the opposite of those indicated in the remaining columns.

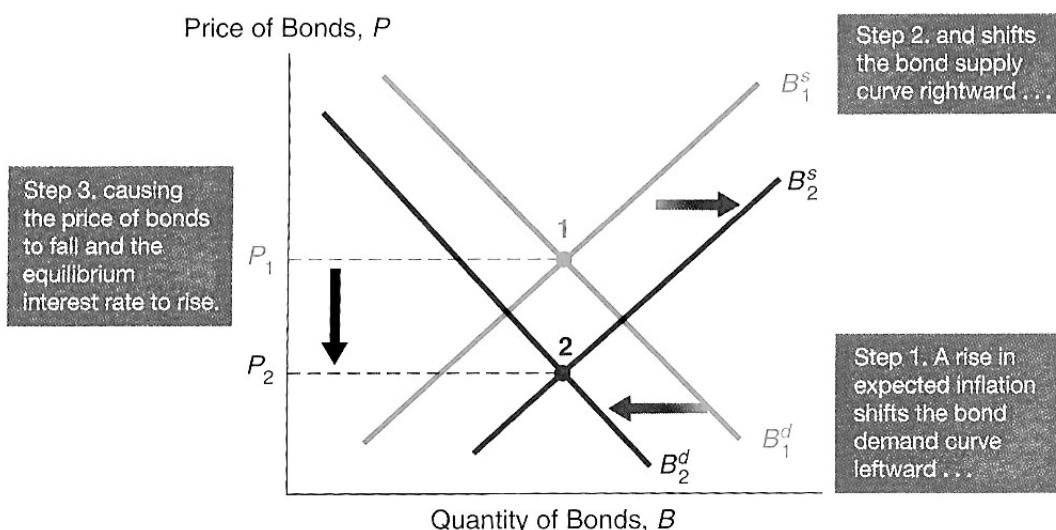
## Factors That Shift the Supply of Bonds

Variable	Change in Variable	Change in Quantity Supplied at Each Bond Price	Shift in Supply Curve
Profitability of investments in a business cycle expansion the supply of bonds increase due to increase investment	↑	↑	
Expected inflation  when inflation increases the real cost of borrowing falls	↑	↑	
Government deficit  during a deficit governments increase the sale bonds to obtain more financing.	↑	↑	

Note: Only increases in the variables are shown. The effect of decreases in the variables on the change in supply would be the opposite of those indicated in the remaining columns.

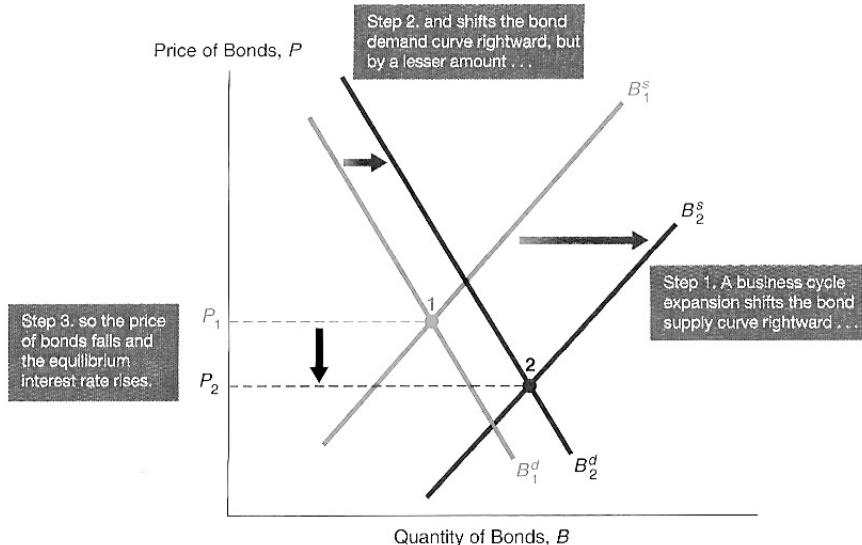
## Changes in the interest rate due to expected inflation, the Fisher Effect

- When expected inflation rises, interest rates will rise, also called the Fisher Effect.
- Ambiguous change in quantity, but certain increase in interest rate.



## Changes in the interest rate due to a business cycle expansion

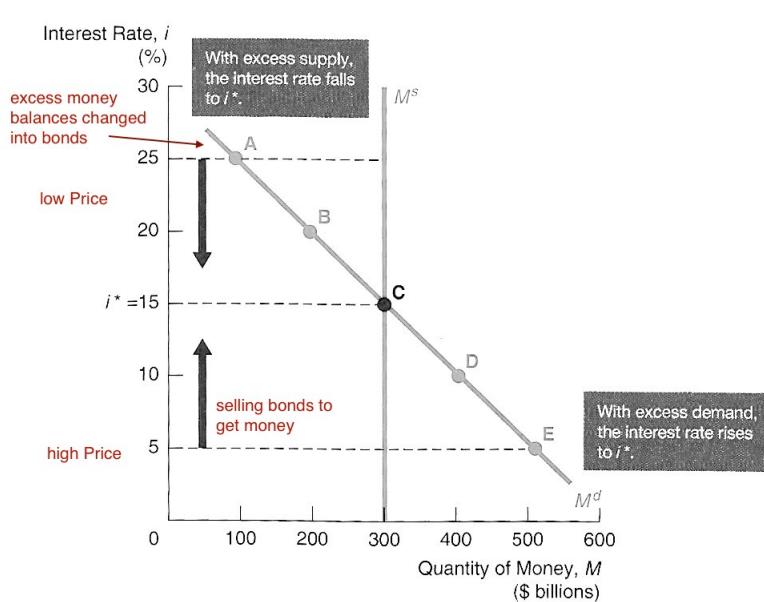
- Amounts of goods and services rise with a corresponding increase in national income and business has more opportunities to expand, therefore they increase the supply of bonds.
- An increase in wealth will, via the theory of portfolio choice, increase the demand for bonds.
- Ambiguous change in interest rate but certain increase in quantity.



## Supply and demand in the market for money: The liquidity preference framework

$$B^S + M^S = B^d + M^d \text{ or } B^S - B^d = M^d - M^s$$

- Simpler analysis is of effects from changes in income, price level and supply of money.
- Simplifying assumptions:
  - 1) Assumes there are only two kinds of assets, money and bonds which equals total wealth, and therefore implicitly ignores any effects on interest rates from changes in expected returns on real assets such as cars.
  - 3) Assumes money has a zero rate of return as it earns no interest. Supply curve is vertical which is not the case in South Africa.
- Demand curve: As the interest rate rises the expected return of money relative to bonds falls and the demand for bonds increases. The quantity of money demand and interest rate are negatively related because of the rising opportunity costs of holding money when interest rates are increasing.
- Supply curve: Central bank supplies a fixed quantity.
- Equilibrium:  $M^s = M^d$  at the intersection of the supply and demand curves.
- When the price level increases more money will be demanded to restore purchasing power.



## Changes in Equilibrium interest rates in the LPF

Factors That Shift the Demand for and Supply of Money

Variable	Change in Variable	Change in Money Demand ( $M^d$ ) or Supply ( $M^s$ ) at Each Interest Rate	Change in Interest Rate
Income 1) wealth increases more money held for store of value 2) more money for transactions medium of exchange	↑	$M^d \uparrow$	↑
Price level restore purchasing power	↑	$M^d \uparrow$	↑
liquidity effect Money supply engineered by Central bank	↑	$M^s \uparrow$	↓

Graphs illustrating the shifts in the money market:

- For Income: A rightward shift of the money demand curve from  $M_d^1$  to  $M_d^2$  leads to a higher equilibrium interest rate  $i_2$  (from  $i_1$ ).
- For Price level: A rightward shift of the money demand curve from  $M_d^1$  to  $M_d^2$  leads to a higher equilibrium interest rate  $i_2$  (from  $i_1$ ).
- For Money supply: An increase in money supply from  $M_s^1$  to  $M_s^2$  leads to a lower equilibrium interest rate  $i_2$  (from  $i_1$ ).

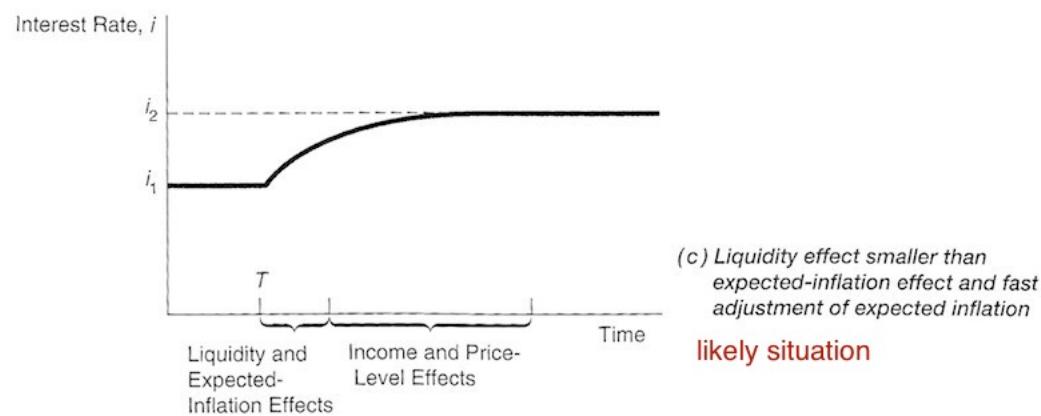
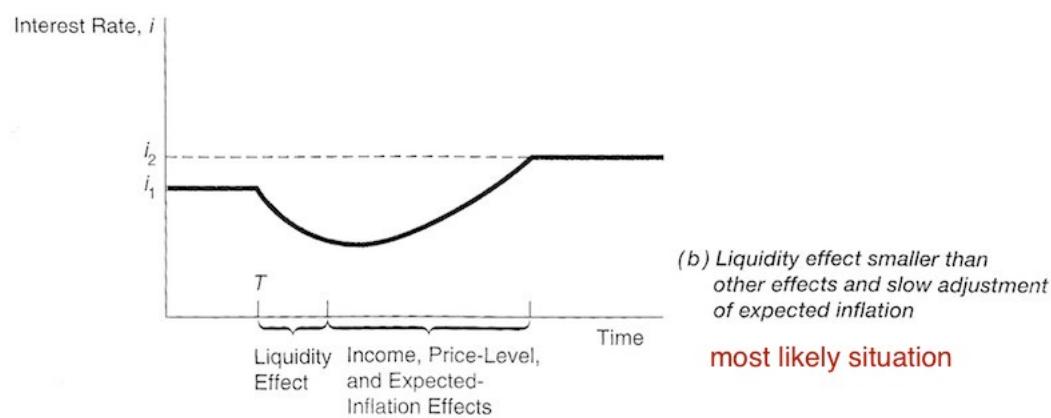
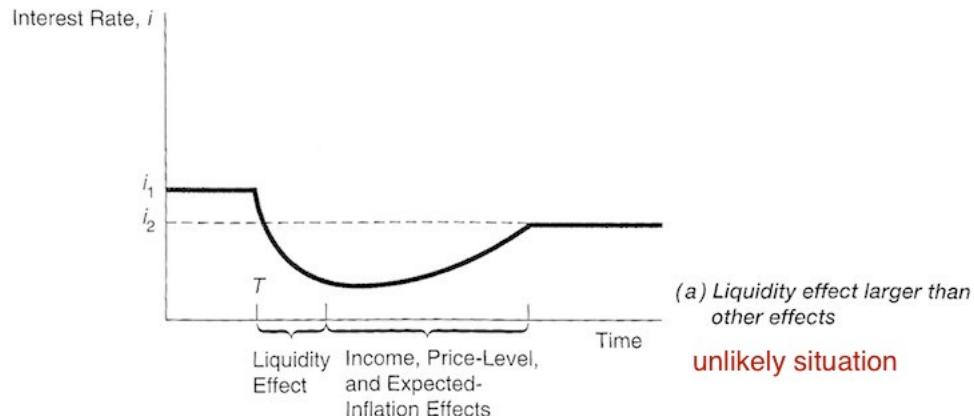
Note: Only increases in the variables are shown. The effect of decreases in the variables on the change in demand would be the opposite of those indicated in the remaining columns.

## 3 effects of changes in money supply

- 1) The income effect of an increase in the money supply is a rise in interest rates in response to the higher level of income.
- 2) the price-level effect from an increase in the money supply is a rise in interest rates in response to the rise in price level.

- 3) the expected-inflation effect of an increase in money supply is a rise in interest rates in response to the rise in the expected inflation rate. The expected-inflation effect will persist only as long as the price level continues to rise.
- Basic difference between price-level effect and expected-inflation effect is that the price-level effect remains even after prices have stopped rising whereas the expected inflation effect disappears.

### Response over time to an increase in money supply growth



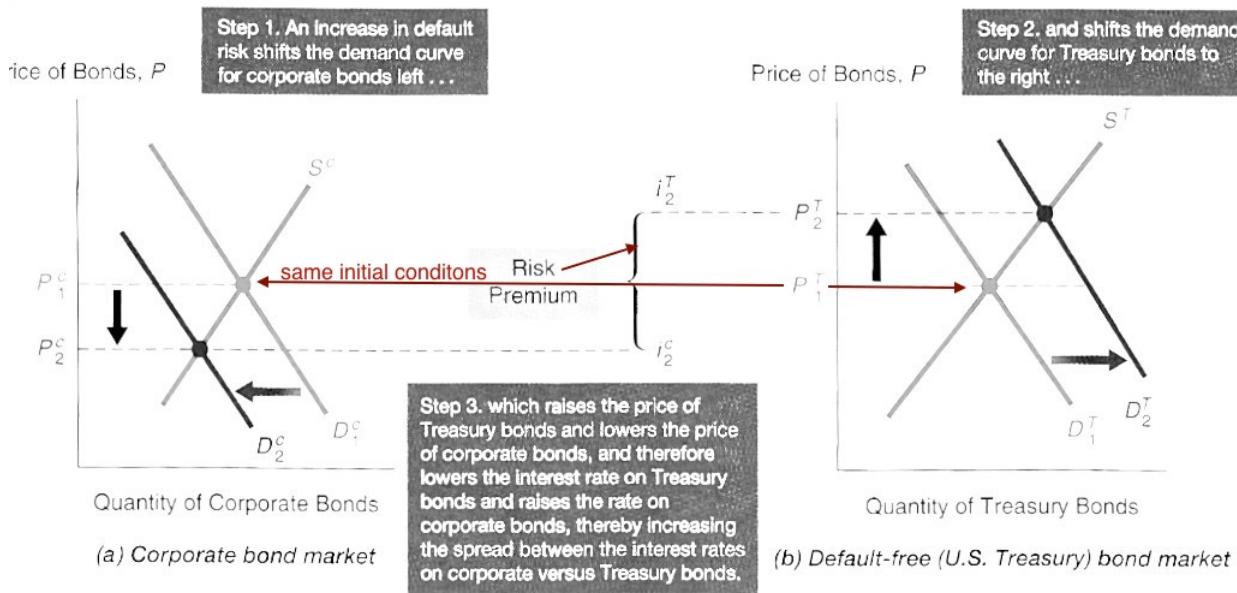
# Chapter 6: The risk and term structure of interest rates

## Risk structure of interest rates.

- The risk structure of interest rates is the relationship among interest rates on bonds with the same maturity.
- 3 Factors affecting risk structure

### 1) Default risk.

- Default risk is the risk of the issuer of the bond being unable or unwilling to make interest payments or pay off the face value when the bond matures.
- Bonds such as US Treasury bonds are considered **default free**, as they are backed by the US government which can increase taxes or print money to meet its obligations.
- The **risk premium** is the difference between bonds with default risk and bonds that are default free.
- A bond with default risk will always have a positive risk premium.
- Increase in default risk will raise the risk premium.
- Credit ratings agencies provide information about the likelihood of a bond issuer defaulting. They can have conflicts of interest in both structuring debt instruments and selling them.
- Junk bonds have high risk premium but are high-yield bonds.

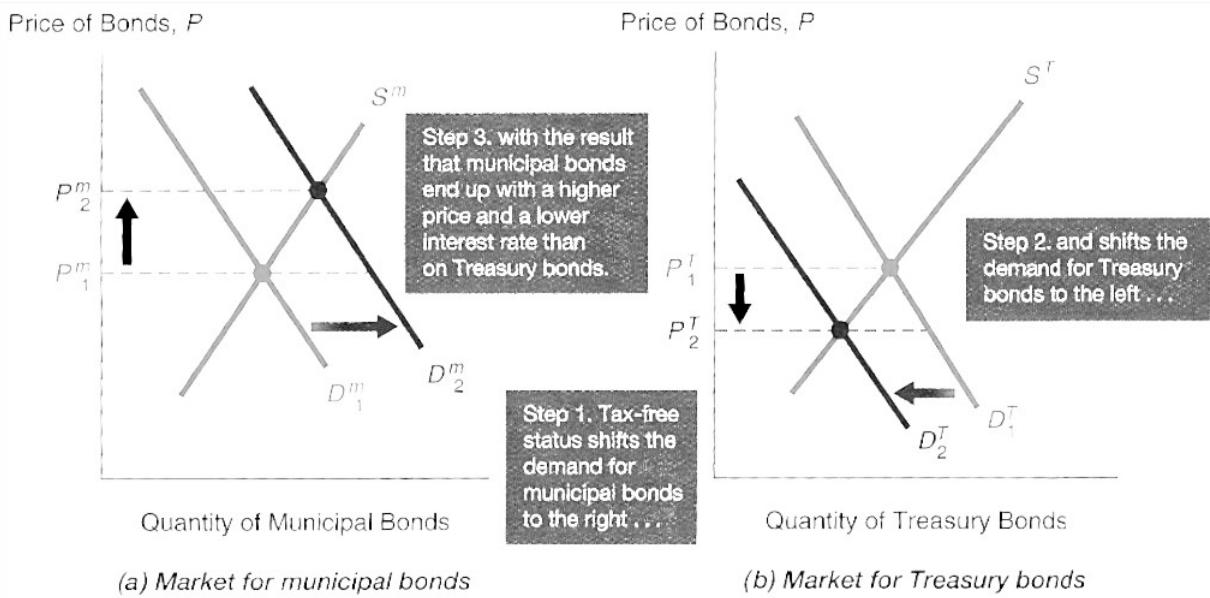


### 2) Liquidity

- the higher the bond's liquidity the more appealing it is and therefore there would be a rightward shift in the demand for bonds curve.
- US Treasury bonds are the most liquid of all bonds.
- Same graph as default risk case.

### 3) Income tax considerations.

- Bonds that are exempt from tax have higher expected returns and hence there is an increased demand for them.
- Bonds with tax-free interest payments have lower interest rates.
- Municipal bonds are not default free and not as liquid as treasury bonds.

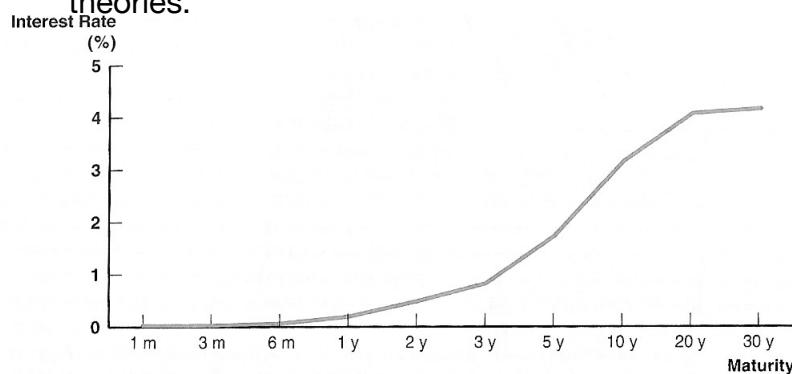


### Term structure of interest rates and the yield curve.

- Bonds with identical risk, liquidity and tax characteristics may have different interest rates because their time remaining to maturity is different. A plot of the yield is called a yield curve.
- Upward sloping yield curves (usual case) indicate long-term interest rates are higher than short term interest rates.
- Flat yield curves mean same short and long-term interest rates
- Downward (inverted) sloping yield curves mean long-term rates are below short-term rates.
- Yield can also have more complex shapes as in up and down.

### 3 empirical facts to be explained

- 1) interest rates on bonds of different maturities move together over time. Explained by Expectations and liquidity premium theories.
- 2) when short-term interest rates are low, yield curves are more likely to have an upward slope and when short-term rates are high yield curves will be inverted. Explained by Expectations and liquidity premium theories.
- 3) yield curves almost always slope upward. Explained by Segmented, and liquidity premium theories.



### Expectations theory

- The interest rate on a long term-term bond will equal an average of the short-term interest rates that people expect to occur over the life of the long-term bond.

- The key assumption is that buyers of bonds do not prefer bonds of one maturity over another, so they will not hold any quantity of a bond if its expected return is less than that of another bond with a different maturity
- Implies Bonds with different maturities are perfect substitutes therefore same expected return.
- When the yield curve is upward sloping short term interest rates are expected to rise. Or the average of expected future short-term rates is higher than the current short-term rate.
- When the yield curve is inverted the average of future short-term interest rates is expected to be lower than the current short-term rate, implying that short-term interest rates are expected to fall.
- If the yield curve is flat short-term interest rates are not expected to change on average in the future.
- Explaining empirical facts:
  - 1) A rise in short term rates will raise people's expectation of future short-term rates and given that long-term rates are an average of short-terms rate they to will rise and hence move together. 2) When short term rates are low people will expect them to rise in the future and hence the average of future short-term rates rate is will be higher relative to the current short-term rates hence long-terms rates will bi higher and the yield curve has an upwards slope. Conversely for the high short-term rates and the inverted yield curve.
  - 3) It cannot explain this fact as it predicts a typical curve would be flat because a rise or fall in interest rates is equally likely.

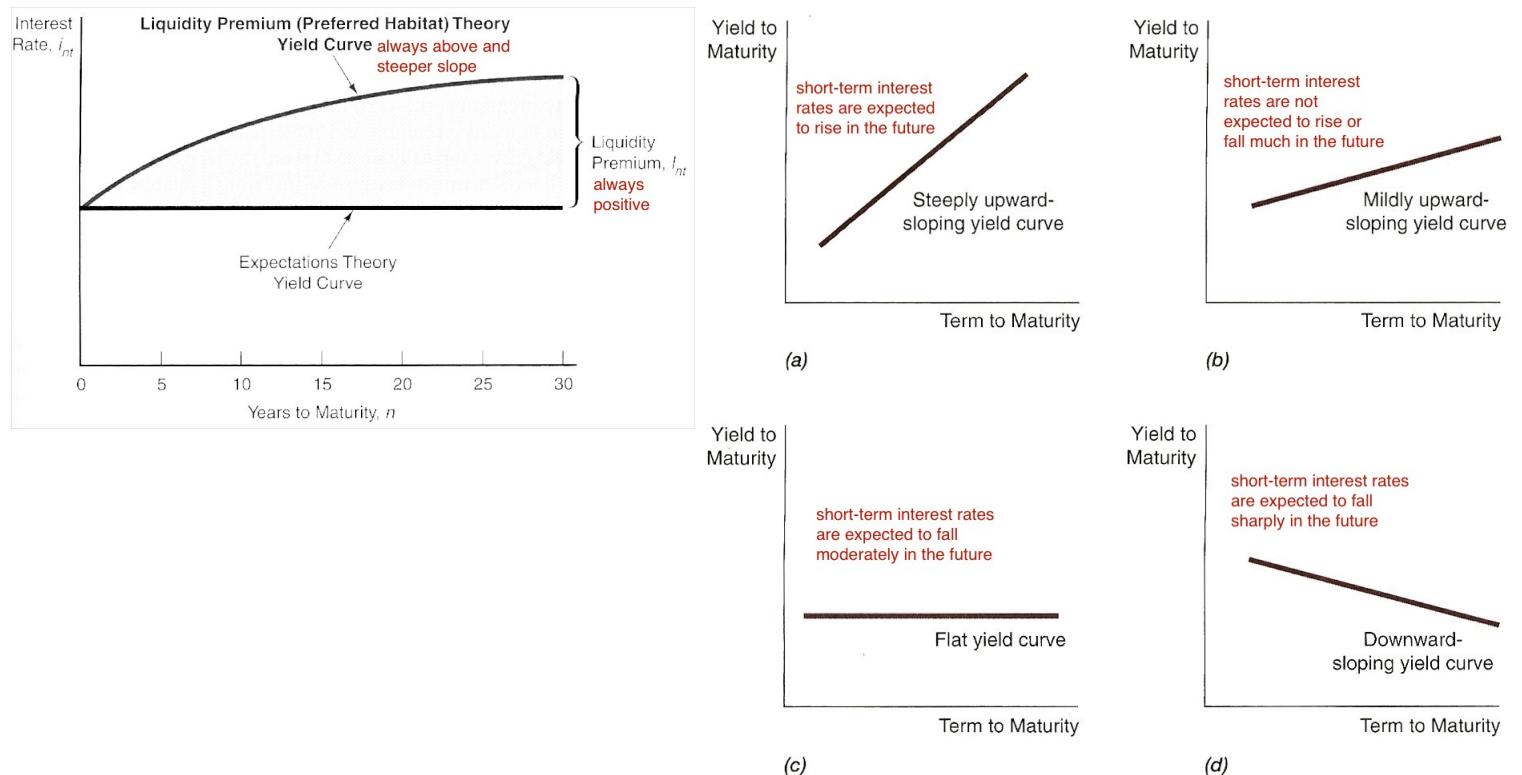
## **Segmented market theory**

- Sees markets for different-maturity bonds as completely separate and segmented no substitution and no effect on each other expected returns.
- Bond are not substitutes at all due to the fact that investors have a strong preference for bonds of one maturity but not for another and are only concerned with the expected returns of their preference. This is due to the preference for a certain holding period. (holding period = term to maturity = no interest rate risk).
- The interest rate for each bond with a different maturity is then determined by supply and demand for that bond.
- Explaining empirical facts:
  - 1) Unable to explain fact due to the fact that different maturity bonds are segmented and have no influence on each others interest rates.
  - 2) Unable to explain because it is not clear how demand and supply for short-term bonds versus long-terms bonds change with the level of short term interest rates.
  - 3) Demand for short-term bonds is higher due to the lower risk hence higher prices and lower interest rates and long term bonds have lower prices and higher interest rates. This explain the normal upward slope.

## **Liquidity premium theory and preferred habitat theory**

- Most widely accepted because explain facts the best and the other two theories lay ground work for this one, and shines a light on how economist modify theories to empirical evidence.
- The liquidity premium theory states the the interest rate on a long-term bond will equal an average of short-term interest rates expected to occur over the life of the long-term bond plus a liquidity premium (term premium) that responds to supply and demand.
  - Key assumption is that bonds of different maturities are substitutes with their expected returns influencing one another, they are not perfect substitutes.

- Investor tend to prefer short term bonds as they have lower interest-rate risk.
- Investor must be offered a positive liquidity premium to induce them to hold longer-term bonds.
- Preferred habitat theory assumes investors have preference for bonds of one maturity over another and will only buy non-preferred bonds with higher expected returns.
  - Most investor prefer the shorter-term habitat and therefore longer term bonds will have higher prices.
- Explaining empirical facts:
  - 1) A rise in short-term interest rates mean short-term rates will be higher on average and therefore so will long-term rates and so they move together.
  - 2) If short-term rates are high people expected them to come down, therefore average of future short term rates will be expected to be much more lower, therefore lower long-term rates (despite the liquidity premium) are lower and there is an inverted yield curve.
  - 3) Because the liquidity premium rises with a bond maturity because of the strong preference for short-term bonds.



## Evidence of term structure

- One test indicated spread between short and long-term does not always predict future interest rates because of fluctuations in the long term liquidity premium.
- New evidence suggests: Quite a bit of information in short-term and long-term structure, but unreliable at predicting rates over the intermediate term.
- Can also help forecast future inflation and business cycles.

### SA yield curve

- Extremely volatile

- The short-term bond yield is heavily affected by monetary policy and the repo rate.
- The long-term bond yield is heavily affected by inflation, foreign exchange markets and the general economic outlook.

## Part 3

### Chapter 8: An Economic analysis of financial structure

#### How financial intermediaries reduce transaction costs.

- Financial intermediaries stand between lender-savers and borrow-spenders.
  - They enable funds to be transferred from people with non-productive opportunities to people with productive opportunities.
  - In financial markets the costs of transacting is high.
- 1) Economies of scale
    - They bundle investors funds together to reduce the cost per individual investor.
    - The costs of a small transaction are similar to the costs of a large transaction.
    - Example a Mutual fund financial intermediary which sells shares to individuals and then invests the proceeds in bonds and stocks. The charge fees for administrating accounts.
    - They increase diversification of risk, buy purchasing a range of securities, as small investors would be compelled to keep all their eggs in the same basket, to keep costs down.
    - Economies of scale are important in lowering costs for communication and computerisation in financial transaction.
  - 2) Expertise
    - Expertises in things such as computer technology, providing help desks and information.
    - They provided liquidity services (easier transactions or being able to pay bills).

#### Lemons problem and adverse selection

- Buyers cannot asses the quality of used cars, therefore the price buyers will pay must reflect the average quality, between a low lemon and a high peach.
  - The owners knows the quality of the used car
    - 1) If its low (lemon) they will be happy to accept the average price which is higher than a lemon.
    - 2) If its high(peach) then the owner knows the car is undervalued at the average price and may not sell.
  - The result is fewer good cars and the average quality ill be low, hence few sales and a poorly functioning market.
  - In the absence of asymmetric information where buyers know as much about the quality of the used car as the sellers then buyers will be willing to pay full value for good used cars.
  - Because byers are getting a fair price they will sell, and the market will have many transactions.
  - Similar arguments for stock and bond markets.
  - Tools to solve adverse selection problem
- 1) Private production and sale of information
    - Provide the people supply funds with more details about the individuals or firms seeking finance.
    - Private companies collect and produce information that distinguishes good from bad.
    - Creates the free-rider problem, where people who don't pay for the information take advantage of the information other people have paid for.

- If A paid for info to invest in undervalued securities, and B and many others copy A, then the price will go up and the security will no longer be undervalued and hence A will not buy info in the future.
- The weakened ability of private firms to profit from selling information will lead to less information in the market and an increase in adverse selection.

## 2) Government regulation to increase information

- Government would be reluctant to release negative information as it would be politically unfavourable.
- Governments regulate securities markets to encourage firms to reveal honest and accurate information about themselves, and requiring audits.
- Does not always work e.g. Enron. Statistics do not reveal the entire picture and bad companies tend to paint the information in a good light.

## 3) Financial intermediation

- They become experts in the production of information about firms and sorting the good credit risks from the bad ones.
- The higher profits from the information serves to incentivise information production.
- They avoid the free-rider problem by making private non-traded loans and not public purchases.
- Banks have an increased role in developing economies because they reduced adverse selection
- As information becomes easier to acquire the role of banks will decline.
- Easier for bigger firms to get funds in the direct route as more information about them is available.

## 4) Collateral and net worth

- Reduces the lenders loss in the result of default and therefore reduces adverse selection
- Lenders are more willing to make loans because of the reduced risk.
- Borrowers are more willing to supply collateral to get the loans
- High net worth (difference between assets and liabilities) can serve as collateral

## Moral hazard and equity contracts

Principal-agent problem (Moral hazard in equity contracts)

- Separation of ownership and control involves moral hazard, as managers (agents) may act in their own interests rather than in the interests of the stock-holders (principles) because the managers have less incentive to maximise profits than shareholders do.
- Examples are pursuing personal interests like diverting funds, or acquisitions of firms that increase personal power but do not increase profitability.
- Would not arise if owners had complete information about the managers and could prevent wasteful or fraudulent expenditure.
- Would also not arise if there was no separation of ownership and control.

→ Tools to solve moral hazard problem in equity contracts

### 1) Production of information: Monitoring (Costly state verification)

- Principles can monitor agents actions, conduct regular audits
- Can be expensive in terms of time and money and makes equity contracts less desirable.
- Subject to free-rider problem where if you know other stockholders are monitoring the agents then you can take a free ride on their activities, if everyone does this the moral hazard increases.

2) Government regulation to increase information.

- Governments have laws to force firms to adhere to standard accounting principles that make profit verification easier.
- They impose criminal penalties for fraud and theft.
- Only partly effective as fraud detection is difficult and agents have incentive to obfuscate.

3) Financial intermediation

- They have the ability to avoid the free-rider problem
- Venture capital firms pool resources of partners and use the funds to help entrepreneurs start businesses. In exchange the venture capitalists receive an equity share. Due to costly state verification, they insist on having several of their own people participate as members of the managing body to keep an eye on the firm. When they supply start-up funds the equity is not marketable to anyone except themselves and they avoid the free-rider problem and therefore reduce moral hazard.

4) Debt contracts

- A contract structured so that moral hazard would only exist in certain situations.
- In a debt contract the borrower must pay the lender a fixed regular payments. As long as these payments are made the lender does not care about the profitability of the borrower.
- Only when the firm cannot meet its debt payments does the lender need to verify the state of the firm's profits, in this case they then act more like equity contract holders.
- Less frequent need to monitor firm
- Lower cost of state certification

## Moral hazard and debt contracts

→ Borrowers have an incentive to take on more risk than lenders would like because borrowers get to keep excess profits and lenders only receive their principle and interest payments.

→ Tools to solve moral hazard problem in debt contracts

1) Net worth and collateral

- When borrowers have more at stake moral hazard is reduced.
- High net worth or collateral pledged to the lender reduces the risk of moral hazard.
- Makes the debt contract incentive compatible, the greater the borrower's net worth or collateral pledged the greater the borrowers incentive to behave in a way that lenders expect and desire and the smaller the moral hazard problem and easier it is to obtain funds.

2) Monitoring and enforcement of restrictive covenants

- Covenants to discourage undesirable behaviour. Loans for specific activities only, or restriction on risky activities.
- Covenants to encourage desirable behaviour. Life insurance on a mortgage borrower. Maintaining minimum holdings of certain assets relative to firm's size.
- Covenants to keep collateral valuable. Keep collateral in good condition and maintain possession of collateral. Theft and fire insurance.
- Covenants to provide information. Quarterly accounting and income reports to allow easier monitoring. The right to audit and inspect firm's books at any time.

3) Financial intermediation.

- Restrictive covenants do not completely eliminate moral hazard. Difficult to account for all situations and borrowers look for loopholes.
- Restrictive covenants also have to be monitored and enforced and are meaningless otherwise, this is costly.

- The free rider problem also arises.
- Banks avoid free rider problem by making private loans.

## Eight basic facts about financial structure throughout the world

- 1) Stocks are not the most important source of external financing for business
- 2) Issuing marketable debt and equity securities is not the primary way in which businesses finance their operations.
- 3) Indirect finance is more important than direct finance
- 4) Banks are the most important source of indirect finance
- 5) The financial system is heavily regulated
- 6) Only large well-established companies have easy access to securities markets
- 7) Collateral is a prevalent feature of debt contracts
- 8) Debt contract are complicated legal documents placing substantial restrictions on borrowers

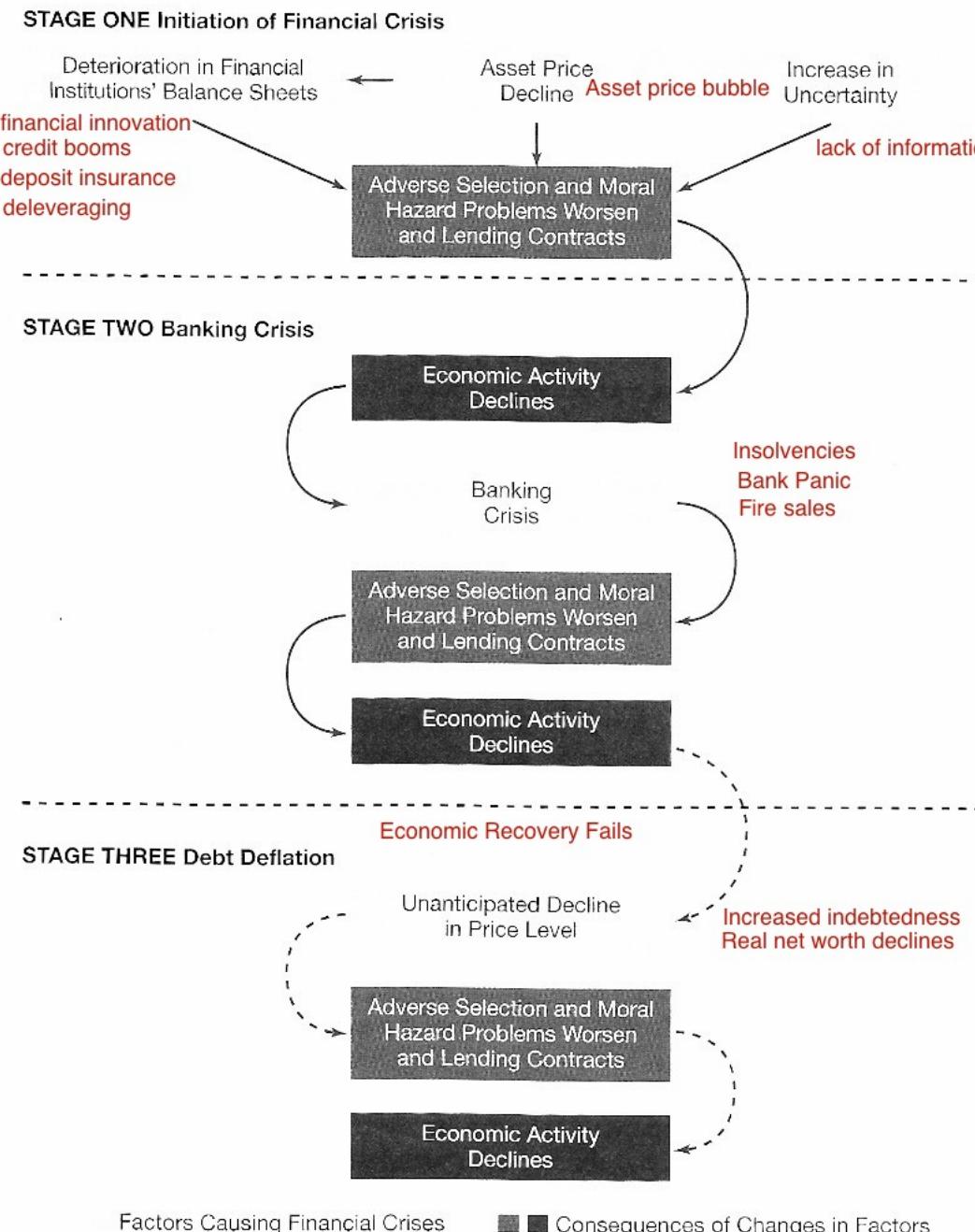
### Asymmetric Information Problems and Tools to Solve Them

Asymmetric Information Problem	Tools to Solve It	Explains Fact Number
Adverse selection	Private production and sale of information	1, 2
	Government regulation to increase information	5
	Financial intermediation	3, 4, 6
	Collateral and net worth	7
Moral hazard in equity contracts (principal–agent problem)	Production of information: monitoring	1
	Government regulation to increase information	5
	Financial intermediation	3
	Debt contracts	1
Moral hazard in debt contracts	Collateral and net worth	6, 7
	Monitoring and enforcement of restrictive covenants	8
	Financial intermediation	3, 4

## Financial Development and Economic Growth Problems

- The institutional environment of a poor legal system
- Weak accounting standards
- Inadequate government regulation
- Government intervention through directed credit programs and state ownership of banks

# Chapter 9: Financial Crises in advanced economies



## Great Depression

- 1) Stock market crash
  - Stock market in a boom
  - Fed was tightening monetary policy.
  - Stock market crashed
  - Stocks temporarily recovered part of their losses.
- 2) Bank panics
  - Severe drought lead to large losses on farm mortgages.
  - Substantial withdrawals from banks lead to bank panic.

- Fed did not act and many banks failed.
- 3) Continuing decline in stock prices.
  - Stock fell to 10% of their value from peak.
  - Increased uncertainty lead to moral hazard and adverse selection problems
  - Lending contracted
  - Increased interest spread.
- 4) Debt deflation
  - Large decline in price level
  - Short circuited normal recovery process
  - Increased indebtedness
  - Net worth decreases.
  - Prolonged contraction increased unemployment  
International Dimensions)
  - Bank panics spread to rest of world
  - Decreased imports
  - Worldwide depressions lead to rise of fascism and WW2.

## Global Financial Crisis 07-09

### Causes

- 1) Financial Innovation in Mortgagee markets
  - High risk subprime mortgages because of lower transaction costs, computer technology, credit scores and securitisation.
  - Bundled into mortgage-backed securities, most notorious CDO's
  - Increased complexity of structured products lead to asymmetric information problems.
- 2) Agency problems in the mortgage markets
  - Originate-to-distribute agency problem
  - Mortgage brokers did not act in the best interest of investors, due to fees earned.
  - Risk takers lined up for easy home loans
  - Banks also suffered from agency problems due to fees
  - Insurance companies had conflicts of interest on insurance contracts for defaults (credit default swaps) due to large fees.
- 3) Asymmetric information and credit-rating agencies.
  - Advised clients on how to structure complex financial instruments and at the same time they were rating the identical products.
  - Conflict of interest on fees earned, lacked incentive to rate accurately.

### Effects

- 1) Residential housing prices: boom and bust
  - Booming housing prices fuelled by low interest rates and foreign cash flows in subprime mortgage market.
  - Large amounts of re-mortgaging, and lower house prices lead to value of houses below mortgage value
  - Increased incentive to just walk away and increased defaults on loans leading to millions of foreclosures.
- 2) Deterioration of financial institutions balance sheets
  - Value of mortgage backed securities fell leaving banks with lower value of assets and lower net worth

- Banks started to de-leverage, selling assets and restricting lending
  - Increased financial frictions.
- 3) Run on the shadow banking system
- Large runs on hedge funds, investment banks and other nondepository institutions.
  - Increase collateral requirements led to a vicious cycle of fire sale of assets and declining prices.
  - Consumption and expenditure declined and the economy contracted.
- 4) Global financial markets
- Run on shadow banks became worse international
  - Banks hoarded cash and would not lend to one another
  - Banks and institutions in Europe started to fail.
- 5) Failure of high-profile firms
- Bear Stearns sale to J.P Morgan
  - Fed bailout of Fannie Mae and Freddie Mac
  - Lehman Brothers bankruptcy
  - Merrill Lynch sale to Bank of America
  - Government bailout of AIG for losses on credit default swaps.

#### Height of crisis

- Bailout packages
- Increased credit spreads
- Stock market crash accelerated
- Real GDP declined
- Unemployment went up

#### Government intervention and recovery

- Smaller in magnitude than Depression because of massive interventions by governments to prop up financial markets and stimulate economy.
- Massive bailouts
- Temporary increase of federal deposit insurance limit.
- Stocks prices increased
- Credit spread began to fall
- Slow pace of recovery.

### Extra Points

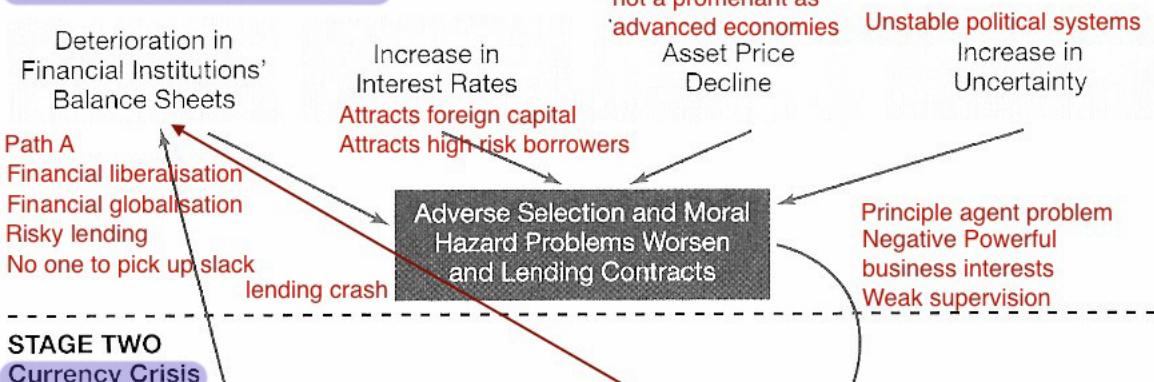
- When an asset-price bubble bursts and asset prices realign with fundamental economic values, there is a resulting decline in the net worth of firms and firms have incentives to take on risk at the lender's expense.
- An unanticipated decline in the price level leads to firms' real burden of indebtedness increasing. The resulting decline in a firm's net worth increases adverse selection and moral hazard problems facing lenders.
- When a domestic firm's debt contracts are denominated in foreign currency, and when there is an unanticipated decline in the value of the domestic currency, then the debt burden of the firm increases.
- A failure of a major financial institution, which leads to a dramatic increase in uncertainty in financial markets, makes it hard for lenders to screen good from bad credit risks. The resulting inability of lenders to solve the adverse selection problem makes them less willing to lend.

- Individuals and firms with the riskiest investment projects are those who are willing to pay the highest interest rates. If increased demand for credit drives up interest rates sufficiently, good credit risks are less likely to want to borrow while bad credit risks are still willing to borrow.
- When there is weak bank regulation and supervision, then financial institutions will take on excessive risk because market discipline is weakened by the existence of a government safety net.

## Chapter 10: Financial crises in emerging market economies

### STAGE ONE

#### Initiation of Financial Crisis



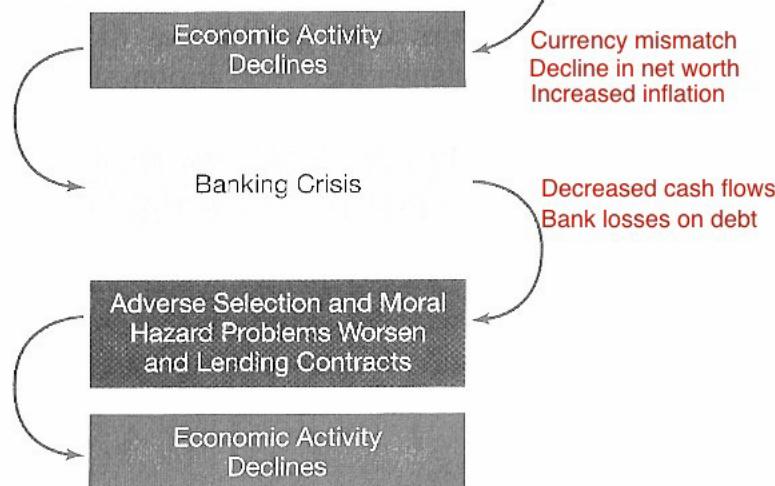
### STAGE TWO

#### Currency Crisis



### STAGE THREE

#### Full-Fledged Financial Crisis



Factors Causing Financial Crises

Consequences of Changes in Factors

## Chapter 11: Banking and the management of financial institutions

### The bank balance sheet

- Total assets = total liabilities + capital

→ Profits on interest from assets exceeding interest on liabilities + costs.

### Liabilities (sources)

→ Banks acquire funds by selling or issuing liabilities

- 1) Checkable Deposit and money market accounts. Payable on demand. Lowest-cost (interest payments, administration, advertising and branches) source of bank funds.
- 2) Nontransaction deposits. Largest source of bank funds. Higher interest no checks. (savings accounts, certificates of deposit, and negotiable certificates of deposit )
- 3) Borrowings. Loans from Fed, other banks and corporations.
- 4) Bank capital. Banks net worth. Sales of equity. Cushion against drop in assets.

### Assets (uses)

- 1) Reserves. Vault cash + Reserves at fed (required reserves + excess reserves)
- 2) Cash items in process of collection.
- 3) Deposits at other banks.
- 4) Securities. Short-term government securities are secondary reserves.
- 5) Loans. Primary profits. Lack of liquidity and high default risk means higher interest earned on loans.
- 6) Other assets. Bank buildings, computers, equipment.

<b>Assets (Uses of Funds)</b>	<b>Liabilities (Sources of Funds)</b>
Reserves and cash items	Checkable deposits
Securities	Nontransaction deposits
U.S. government and agency	Small-denomination time deposits
State and local government and other securities	(< \$100,000) + savings deposits
Loans	Large-denomination time deposits
Commercial and industrial	Borrowings
Real estate	Bank capital
Consumer	
Interbank	
Other	
Other assets (for example, physical capital)	

## Basic banking

- General profits are from asset transformation. (Selling one type buying another)
- Borrows short and lends long.
- T-account. Simplified balance sheet with lines in the form of a T, and lists changes that occur in balance sheet items starting from some initial position.
- When a bank receives additional deposits it gains an equal amount of reserves and vice versa.
- 5 C's
  - 1) Character
  - 2) Capacity (ability to pay)
  - 3) Collateral

- 4) Conditions (local and national economy)
- 5) Capital (net worth)

## General principles of bank management

### Liquidity management

- Acquisition of sufficiently liquid assets to meet the bank's depositor obligations
- If a bank has ample excess reserves a deposit outflow does not necessitate changes in other parts of the balance sheet.
- To Eliminate required reserve shortfalls.
  - 1) Borrow from other banks or corporations. Incurs interest costs.
  - 2) Sell some securities. Brokerage and transaction costs.
  - 3) Borrowing from central bank. Cost is discount rate.
  - 4) Reducing loans. Most costly as antagonises customers.
- Excess reserves are insurance against the cost associated with deposit outflows.

### Asset management

- Pursue acceptable risk policy. Low rate of default and diversifying.
  - 1) Find borrowers who will pay high interest rates and not default
  - 2) Purchase securities with high returns and low risk
  - 3) Diversification
  - 4) Holding liquid securities to meet reserve requirements.

### Liability management

- Acquire funds at low cost
- Selling securities other than checkable deposits.

### Capital adequacy management

- Amount of capital the bank should maintain, and acquire needed capital.
  - 1) Prevent bank failure
  - 2) Returns for the owners.  $ROE = ROA \times EM$ .  $EM$  (equity multiplier) =  $\frac{\text{assets}}{\text{equity capital}}$  Given the return on assets, the lower the bank capital the higher the return for the owners of the bank. Bank might not want to hold too much capital.
    - Trade-off between safety and returns to equity holders. Bank managers must decide how much of the increased safety that comes with higher capital they are willing to trade off against the lower return on equity that comes with higher capital.
  - 3) Bank capital requirements by authorities.

## Strategies for managing bank capital

- To lower the amount of capital relative to assets and raise equity multiplier (smaller value).
  - 1) Stock buy back
  - 2) Reduced retained earnings by paying higher dividends
  - 3) Keep bank capital constant but increase asset transformation.
- To raise the amount of capital relative to assets and decrease equity multiplier (larger value).
  - 1) Issue equity
  - 2) Reduce bank dividends.
  - 3) Keep bank capital constant but make fewer loans or sell securities and then reduce liabilities.
- A shortfall of bank capital is likely to lead to a bank reducing its assets and therefore a contraction in lending.

## How a capital crunch caused a credit crunch during the Global Financial Crisis

- Shortfalls of capital (losses on mortgage back securities) therefore sale of assets.
- Difficult to raise new capital so tightened lending standards and reduced lending.

## Managing credit risk

### Screening and monitoring

- 1) Screening: Collecting information about prospective borrowers and making judgement calls.  
Statistics and personal information.
- 2) Specialisation in lending. Concentrating lending on firms in specific industries, banks become more knowledgeable about specific industries and better able to predict default risk.
- 3) Monitoring and enforcement of restrict covenants. Provisions in loan contract restricting risky activities, must be monitored for compliance.

### Long-term customer relationships

- Analysis of past activity
- Lower costs of monitoring
- Easier to obtain loans for borrowers.
- Helps with unanticipated moral hazard contingencies.

### Loan commitments

- Commitment to a commercial customer to provided loans up to a given amount for a specified future period of time at market interest rates.
- Advantage for firms as a source of credit when needed.
- Promotes long-term relationships.

### Collateral and compensating balances

- Compensating balances: A required minimum cash balance in checking account as collateral.  
Also Allows bank to monitor account for activity.

### Credit rationing

- Refusing loans of any amount. Reduces adverse selection as higher interest rates only attract riskier borrowers.
- Restricting size of loan to less than amount wanted. Reduces moral hazard. More borrowers repay their loans if they are small.

## Managing interest rate risk

- Rate-sensitive assets/liabilities are short-term.
- If a bank has more rate-sensitive liabilities than assets, a rise in interest rates will reduce bank profits and a decline in interest rates will raise bank profits.

### Gap and duration analysis

- Gap analysis = rate-sensitive assets - rate-sensitive liabilities X change in interest rate.
- Duration analysis examines the sensitivity of the market value of bank's total assets and liabilities to changes in interest rates.

## Application: strategies for managing interest rate risk

- Shortening or lengthening duration of banks assets to increase/decrease sensitivity to interest rate changes
- Can be costly.

## Off-balance-sheet activities

### Loan sales (Secondary loans)

- Sale of all or part of the cash stream from a specific loan
- Removes loan as an asset from the balance sheet
- Sold at a higher amount to earn profit

#### **Generation of fee income**

- Providing specialized services such as foreign exchange services, servicing mortgage backed securities, guaranteeing debt securities.
- Providing backup credit such as overdrafts
- Off balance sheet activities increase bank's exposure to risk.

#### **Trading activities and risk management techniques**

- Trading in debt options, interest-rate swaps and financial futures.
- Trading in foreign exchange.
- Primary done to reduce risk but speculative trading can lead to large losses and bank insolvencies.
- Principle agent problem is huge given the large amount traders have at their disposal and managers need to implement restrictions and conduct Domesday stress tests.

## **Part 4**

### **Chapter 14: Central banks: a global perspective**

#### **Central Bank Independence:**

##### **FOR:**

- Political pressures would impart an inflationary bias due to their short-term focus on winning the next election; this could lead to a political business cycle, with expansionary policy just before an election and contraction policy after.
- It could also be used to fund budget deficits and increase inflation.
- Politicians also lack the ability to control monetary policy, and the agency problem is far worse for politicians as they have fewer incentives to act in the public interest.
- Independent central banks can pursue politically unpopular policies.
- Empirical evidence suggest Independence is best for targeting inflation but central banks should be accountable to parliament.

##### **AGAINST:**

- Undemocratic to be controlled by a few elites, with a lack of accountability.
- There needs to be a coordinated effort between fiscal and monetary policy to reduce cross purposes.
- Central banks may pursue narrow self interests and can be bureaucratic.
- Does not always use its freedom well, and can fail to act when required.
- Can be used as a whipping boy to take heat of politicians.

#### **Can monetary policy help to alleviate SA unemployment problem?**

- No, Monetary policy is an ineffective tool to achieve this goal, reason why
  - 1) South Africa's high level of unemployment is mainly a structural problem
    - Most unemployed are unskilled workers and businesses demand skilled workers
    - Structural problems of a long term nature are best solved by long term structural solutions.
    - Such as a good school system, development of worker skills and entrepreneurship.
  - 2) The economies of countries that have a lower inflation rate generally perform better.
    - Lowering interest rates increases inflation and lowers long term economic growth.

- In the long term, there is no trade-off between price stability and growth
- 3) Lower interest rates increase disposable income of households and increases borrowing, increasing aggregate demand and consumption. However
  - little impact on unemployment if consumption is on imports
  - in SA production is not very sensitive to interest rates
  - even if lower interest rates increase production, it will not necessarily affect employment
  - More likely that output and employment will react to medium and long term interest rates and not to changes in the short term repo rate.
- 4) Everybody can gain by low inflation as the unemployed and poor are impacted the most.
- 5) Lower interest rates might lead to a depreciation of the value of the Rand, increasing the price of imports and raising inflation.
- 6) The real interest rate may be low.
- The best contribution the SARB's monetary policy can make is to maintain price stability and contain cyclical variation in production employment levels. This creates favourable conditions for sustainable growth in income and employment.

## The South African Reserve Bank (SARB)

### 6 Main Functions

- 1) Sole right to issue cash or currency
  - Controls SA Mint Company which issues coins and owns SA Bank Note Company which prints banknotes.
  - New currency is printed to serve the needs of the public.
  - The relatively small net income from printing currency accrues to government
  - Because the printing of new currency generates revenue for the government, it calls for care and restraint, otherwise hyperinflation will occur.
- 2) Clearing and the settlement of interbank obligations
  - Cheques and electronic payments are cleared centrally by the SARB (through the Automated Clearing Bureau)
  - Settlement is the final discharge of an obligation of one bank in favour of another (A at bank AA writes cheque to pay B at bank BB), by means of the accounts the banks hold with the SARB.
  - The SARB also oversees the safety and soundness of the payment system through the introduction of settlement risk reduction measures.
- 3) Banker for and supervisor of other banks and lender of last resort
  - Provides accommodation to banks on a daily basis when they experience liquidity shortages
  - Holds the statutory cash reserves
  - To maintain sound and effective banking practices in the interest of depositors and the economy.
- 4) Formulation and implementation of monetary and exchange rate policy
  - Politically sensitive
  - Refinancing or accommodation system where banks are forced into a liquidity shortage and must borrow from SARB at the set repo rate, this then influence the level of all interest rates and hence all participants in the economy.
  -
- 5) Banker for government
  - Administering the auctions of government bonds and treasury bills

- Participating in National Treasury's debt management meetings
- managing the flow of government funds in the money market
- 6) Custodian of gold and other foreign exchange reserves
- SARB manages these reserves against international uncertainty, external shocks and exchange rate volatility.

### Is the SARB independent?

- SARB does not have goal independence and cannot set objectives on its own as the inflation target is set in consultation between the Governor of the SARB and the Minister of Finance. Not necessarily bad as reducing inflation needs the support of government, firms and labour.
- SARB has operational (instrument) independence in the choice of instruments it uses and the autonomy to adjust such instruments.
- Independence of the SARB is legally established in terms of the Constitution
- SARB is accountable to Parliament via the Minister of Finance
- The Bank must submit a monthly statement of its assets and liabilities and an annual report to Parliament.
- The governor of the SARB also frequently explains the SARB's policy stance in the media.
- President appoints the governor and three deputy governors for five-year terms implies SARB may not be completely isolated from political influences.
- SARB is financially independent of government
- SARB accrues a large surplus net interest income which is paid to government.
- Its operations are not profit driven nor financially constrained by government.

## Chapter 15: The money supply process

### Fed's balance sheet

Federal Reserve System		Monetary base
Assets		Liabilities
Securities <span style="color: red;">Mainly Government securities</span>		Currency in circulation
Loans to financial institutions <span style="color: red;">Borrowed reserves</span>		Reserves <span style="color: red;">Deposits at Fed + Vault cash</span>

### Control of the monetary base

- Monetary base (high-powered money)  $MB = C + R$
- Fed controls monetary base through purchases or sales of securities in the open market and discount loans to banks.
- The effect of an open market purchase on reserve depends on whether the seller of the bonds keeps the proceeds from the sale in currency or in deposits
- The effect of an open market purchase always increases the monetary base.
- The effect of open market transactions on the monetary base is much more certain than the effect on reserves.
- Shifts from deposits in currency do not change the monetary base.

### Other factors affecting monetary base

- 1) Float temporary increase in monetary base from Fed's check-clearing process (crediting bank A before debiting Bank B)
- 2) Treasury Deposits

3) Intervention in foreign exchange markets.

→ Nonborrowed monetary base (tight control) = monetary base - borrowed reserves (less control).

$$MB_n = MB - BR$$

→ Although float and treasury deposits undergo substantial short-run fluctuations, they do not prevent the Fed from actively controlling it.

## Multiple deposit creations

- When the Fed supplies the banking system with \$1 of additional reserves, deposits increase by a multiple of it.
- A bank cannot safely make a loan for an amount greater than the excess reserves it has before it makes the loan.
- Whether a bank chooses to use its excess reserves to make loans or to purchase securities, the effect on deposit expansion is the same.
- A single bank cannot by itself generate multiple expansions of deposits, but the banking system as a whole can.
- The multiple increase in deposits generated from an increase in the banking system's reserves is called the simple deposit multiplier.  $\Delta D = \frac{1}{rr} \times \Delta R$ 
  - Deriving:  $RR = R$  (no excess reserves),  $RR = rr \times D$  substitute into first gives  $rr \times R = R$   
divide by  $rr$  and take change in both sides yields formula.
- Deposit creation will stop only when excess reserves in the banking system are zero, equilibrium, and therefore a given level of reserves in the banking system determines the level of checkable deposits.

### Critique of the simple model.

- Currency has no multiple deposit expansions while deposits do, therefore if proceeds from loans are kept as currency then deposits will not increase as much as model predicts, i.e. does not account for deposits-ratio  $c = \frac{C}{D}$
- If banks choose to hold on to all or some of their excess reserves, the full expansion of deposit creation does not occur, i.e. does not account for excess-reserves ratio  $e = \frac{ER}{D}$
- Depositors decisions on how much currency to hold and bankers decisions on the amount of excess reserves should be taken into account.
- Static model that ignores the steps over time of the deposit creation process.

## Factors that determine money supply

### Money Supply Response

Player	Variable	Change in Variable	Money Supply Response	Reason
Federal Reserve System <b>Central Bank</b>	Nonborrowed monetary base, $MB_n$	$OM \text{ purchases} \uparrow$	$\uparrow$	More MB for deposit creation
	Required reserve ratio, $rr$	$\uparrow$	$\downarrow$	Less multiple deposit expansion
Banks <b>Intermediaries</b>	Borrowed reserves, $BR$	$\uparrow$	$\uparrow$	More MB for deposit creation
	Excess reserves	$\uparrow$	$\downarrow$	Less loans and deposit creation
Depositors	Currency holdings	$\uparrow$	$\downarrow$	Less multiple deposit expansion

Note: Only increases ( $\uparrow$ ) in the variables are shown. The effects of decreases on the money supply would be the opposite of those indicated in the "Money Supply Response" column.

### Money multiplier

$$\rightarrow R = RR + ER \text{ (equilibrium) (ER = excess reserves) (1)}$$

$$\rightarrow RR = rr \times D \quad (D = \text{checkable deposits}) \text{ (2)}$$

$$\rightarrow \text{Substitute 2 into 1, } R = (rr \times D) + ER \quad (rr < 1)$$

$$\rightarrow MB = R + C = (rr \times D) + ER + C$$

$$\rightarrow \text{Given currency ratio } c = \frac{C}{D} \text{ and excess reserve ratio } e = \frac{ER}{D}, \text{ then after rearranging ratios}$$

$$MB = (rr \times D) + (e \times D) + (C \times D) = (rr + e + c) \times D$$

$$\rightarrow \text{Rearranging gives } D = \frac{1}{rr + e + c} \times MB \text{ (3)}$$

$$\rightarrow \text{Using M1 definition of money } M = D + C \text{ and using } C = c \times D \text{ gives}$$

$$M = D + (c \times D) = (1 + c) \times D \text{ (4)}$$

$$\rightarrow \text{Substitute 4 into 3 gives } M = \frac{1 + c}{rr + e + c} \times MB$$

$$\rightarrow \text{therefore money multiplier } m = \frac{1 + c}{rr + e + c} \times MB \quad (m > 1 \text{ if } rr < 1)$$

### Money supply response to changes in the factors

$$\rightarrow M = m \times (MB_n + B)$$

$\rightarrow$  level of currency does rise when the monetary base and checkable deposits increase because  $c > 0$

### Monetary policy in SA

$\rightarrow$  SARB does not pay interest on bank reserves and government deposits.

$\rightarrow$  Government transfers from SARB to banks/nonbank accounts increases reserves.

- SARB buying foreign exchange from banks increases bank reserves.
- Tax and loan accounts are accounts with the commercial banks, transfers from these accounts to and from SARB are used to manipulate reserves of banks for monetary policy reasons.

## Money supply in South Africa

- Money supply = cash and deposits of the nonbank public.
- Money supply increases because of:
  - 1) There is a net increase in the loans the banks grant to the nonbank public.
  - 2) There is a net increase in assets (mostly securities) that banks buy from the nonbank public.
  - 3) There is a net increase in the payments the central bank makes to the nonbank public (open-market purchases from nonbank public)
  - 4) There is a net increase in the payments the government makes to the nonbank public. (budget deficit)
  - 5) There is a net increase in the amount of foreign exchange the nonbank public sells to the banks. (surplus on the balance of payments)

Assets	Liabilities
Claims on the private sector	Money supply deposits
Claims on the foreign sector	Foreign deposits (deposits by non-residents with SA banks)
Claims on the government sector	Government deposits
Interbank claims	Interbank deposits and loans
Other assets	Capital and reserves and other liabilities

## Causal direction of money supply process in SA

- Mishkin implies reserve holding leads to deposit creation others argue deposits creation leads to reserve holding.
- Commercial banks are dependent on the central bank for their cash reserves and a small part from selling forex.
- Central bank functions as the "lender of last resort" and it is compelled to also supply the banking system with its normal cash reserves requirements.
- Two strategies to supply the banking system with cash reserves:
  - 1) Can control amount of cash reserves it provides and allow the cash fund rate (Fed funds rate/ repo rate) to find its own level as determined by the demand for cash reserves.
  - 2) Can fix the cash funds rate and allow the amount of cash reserves to find its own level, as determined by the demand for cash.
    - There is only a price constraint (cash fund rate) and no quantity constraint.
    - No choice but to accommodate fully and unconditionally the banking sector's total demand for cash reserves at that target level.
    - Individual banks that require a disproportionate amount of cash because they have been irresponsible, may be refused and allowed to go bankrupt unless they are too big to fail.
    - Averagely prudent banks are assured of their cash reserves at the prevailing repo rate.
    - If banks are equally competitive, they face the same growth in the demand for credit and can issue all their deposits as credit, and obtain their cash reserves from SARB. This implies that deposits lead to cash holdings.

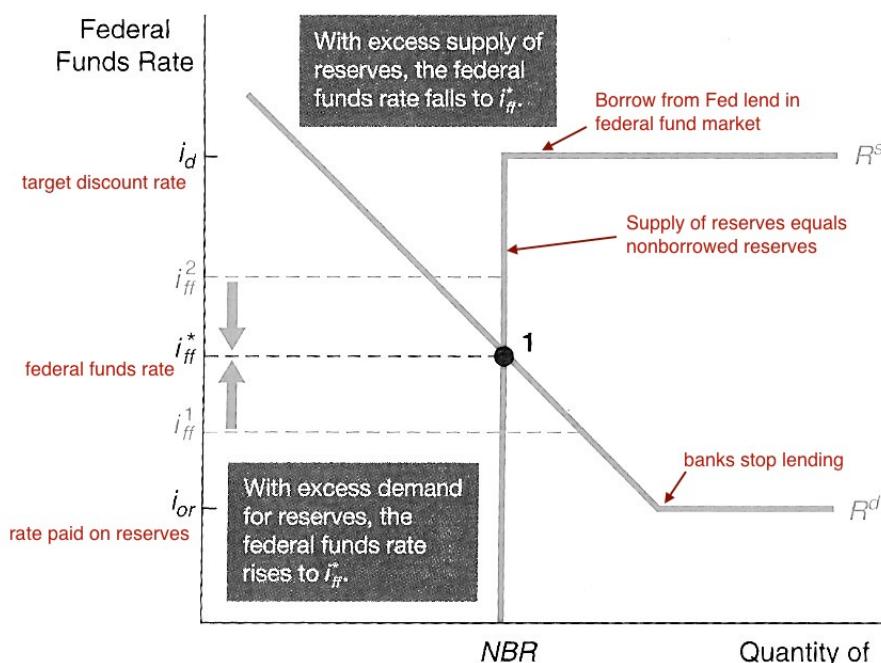
- ( $D \rightarrow R$  or  $M \rightarrow MB$ ) implies that changes in  $r$ ,  $c$  and  $e$  ratios does not cause a change in the impact of  $R$  on  $D$ .
  - If banks are assured cash reserves, there is no reason for excess cash reserves. Excess cash reserves are lent to other banks.
  - Banks only need to keep the required cash reserves as an average over a month period. Removes the need to hold large excess reserves on a daily basis.

## Chapter 16: The tools of monetary policy

### Market for reserves and Federal funds rate

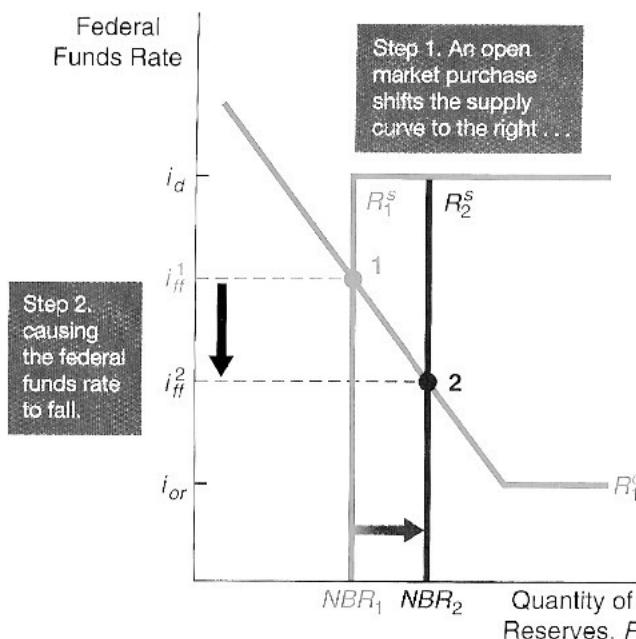
- Where federal funds rate is determined.
- Reserves = Required Reserves ( $rr \times D$ ) + Excess Reserves
- Opportunity cost of holding excess reserves = interest earned on lending out - interest rate paid on reserves.
- Demand curve slopes down because of opportunity cost of holding excess reserves decreases and becomes infinitely elastic when federal funds rates is below rate on reserves.
- Supply curve:
  - Supply broken in to nonborrowed reserves (open market operations) and borrowed reserves (discount rate).
  - Banks will not borrow from the fed if the federal funds rate is below the discount rate and supply is vertical and equals the nonborrowed reserves.
  - If federal funds rate is higher than discount rate banks borrow from fed and lend in federal funds market and supply is infinitely elastic.

### Market Equilibrium

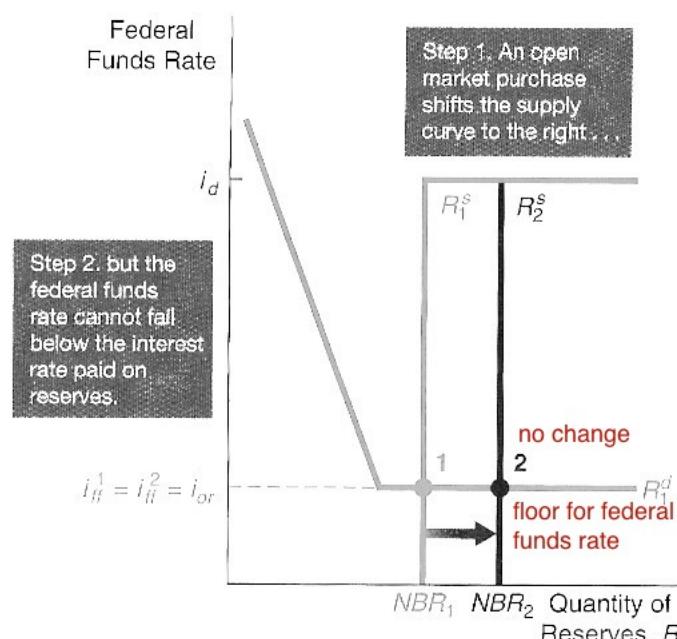


### Response to open market operations

- an open market purchases cause the federal funds rate to fall and vices versa
- the interest rate paid on reserves sets a floor for the federal funds rates.



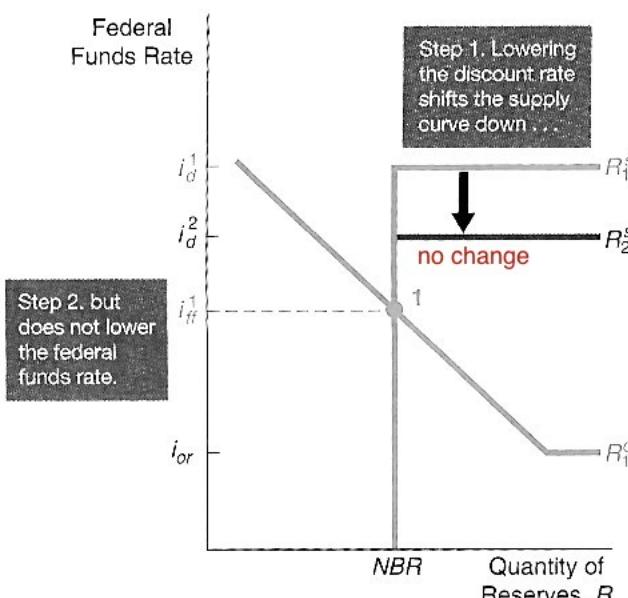
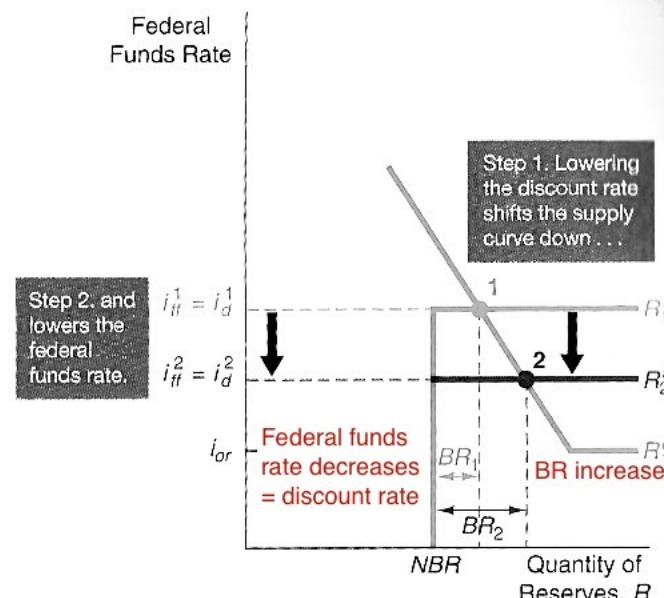
(a) Supply curve initially intersects demand curve in its downward-sloping section



(b) Supply curve initially intersects demand curve in its flat section

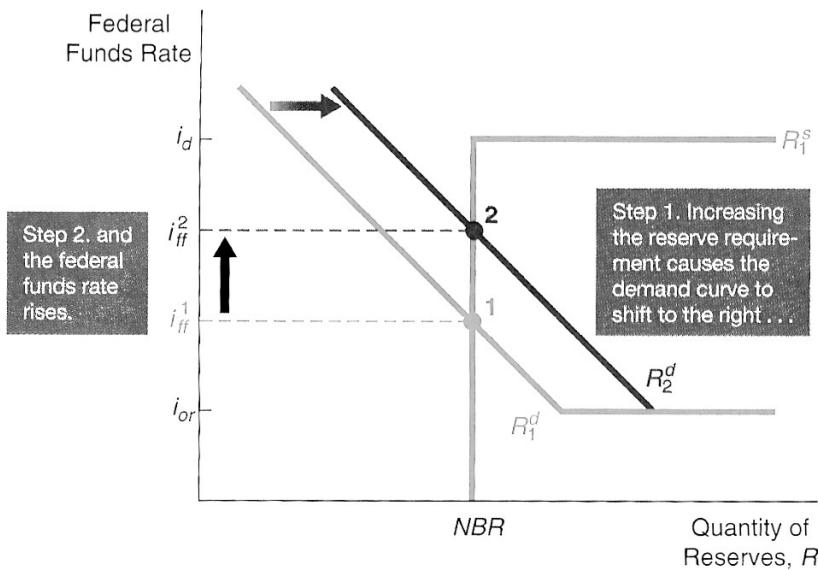
## Response to change in discount rate

→ Most changes in the discount rate have no effect on the federal funds rate.

(a) No discount lending ( $BR = 0$ )(b) Some discount lending ( $BR > 0$ )

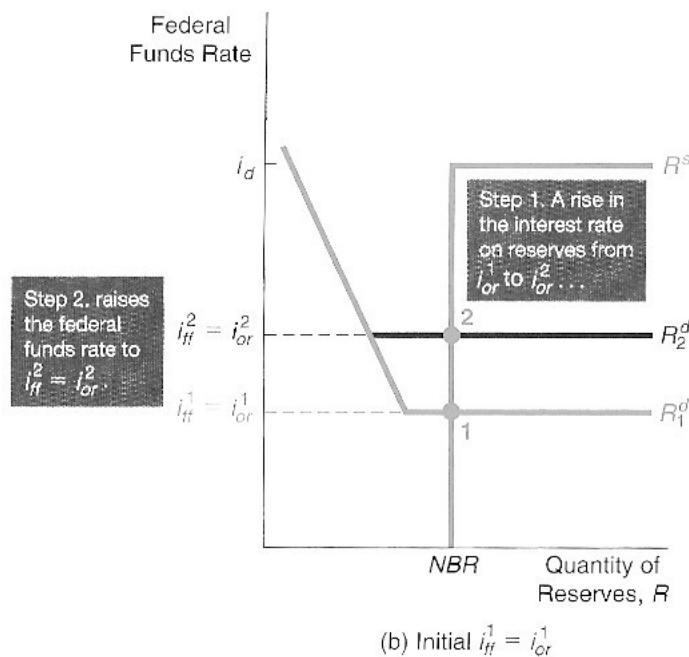
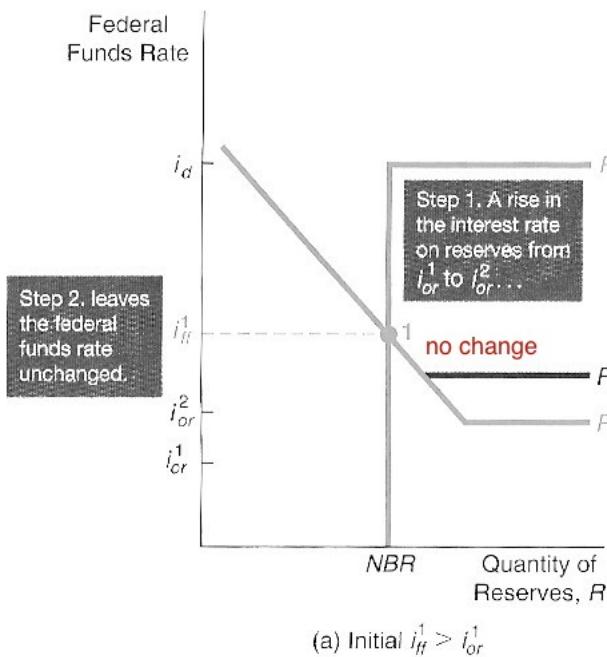
## Response to change in required reserves

→ when the Fed raises the required reserves the federal funds rate rises and vice versa due to increased demand.



## Response to change in interest rate on reserves

- When the federal funds rate is at the interest rate paid on reserves, a rise in the interest on reserves raises the federal funds rate.



## Conventional monetary policy tools

### 1) Open market operations

- Dynamic open market operations. Intended to change the level of reserves and monetary base.
- Defensive open market operations. Intended to offset movements in other factors (changes in float, change in treasury deposits). Usually short term repo's.
- Conducted on liquid securities to avoid substantial affects on prices.

### 2) Discount policy or discount window.

- Primary credit (standing lending facility at discount rate)

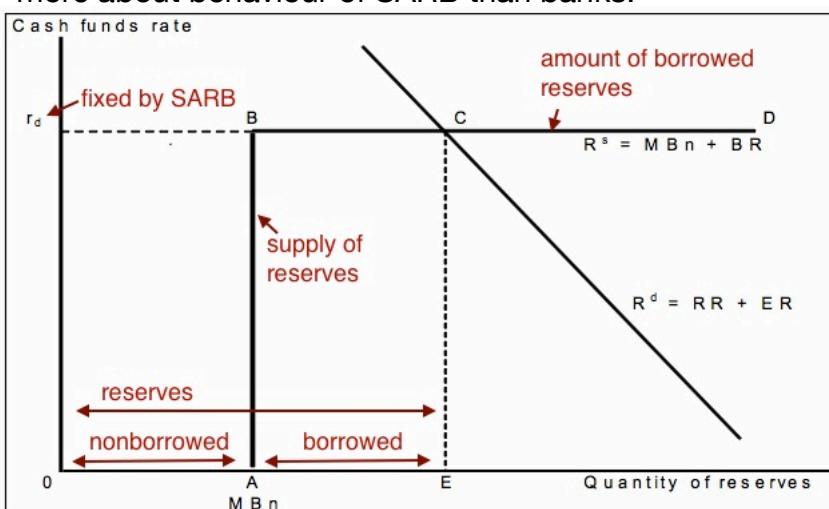
- Secondary credit (Banks in financial trouble) higher rate than discount rate
  - Seasonal credit for vacation and agricultural areas. (average of discount and CD rates)
- 3) Lender of last resort
- Provide reserves to banks when no one else will to prevent bank failure.
  - Moral hazard problem with banks willing to take on more risk than they would normally especially with banks too big to fail.
- 4) Reserve requirements
- Increases in reserves requirements decrease the money multiplier, increases demand for reserves and raises the federal funds rate.
  - Rarely used.
- 5) Interest on Reserves
- Sets a floor and encourages banks to lend in the federal funds market and monitor each other.
  - Usually set below federal funds rate.

## Relative Advantages of the Different Tools.

- Open market operations are the most important because
  - 1) Complete control over volume unlike discount operations where Fed cannot control the volume.
  - 2) They are flexible and precise. Can be used for small or large operations.
  - 3) They are easily reversed. To many purchases and be undone with immediate sales.
  - 4) They can be implemented quickly and involve no administration delays. Changes to reserve requirements take time and are costly to implement.
- Other operations are better when:
  - Massive open markets operations would be needed to remove excess reserves and is better to raise the federal funds rate by raising interest on reserves.
  - Discount policy is better used for lender of last resort.

## A framework for monetary policy in South Africa

- South African interbank market is too small to function effectively, lack of competition.
- SARB conducts OMOs to ensure banks do NOT obtain all the reserves they need to meet their reserve requirements and banks are forced to obtain unconditional accommodation loans. Reveal more about behaviour of SARB than banks.



- Vertical (AB) shows that the supply of nonborrowed reserves  $MB_n$  is independent of the cash funds rate.

- SARB ensures that the banks always have a liquidity shortage which forces them to borrow reserves from the SARБ.
- Because repo rate is fixed, model only determines the total amount of borrowed reserves (and hence total reserves) and not the interest rate.

## How monetary policy is applied in South Africa

### Open-market operations

- SARB is constantly active in the money market to drain excess liquidity in order to force a liquidity shortage
- The SARБ carefully estimates the banks' overall liquidity requirements and then offers securities on auction at varying interest rates. Banks estimate their liquidity shortage and tender for the amounts and interest rates, which are then allocated in ascending order of interest rates bid.
- To drain liquidity from the market, the SARБ also sells longer-term reverse repo from its monetary policy portfolio
- SARБ also uses foreign exchange swap transactions to temporarily drain rand liquidity from the market.
- Transfers to and from tax and loan accounts of the government held with private banks to accounts at SARБ.

### Accommodation Policy

- The purpose of accommodation policy is to provide liquidity (borrowed cash reserves) to banks through repo agreements. Much larger in SA than USA(discount loans).
- A change in the repo rate amounts to a change in monetary policy because the repo rate affects interest rates in general.
- At refinancing repo auctions that occur weekly, banks sell their securities to the SARБ for a period of one week, in return for cash reserves. Banks pay then repay the original amount provided a week ago plus interest at the repo rate.
- Ownership of the securities remains with banks, who also retain the right to interest income.
- Shortages are provided for by a supplementary repo auction or a standing facility repo.
- Surplus liquidity is absorbed by means of a supplementary reverse repo auction or a standing facility reverse repo.
- Also provides a lender of last resort role at higher rates.

### Reserve requirements

- Required to hold 2,5% of their total liabilities to the public as required reserves.
- Required reserves held at the SARБ are in addition to vault cash.
- SARБ does not change required reserves often because they need gazette a change which is slow, it is crude because small changes in the reserve requirement lead to relatively large changes in required reserves, and a fluctuating reserve requirement increases uncertainty for banks. It amounts to a tax on the banking system.

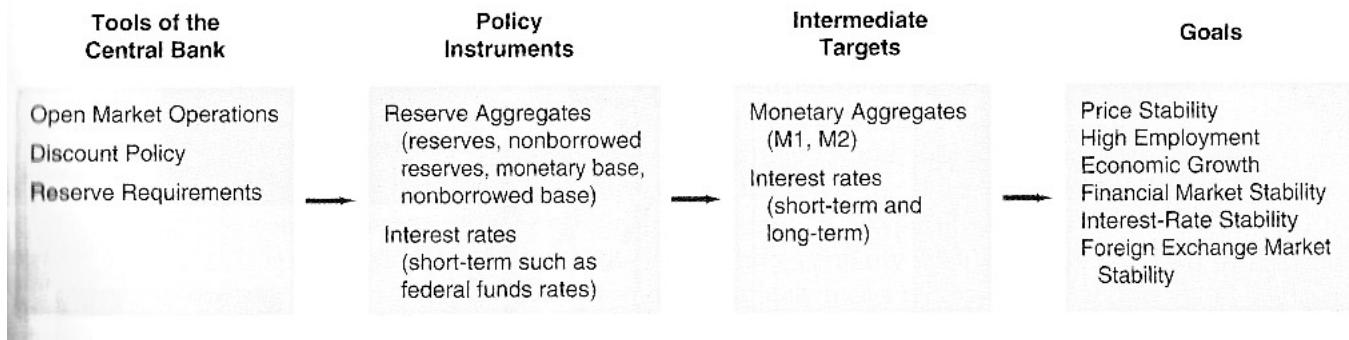
## Explain whether the formula $M=m \cdot MB$ applies to South Africa.

- If we assume that  $c$ ,  $r$  and  $e$  are constant over time then the formula  $M= m \times MB$  explains how  $MB$  and  $M$  are related. Of course,  $c$ ,  $r$  and  $e$  are, in practice, not constant over time which causes the relationship between  $MB$  and  $M$  to be less than perfect (meaning a constant ratio over time).
- The formula appears to imply that  $MB$  is controlled by the central bank and that changes in  $MB$  causes changes in  $M$  ( $MB \rightarrow M$ ). In SA, the  $MB$  is not controlled by the central bank as indicated in the answer to activity (5). The central bank only controls the supply of nonborrowed reserves while

the banks are accommodated by the central bank with as much supply of borrowed reserves ( $BR = R - MB_n$ ) as needed to meet their total reserve requirement ( $R = RR + ER = r \times D + ER$ ). Because BR automatically adjusts to other variables, and reserves are not controlled (fixed) by the central bank, the causality does not run from  $MB \rightarrow M$  but rather from  $M \rightarrow MB$ . Thus reverse causality applies.

## Chapter 17: The conduct of monetary policy: Strategy and tactics

- No inconsistency exist between achieving price stability in the long run and the natural rate of unemployment.
- The central bank cannot simultaneously set both a monetary aggregate instrument and an interest rate instrument.
- Endogenous money means that the level of the money stock changes mainly as a result of changes in the demand for bank loans.
- Monetary targeting can only work well when there is a reliable and stable relationship between the growth of the monetary aggregate and the inflation rate.
- The advantages of monetary targeting are that data on the instrument and the goal become available without a long delay, and that the central bank can be held accountable for executing monetary policy.
- Monetary targeting means that only a growth rate of some monetary aggregate is targeted. The goal is indeed to counter inflation
- Although inflation targeting is highly transparent, inflation itself cannot be readily controlled by the central bank.



## Part 6

### Chapter 20: Quantity theory, inflation and the demand for money

#### Quantity theory of money

- Theory of the demand for money and suggests interest rates have no effect on the demand for money.

#### Velocity of money and equation of exchange

- Velocity of money, the average number of times per year that a dollar is spent buying the total amount of goods and services produced.
- $V = \frac{P \times Y}{M}$  where  $P \times Y$  is total spending
- Equation of Exchange:  $M \times V = P \times Y$ . The quantity of money multiplied by the number of times that this money is spent in a given year, must equal nominal income (total amount spend on goods and services).

## Determinants of velocity

- Assumed to be constant
- Institutional and technological features would only affect velocity slowly over time.
- Credit cards mean less money and therefore a higher velocity.

## Demand for money

- $M^d = k \times PY$  where  $k = \frac{1}{V}$
- Suggest demand is then purely a function of income and interest rates have no effect on the demand for money.

## Quantity theory of money

- $P \times Y = M \times \bar{V}$
- Implies change in the quantity of money leads to a proportional change in price level.

## Quantity theory and inflation

- inflation rate  $\pi = \% \Delta M - \% \Delta Y$
- Quantity theory of money indicates that the inflation rate equals the growth of the money supply minus the growth rate of aggregate output.
- The quantity theory of money is a good theory of inflation in the long run but not in the short run.
- Classical theory assumes wages and prices are completely flexible.

## Government budget constraint

- $DEF = G - T = \Delta MB + \Delta B$  where  $\Delta B$  government bonds held by public.
- If the government budget deficit is financed by an increase in bond holdings by the public, there is no effect on the monetary base or money supply.
- If the deficit is not financed by increased bond holdings by the public, the monetary base and money supply increase.
- The budget deficit will increase the monetary base if financed with high powered money.
- Financing a persistent deficit by money creation will lead to a sustained inflation.

## Liquidity preference theory

### Motives for the demand for money

- 1) Transactions Motive. Medium of exchange, demand for money declining due to new technology. Proportional to income.
- 2) Precautionary Motive. Cushion against unexpected wants. Proportional to income.
- 3) Speculative Motive. Store of wealth. Proportional to opportunity cost of holding which the interest earned on bonds.

→ liquidity preference function.  $\frac{M^d}{P} = L(i, Y)$  where  $\frac{M^d}{P}$  is real money balances.

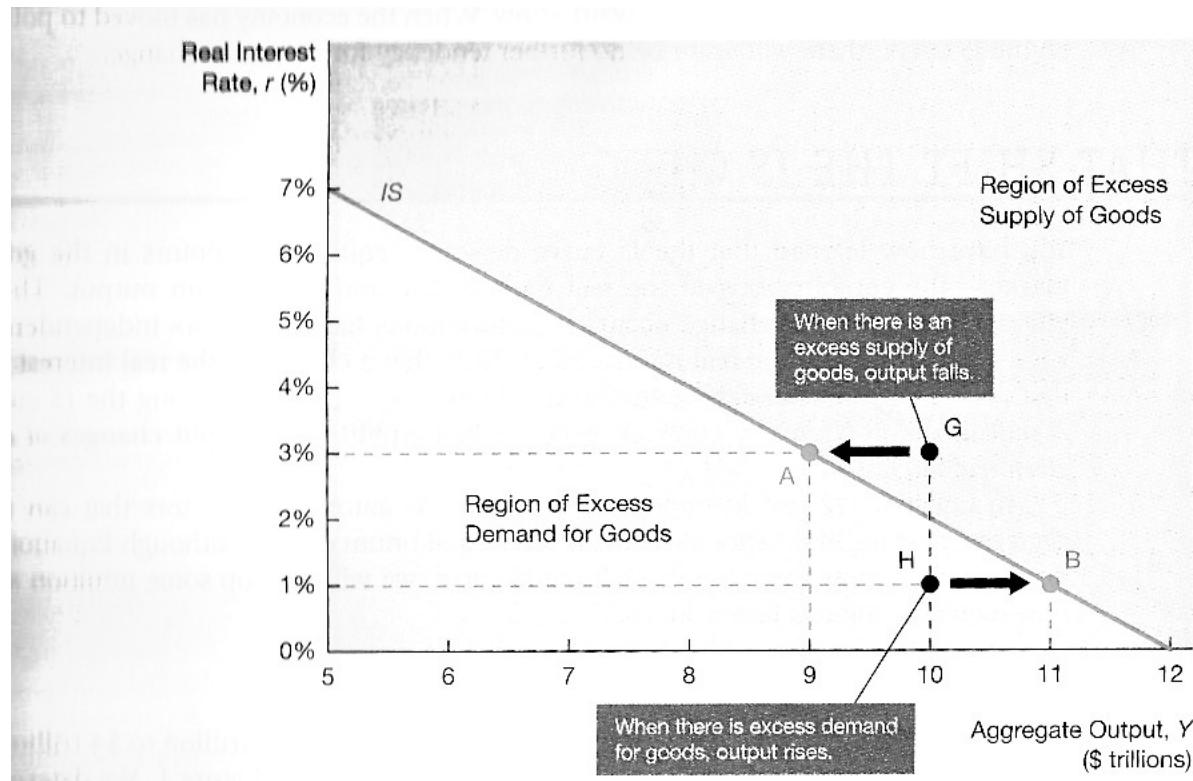
→ Velocity is therefore  $V = \frac{PY}{M} = \frac{Y}{L(i, Y)}$  and it fluctuates.

→ Liquidity trap, where conventional monetary policy has no direct effect on aggregate spending, because a change in the money supply has no effect on interest rates, occurs when nominal interest rates are 0 and the demand for money is flat.

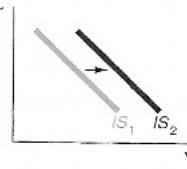
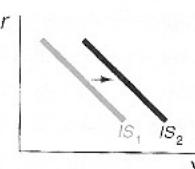
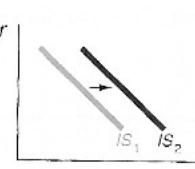
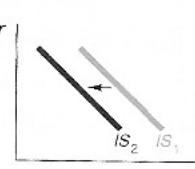
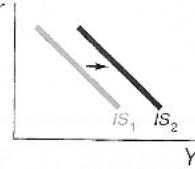
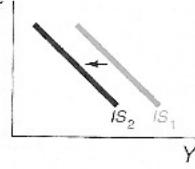
## Factors That Determine the Demand for Money

Variable	Change in Variable	Money Demand Response	Reason
Interest rates	↑	↓	Opportunity cost of money rises
Income	↑	↑	Higher transactions
Payment technology	↑	↓	Less need for money in transactions
Wealth	↑	↑	More resources to put into money
Risk of other assets	↑	↑	Money relatively less risky and so more desirable
Inflation risk	↑	↓	Money relatively more risky and so less desirable
Liquidity of other assets	↑	↓	Money relatively less liquid and so less desirable

## Chapter 21: The IS curve



Shifts in the *IS* Curve from Autonomous Changes in  $\bar{C}$ ,  $\bar{I}$ ,  $\bar{G}$ ,  $\bar{T}$ ,  $\bar{NX}$ , and  $\bar{f}$ 

Variable	Change in Variable	Shift in <i>IS</i> Curve	Reason
Autonomous consumption expenditure, $\bar{C}$	↑		$C \uparrow Y \uparrow$
Autonomous investment, $\bar{I}$	↑		$I \uparrow Y \uparrow$
Government spending, $\bar{G}$	↑		$G \uparrow Y \uparrow$
Taxes, $\bar{T}$	↑		$T \uparrow \Rightarrow C \downarrow Y \downarrow$
Autonomous net exports, $\bar{NX}$	↑		$\bar{NX} \uparrow Y \uparrow$
Financial frictions, $\bar{f}$	↑		$I \downarrow Y \downarrow$

**read study guide****Chapter 24: Monetary Policy Theory****Response of monetary policy to shocks**

- In the case of aggregate demand shocks, there is no trade-off between the pursuit of price stability and economic activity stability.

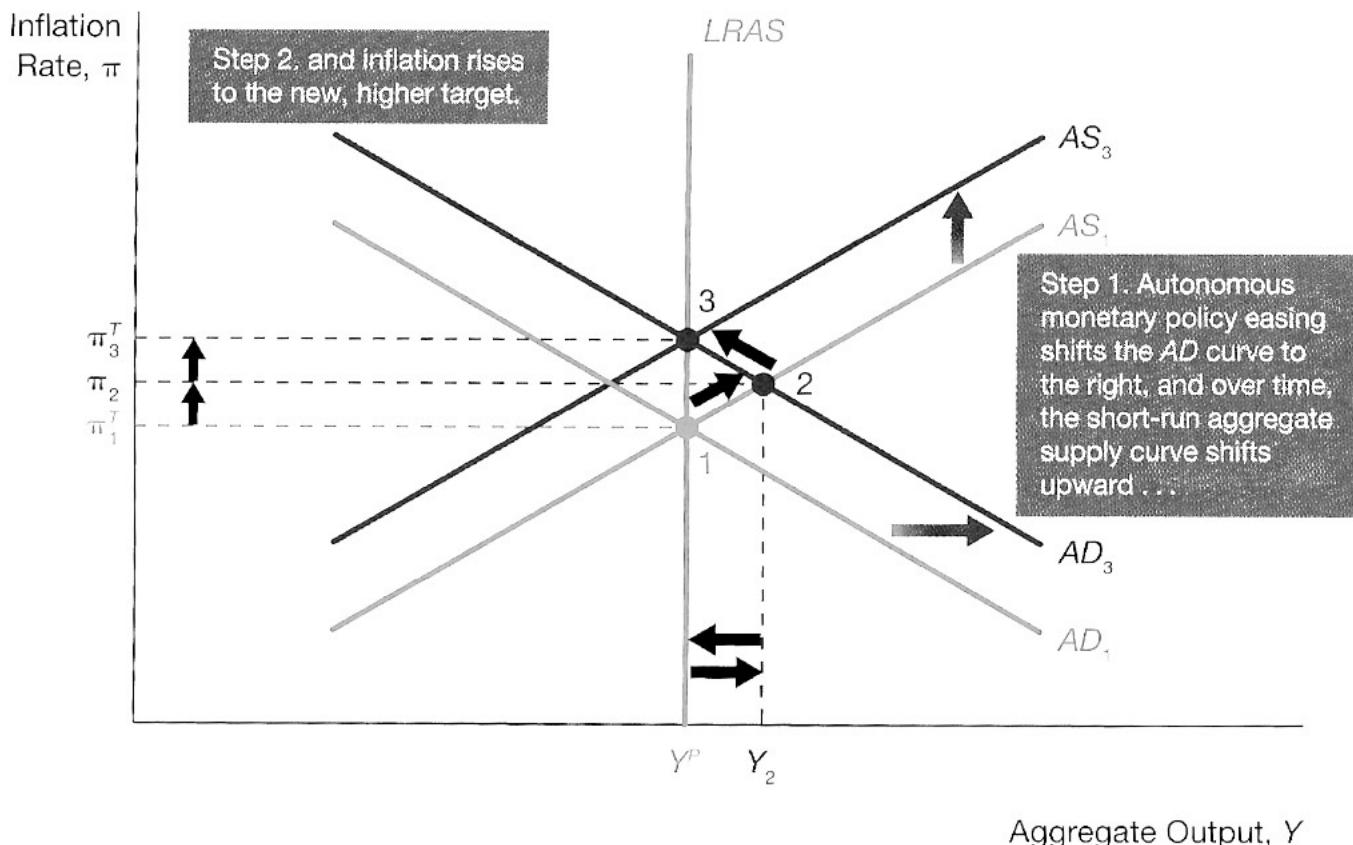
**How actively should policy-makers try to stabilize economic activity?****Lags and Policy Implementation**

- 1) Data lag
- 2) Recognition lag

- 3) Legislative lag
- 4) Implementation lag
- 5) Effectiveness lag

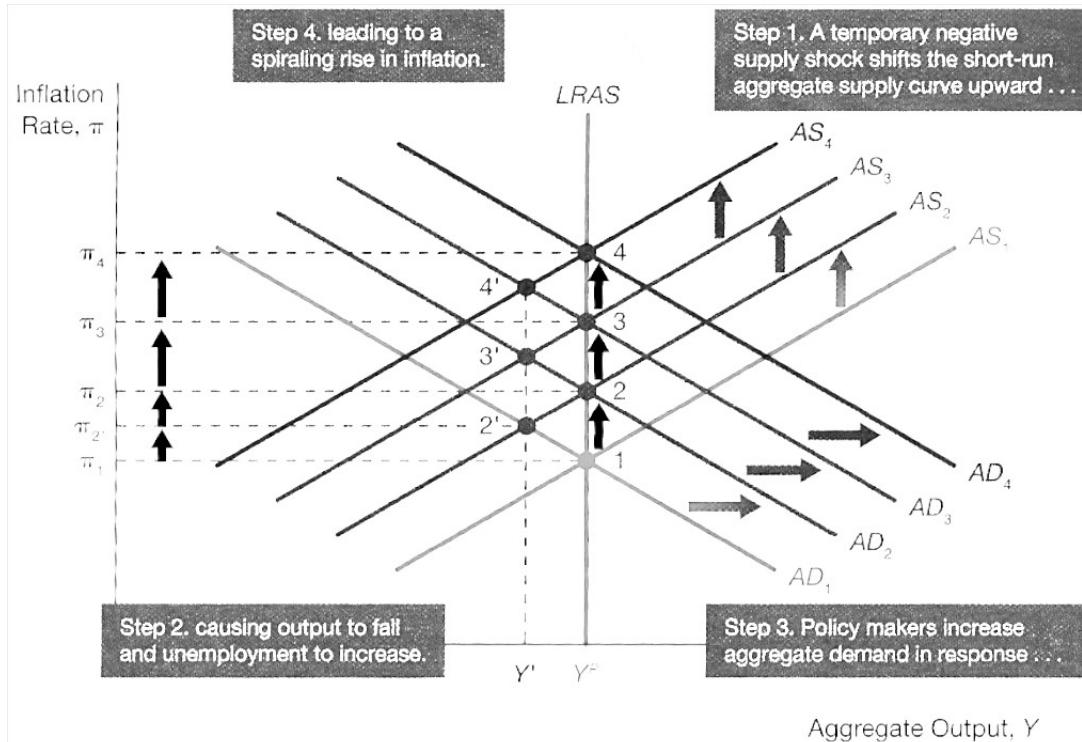
### Inflation: Always and everywhere a monetary phenomenon

- Monetary authorities can target any inflation rate in the long run with autonomous monetary adjustments
- Potential output and therefore the quantity of aggregate output produced in the long run is independent of Monetary policy.
- This is correct in the sense that a high rate of money growth is a necessary condition for sustained inflation.
- Inflation, in the sense of a sustained increase in the general price level, must necessarily be supported by a continuous increase in money growth. If the money growth is limited or blocked, then the inflation process cannot continue.

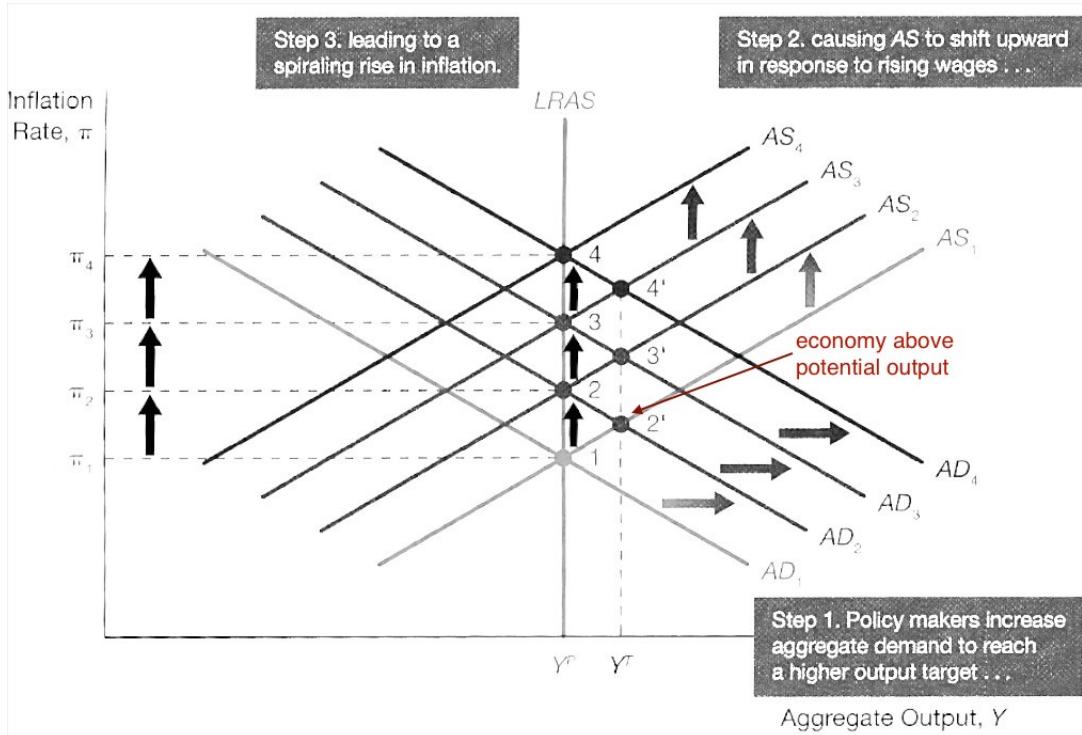


### Causes of inflationary monetary policy

- 1) High employment targets and inflation
  - Governments primary goal is to support high employment through expansionary activist policies this causes two types of inflationary pressures.
  - Cost-push inflation, either from a temporary negative supply shock or push by workers for wages beyond what productivity gains justify.
  - Typically when unemployment is above the natural rate.



- Demand-pull inflation, result from policy makers pursing policies that increase aggregate demand.
- Policy makers underestimate the natural rate of unemployment and set a target that is to low.
- Typically when unemployment is below the natural rate.



## Definition and measurement of inflation

- Inflation is defined as a continuous and considerable rise in the general (or aggregate) price level.
- Inflation is measured as the annual rate of increase in the price of a basket of goods over a time

period.

- PPI is a measure of prices of manufactured goods at the factory door and values imports at the price importers pay. The aim of the PPI is to measure the cost of production.
- The CPI measures the cost of consumption.
- Core inflation, is CPI net highly volatile short term prices, or prices sets by government (fresh fruit and vegetables, bond rate, VAT rate) and measures the more sustained inflationary tendencies in the economy.
- SA use CPI to set inflationary targets.
- When a market price increases, suppliers raise their claims on real wealth at the expense of Demanders (first-generation effect).
- If Demanders subsequently react to these losses, not by simply accepting them or by compensating for them through increasing their real wealth creation (produce and sell more), but by playing the same trick on other Demanders when acting as supplier themselves, price increases feed on themselves and total income claims keep on running ahead of total real wealth creation at existing prices (second-, third-, umpteenth-generation effect). In order to achieve ex post equality between total income claims and real wealth creation, the nominal value of the latter is then inflated.
- While inflationary impulses can be a matter of either cost-push or demand-pull, inflationary spirals are a matter of cost-push only

## Social conflict and inflation proneness

- Inflation is thus essentially a symptom of conflict over income distribution, which is not settled by relative price/wage movements.
- Three factors:
  - 1) Regular significant increases in the price of goods or services which are an important input into the production process or of the cost of living
  - 2) Is affected by the competitiveness of both its goods and labour markets. (powerful interest groups)
  - 3) If the money stock is highly elastic. When there is less money and the demand for goods is scarcer, firms are encouraged to absorb more cost increases and accept lower profit margins.
- An increase in the rand price of imported goods (for an unchanged volume) raises foreign claims on the local social product. South Africans have no choice but to give up some of their real income. This necessary and unavoidable real income sacrifice could be extremely painful.
- 3 ways to bear the pain.
  - 1) Non-inflationary scenario,
    - local producers and retailers keep their rand prices unchanged and accept lower profit margins.
  - 2) Fully inflationary scenario (Inflationary spiral)
    - Local businesses carry their import cost increases forward into higher prices in full, to maintain real profit margins
    - Consumers carry their living cost increases forward into higher wage demands to protect their real wage rates.
  - 3) Partially inflationary scenario
    - Business, labour and government each absorb some of the pain by carrying forward only part of their cost increases in higher prices/wages, accepting some decrease in profit margins and real wages.

## Combating inflation

- Inflation cannot come down unless real income sacrifices are made
- 1) Price controls
  - Fixing prices by law.
  - Empirical evidence shows that it does not work
  - Creates black markets, reduces supply, stifles competition.
  - Only temporarily reduces inflation.
- 2) A voluntary social contract between business, labour and government
  - Business, labour and government work out a compromise on allowable price/wage/tax increases
  - Problem in SA because of mutual distrust between business, labour and government.
- 3) Tight monetary policy: increasing the scarcity of demand
  - One adopted by most central banks
  - Tight monetary policy by way of high interest rates.
  - A greater scarcity of demand increases competition between businesses, and encourages firms to accept lower profit margins, and strengthens their resolve to withstand wage demands by labour.
  - Might not immediately lead to lower credit demand. (lag) Still an immediate reduction in disposable income thought.
  - An increase in the interest rate not only works on the demand side by lowering demand for goods, but also on the supply side by increasing costs (interest payments) which can have an inflationary effect.
  - Success of tight monetary policy in combating inflation requires the cooperation of business and labour, which the central bank does not always enjoy
  - Productivity increases can neutralise the inflationary effect of increased income demands.
- 4) The role of the foreign sector
  - An increase in the value of the currency is a painless and effective way of reducing inflation, apart from the fact that it reduces the rand income of local exporters.
- 5) The self-reinforcing nature of lower inflation: the role of inflationary expectations
  - influence the public's inflationary expectations
  - Widely publicising an inflation target and emphasising the government's resolve to reach that target is an exercise in persuasion.
  - People factor their inflationary expectations into their current income demands
  - Can create a downward inflationary spiral.
  - However in the current climate of rising inflation and pessimistic forecasts, the central bank's ability to influence people's inflation expectations is severely tested.

## The costs of inflation

- Inflation damages real productivity when it turns economic agents away from productive activity and productive investment, which can happen for three reasons.
  - 1) Contributes towards a general climate of instability and pessimism
  - 2) Inflation means that changes in nominal prices no longer reflect changes in relative prices
  - 3) Causes people to divert their effort and capital away from productive enterprise towards non-productive investment such collection stamps.
- Adverse effects on income distribution:
  - 1) Those who lack the bargaining power to increase their nominal incomes

- Contractually fixed incomes
  - Unemployed, the non-unionised, pensioners, and small business owners
  - Inflation therefore tends to hit the weakest in society hardest
- 2) Those people who hold money (wallets and bank accounts)
- Inflation reduces the purchasing power of that money
  - Mainly affects poorest as greater portion of their wealth is in money
  - The wealth of richer people is better protected against inflation. (Assets are houses, shares)
- 3) Creditors – people who have lent money to others
- When inflation causes a decline in the real interest rate on debt creditors lose and debtors gain.
- 4) Tax payers.
- Inflation causes tax payers to fall into a higher income tax bracket.
  - Bracket creep.
- Inflation rate higher than that of main trading partners can also discourage foreign investment.

## Chapter 25: The role of expectations in monetary policy

### Discretion and the time-inconsistency problem.

- Policy-makers operate with discretion when they make no commitment to future actions but instead make what they believe in the moment to be the right policy actions.
- Time-inconsistency problem reveals potential limitations of a discretionary policy.
- Policy makers are always tempted to pursue a policy that is more expansionary than what firms or people expect, because such a policy would boost economic output, however the best policy is not to pursue an expansionary policy.
- When workers see a central bank pursuing a discretionary expansionary policy they anticipate the higher inflation and raise their wage demands.
- Policy makers will have better inflation performance in the long run if they do not surprise people with an unexpected expansionary policy.

### Benefits of a credible nominal anchor.

- 1) Has elements of a behaviour rule
    - Helps overcome the time inconsistency problem.
    - Allows the public to keep policy makers in check.
  - 2) Helps anchor inflation expectations
    - Leads to smaller fluctuations in inflation.
- Contributes to price stability and stabilising economic activity.

## Chapter 26: Transmission mechanism of monetary policy

### Transmission mechanism of monetary policy

- The way in which monetary policy affects aggregate demand and the economy.

### Traditional interest rate channels

- $r \downarrow \Rightarrow I \uparrow \Rightarrow Y^{ad} \uparrow$
- Applies equally to consumer spending.
  - Focus on real long term interest rates.
- $\pi^e \uparrow \Rightarrow r \downarrow \Rightarrow I \uparrow \Rightarrow Y^{ad} \uparrow$

- If nominal rates are zero, a commitment to future expansionary monetary policy raises inflation exceptions, thereby lower the real interest rate.

## Other asset price channels

### Exchange rate effects on net exports

$r \downarrow \Rightarrow E \downarrow \Rightarrow NX \uparrow \Rightarrow Y^{ad} \uparrow$  where  $E \downarrow$  is a depreciation of currency due to lower demand.

### Tobin's q theory

- Explains how monetary policy can affect the economy through its effect on the valuation of equities.
  - $q$  is the market value of firms divided by the replacement cost of capital.
  - If  $q$  is high the market price of firms is high relative to the replacement cost of capital and new plant and equipment capital is cheap relative to the market value of firms, companies can issue stock and get a high price. Investment spending increases.
- $r \downarrow \Rightarrow P_s \uparrow \Rightarrow q \uparrow \Rightarrow I \uparrow \Rightarrow Y^{ad} \uparrow$  where  $P_s$  is stock prices.

### Wealth effects

- Consumption is spending by consumers on non-durable goods and services.
  - Consumers smooth out their consumption over time.
  - Therefore the lifetime resources (financial wealth, mainly stocks) of consumers determines consumption spending and not just today income.
  - Can be applied to house prices
- $r \downarrow \Rightarrow P_s \uparrow \Rightarrow \text{wealth} \uparrow \Rightarrow \text{consumption} \uparrow \Rightarrow Y^{ad} \uparrow$

### Credit view

- As a result of financial frictions from asymmetric information.

### Bank lending channel

- Banks play a special role in solving asymmetric information problems.
- Expansionary monetary policy increases bank reserves and bank deposits raising the quantity of bank loans available.
- Many borrowers are dependant on banks for loans to finance activities and this increases in loans causes investment spending to rise.
- Implies monetary policy will have more of an impact on small firms than larger firms who can get funds through direct finance.
- Declining in importance

Bank reserves  $\uparrow \Rightarrow$  bank deposits  $\uparrow \Rightarrow$  bank loans  $\uparrow \Rightarrow I \uparrow \Rightarrow Y^{ad} \uparrow$

### Balance sheet channel

- A decline in net worth increase the adverse selection problem, and leads to decreased lending to finance investment.
- A lower net worth increases the moral hazard problem because owners have lower equity stake and engage in riskier investments.
- Easing of monetary policy leads to increased net worth and increase aggregate output.

$r \downarrow \Rightarrow P_s \uparrow \Rightarrow \text{firm's net worth} \uparrow \Rightarrow \text{adverse selection} \downarrow \Rightarrow \text{moral hazard} \downarrow \Rightarrow \text{lending} \uparrow \Rightarrow I \uparrow \Rightarrow Y^{ad} \uparrow$

### Cash flow channel

- A rise in cash flow from lower nominal interest rates increases liquidity and therefore increases lending.
- Also lower adverse selection by reducing credit rationing.

$i \downarrow \Rightarrow$  firm's cash flow  $\uparrow \Rightarrow$  adverse selection  $\downarrow \Rightarrow$  moral hazard  $\downarrow \Rightarrow$  lending  $\uparrow \Rightarrow I \uparrow \Rightarrow Y^{ad} \uparrow$

### Unanticipated Price level change

$\rightarrow$  Lowers real value of firms liabilities and increased their net worth

$r \downarrow \Rightarrow \pi \uparrow \Rightarrow$  unanticipated  $P \uparrow \Rightarrow$  firms real net worth  $\uparrow \Rightarrow$  adverse selection  $\downarrow \Rightarrow$  moral hazard  $\downarrow \Rightarrow$  lending  $\uparrow \Rightarrow I \uparrow \Rightarrow Y^{ad} \uparrow$

### Household liquidity effects

$\rightarrow$  Consumer spending on durables and housing.

$\rightarrow$  Liquidity effects view, impact on consumers desire to spend rather than lenders desire to lend.

$\rightarrow$  If consumers expect a higher likelihood of financial distress they hold fewer illiquid consumer durable or housing assets (lemon) and more financial assets.

$r \downarrow \Rightarrow P_s \uparrow \Rightarrow$  value of household's financial assets  $\uparrow \Rightarrow$  likelihood of financial distress  $\uparrow \Rightarrow$  consumer durable and housing expenditure  $\uparrow \Rightarrow Y^{ad} \uparrow$

### Why are credit channels likely to be important?

- 1) Large body of evidence supports the view that financial frictions of the type crucial to the operation of credit channels do affect firms employment and spending decisions.
- 2) Small firms are hurt more by tight monetary policy than large firms which are unlikely to be credit constrained.
- 3) Asymmetric information view has proved useful in explaining other important phenomenon like why financial intermediaries exist.

