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**P R I S T I N E**

## **Economics III**

- **Medium of exchange** - Accepted as payment for goods and services
  - Ex: wages, any goods bought or sold.
- **Used to store value** - Saved money can be used later for future needs
  - Ex. Salary deposited in bank
- **Unit of account** - Used to express prices of goods and services
  - Ex: Burger: \$1, A doctor visit: \$10

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- **M1** – All currency except held at banks plus
  - + traveler's checks
  - + checking a/c deposits of individuals and firms (excluding govt. checking accounts)
- **M2** – M1 plus
  - + time deposits
  - + saving deposit
  - + money market mutual fund balances
- **NOT counted as money**
  - Outstanding Checks since it just a transfer or medium of money from one owner to other instead of real money
  - Credit card transactions
    - Short term loan till the bill due date
    - Does not increase money supply

# Types of Depository Institutions

- **Commercial banks** – Accept deposits from savers and loan to borrowers
  - Deal in short term securities (treasury bills)
    - Investment in long terms securities (treasury and corporate bonds)
  - Under fractional reserve banking system, banks are required to deposit a portion of deposits either with Reserve Bank or/and keep a specific portion in cash/secured securities
- **Thriffs and thrift institutions**
  - **Saving & loan associations (S&L)** – both checking and saving accounts, issue all kinds of loans
  - **Saving banks** – only saving accounts, issue primarily home loans
  - **Credit unions** – for specific group of individuals
- **Money market mutual funds**
  - Manages pooled funds invested in short term debt (<1 yr maturity)
  - Securities to preserve the funds value and get returns
  - Investment management firm

Broadly 4 function –

- **Acting as Financial Intermediaries** – Receive deposits which are used to provide loans; Loans are provided at lower rate than what borrowers could have raised outside
- **Provide Liquidity** -- offers long term loans from short term deposits
- **Risk Monitoring** – Institutions have better understanding and mechanism to monitor risk compared to individuals
- **Pooling of Individual Risks** – Minimize individual risk by pooling individual loans in well diversified portfolios

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## Impact of financial regulations

- **Cash reserves:** Institutions need to retain a minimum percentage of deposits (depends on accounts) as cash or deposit with central bank.
- **Proportion of various types of loans** – Institutions have restrictions on various types of loans (depends on institutions).
- **Types of deposits** – Institutions have restriction on different types of deposits (ex: saving, checking).
- **Share of owner's capital** – A minimum amount should be maintained as institution owners' capital (equity) so that owner manages the risk of the asset portfolio better.
- Federal Deposit Insurance Corporation provides insurance of \$100,000 on bank and S&L deposits

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- **Impact of Bank-deregulation**

- High competition between banks and thrifts
- Low barriers to entry to other institution to compete with banks

- **Financial innovations -**

- New financial products for depositors and loan seekers
  - Ex: Variable mortgages and S&Ls (which transfers some of the risks of inflation and interest rate to borrowers)
  - New type of accounts
  - Technology innovations (computerization, internet, ATM)

- **Impact of Financial innovations**

- Declining savings account deposit caused money market mutual fund to grow substantially
- Checking account deposits shifted from banks to thrifts
- Cost of transactions reduced significantly

- **Manage the money supply with a perfect balance to**
  - Have low inflation
  - Promote economic growth (attaining full employment)
- **3 tools available to attain such goals**
  - **Bank Rate:** a.k.a. discount rate
    - Rate of interest which a central bank charges on the loans and advances to commercial banks and other financial intermediaries
    - For US central bank is called Federal Bank
    - **Lower rate** makes reserves less costly to banks **encouraging lending** => decrease interest rates

Central banks changes money supply to control inflation and fuel growth using 3 tools – reserve requirement, open transaction and changing bank rate

- **Cash Reserve:** % of deposits that banks retain in cash or deposit with Fed
  - **Increasing % => decreases funds available** for lending => increase interest rates.
  - **Decreasing % => increases funds** available for lending => decreases interest rates.
  - Works well if banks are willing to lend, and customers are willing to borrow
- **Open Market Operations:** Fed buy or sell treasury securities in open market
  - On **buying** securities, **money supply increased** as cash replaces securities and interest rates decrease.
  - On **selling securities**, cash is sucked out of the system and **money supply is decreased** increasing interest rates.
  - Fed's most commonly used tool to achieve the federal funds target rate.

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- **Liabilities**

- Money in circulation (+90%)
- Bank deposits

- **Assets**

- Treasury bills, notes, bonds (Govt. securities). (~90%)
- Gold, deposits with other banks,
- Loans to banks (reserves loaned at the discount rate).

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- **Fractional reserve banking system**

- Based on Required Reserve Ratio banks reserve fraction of its deposits and loan the remaining amount
- The borrowed money is spent and the receiver of such spent money Deposits part of the money with banks
- Again part of the deposits (after reserves) are put for borrowing
- This **cycle of 'borrow-deposit-borrow'** stops when excess reserve available with institutions for borrowing is zero. **The above cycle expand money supply in the economy**

- Amount of loans a bank can generate with new deposits

- **Amount of new deposit / reserve ratio**

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## Example

- Example: Suppose 10% of the deposit is to be reserved;
- \$100 is the deposit. excess reserve = \$90 which can be lent;
- Suppose the borrower spends it in certain things & the receiver deposits the entire money in the bank;
- now the bank can lend  $0.90 \times 90 = \$81$
- Similarly... in total, \$100 of new deposit can increase money supply by \$1,000 ( $\$100 / 0.10$ )

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- **Monetary Base is equivalent as Liabilities**
  - Bank deposits
  - Money in circulation
- When the Fed uses open market operations to expand the monetary base,
  - Quantity of money increases with a **multiplier effect due to concept of reserve ratio** as explained in last slide however
  - **Magnitude of the expansion is reduced by** the portion of securities proceeds and bank loans that are held in cash
    - **Currency drain** which is part of the increase in the money supply which people hold as currency instead of depositing

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# Relation between monetary base, money multiplier, and the quantity of money

- Hence money multiplier, for a change in the monetary base, depends on both the required reserve ratio and the currency drain

$$\text{Money Multiplier} = \frac{1 + c}{r + c}$$

- where  $c$  is currency as a percentage of deposits (currency drain)
  - $r$  is the required reserve ratio.
- The relation among the monetary base, the money multiplier, and the quantity of money can be stated as:
- Change in quantity of money = Change in Monetary Base x Money Multiplier

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- Money = currency in circulation + checking account deposits + traveler's checks + balances held in form of cash
- Income - Consumption = Savings
  - Savings = Held as Cash + Interest earning Savings deposits in Banks + Investment in Securities

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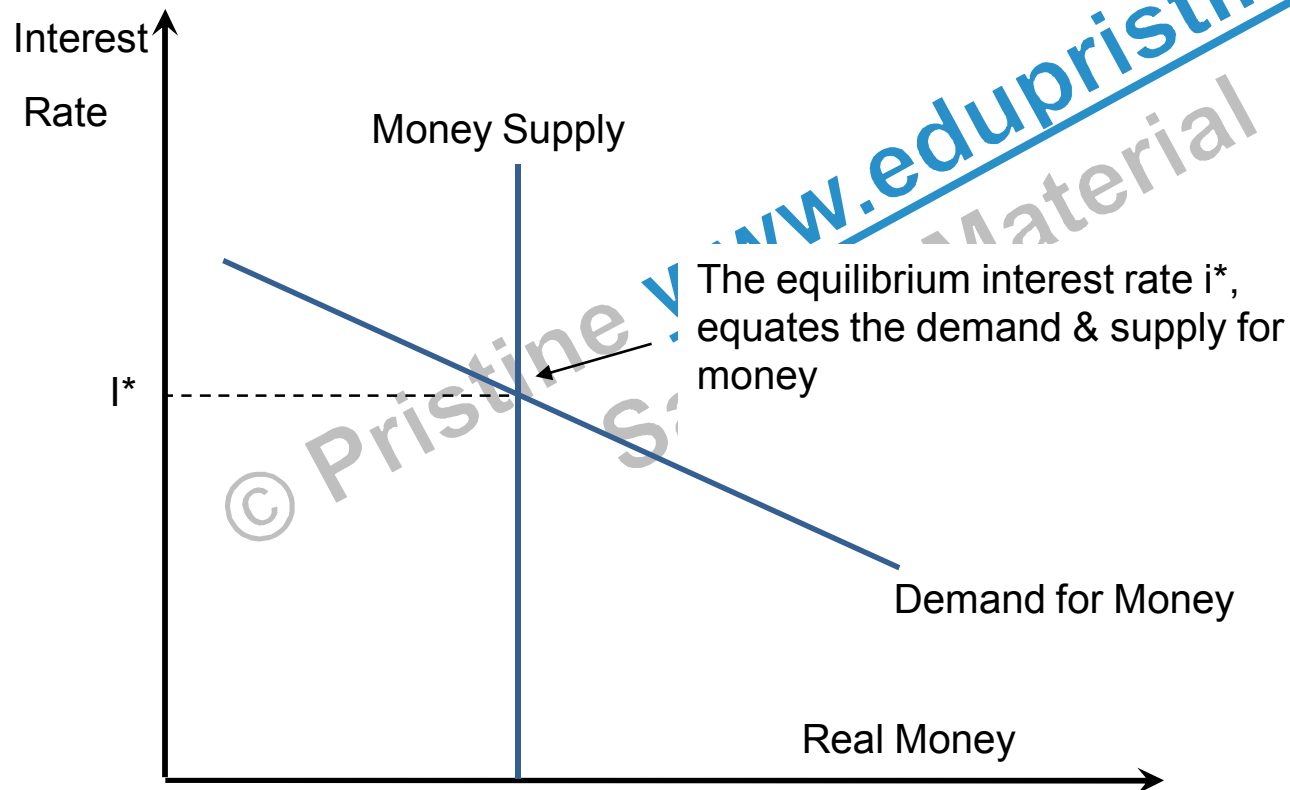
- Broadly 4 factors influence demand for money aka liquidity preference
  - **Interest rates:** Causes changes in preference to hold cash by firms and individuals (F&I) and demand for money
    - At **high interest rates**, F&I **holds less money** and buy interest assets as opportunity cost of holding money is high
    - At low interest rates, F&I holds more money due to low opportunity cost of holding money
    - This characteristics of demand of money causes demand curve to have downward slope which indicates demand of money increases at low interest rates
  - **Inflation:**
    - Increase in inflation increases demand for money since F&I needs more money to fulfill their needs
  - **Changes in GDP** (next slide)
  - **Financial Innovation** (next slide)

## Factors affecting Demand of money (Cont...)

- If **real GDP**  $\uparrow$   $\Rightarrow$  Money Demand Curve  $\uparrow$ 
  - More goods and services are produced, bought and sold
  - More money is needed for the same and demand of money increases
  - Shifts money demand curve up
- **Financial Innovation, like mentioned below, reduces demand for money**
  - Credit cards & debit cards
  - Interest bearing checking accounts
  - Easier funds transfer from savings to checking
  - Proliferation of ATMs
  - Internet banking and bill paying

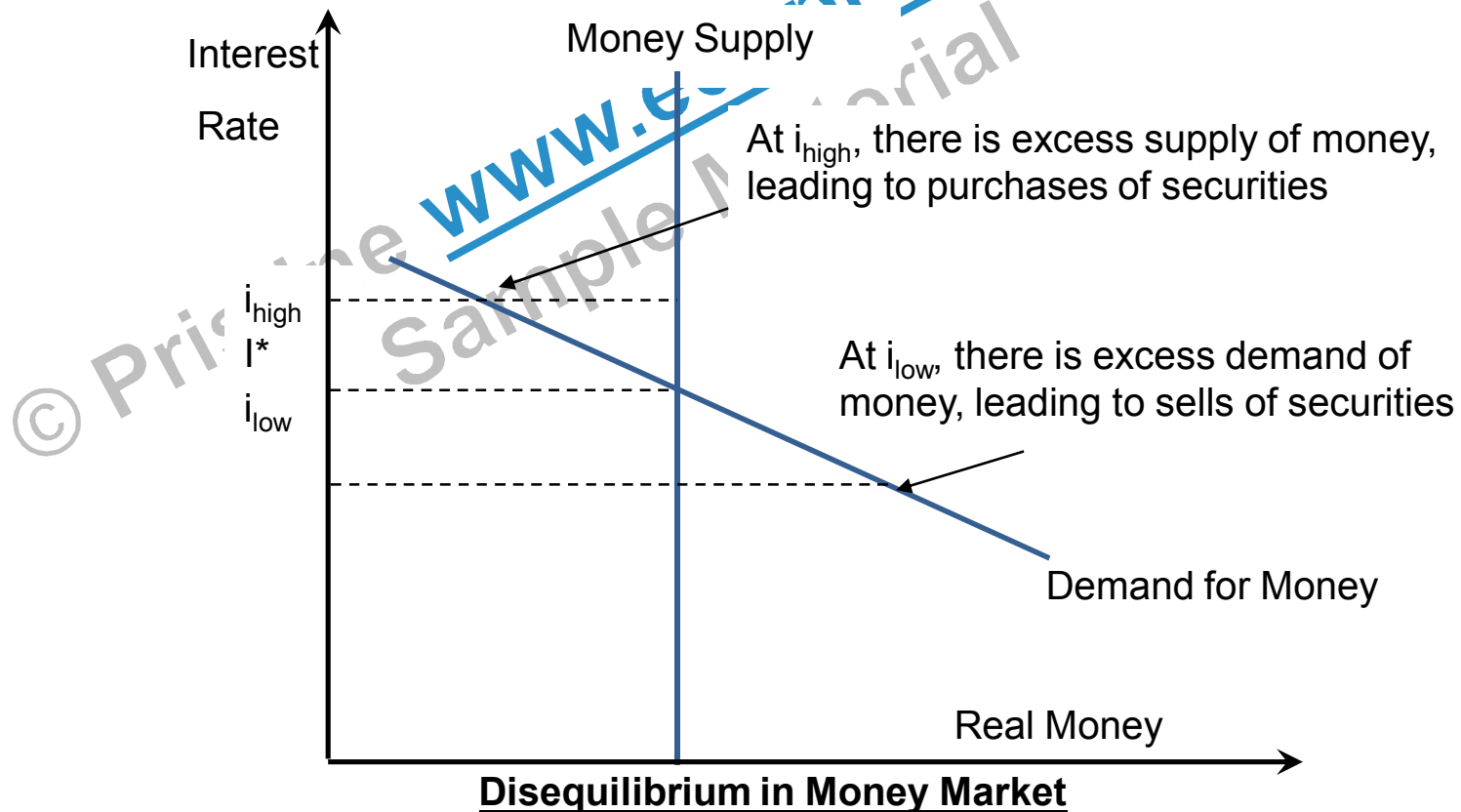
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- **Downward sloping demand curve** for money (as explained before)
- Vertical (**perfectly inelastic**) **supply curve**,  $i^*$  = equilibrium interest rate
  - Supply of money is determined by the central bank (Fed or RBI) which is independent of the interest rate.

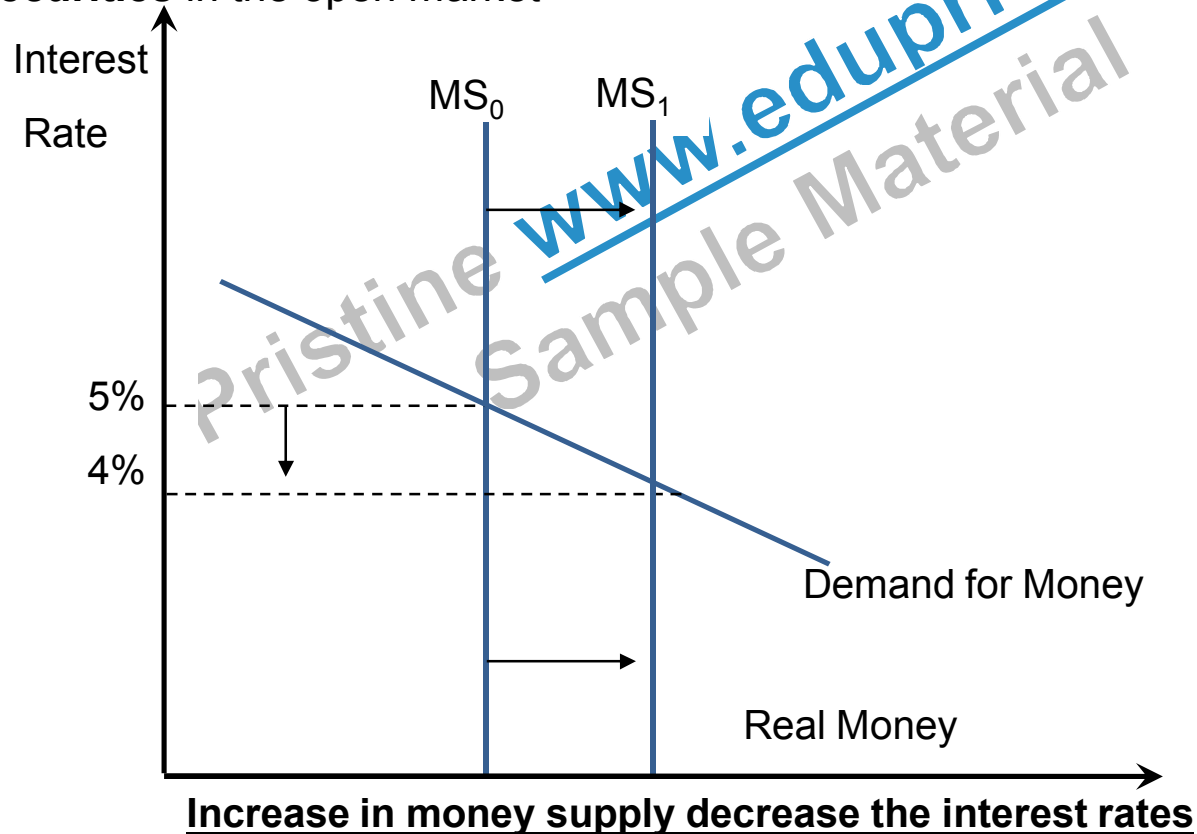


Supply & Demand for Money

- The equilibrium interest rate (EIR),  $i^*$ , is the interest rate where,
  - Demand to hold real money = real money supply (See chart in slide 20)
- **If interest rates are higher than EIR**
  - There is **excess supply** which causes purchase of securities => reduces supply => reduces interest rates to EIR
  - Vice versa when interest rates are lower than EIR



- If CB wants to decrease short-term interest rates
  - **Buy securities** in the open market => increases the real money supply and bank reserves => further increase in the real money due to multiplier impact => shifts real money supply curve to right
  - Excess supply of money balances decreases interest rates
- If CB wants to increase interest rates
  - **Sell securities** in the open market



- Increase in money supply leads to lower real rates which causes
  - Individuals buy good and durables
    - Consumer spending (C) components of AD increases
  - Firms invest more
    - Business investment (I) components of AD increases
  - Domestic currency gets cheaper causes exports up imports fall
    - Net exports component of AD increases
- Overall GDP increases

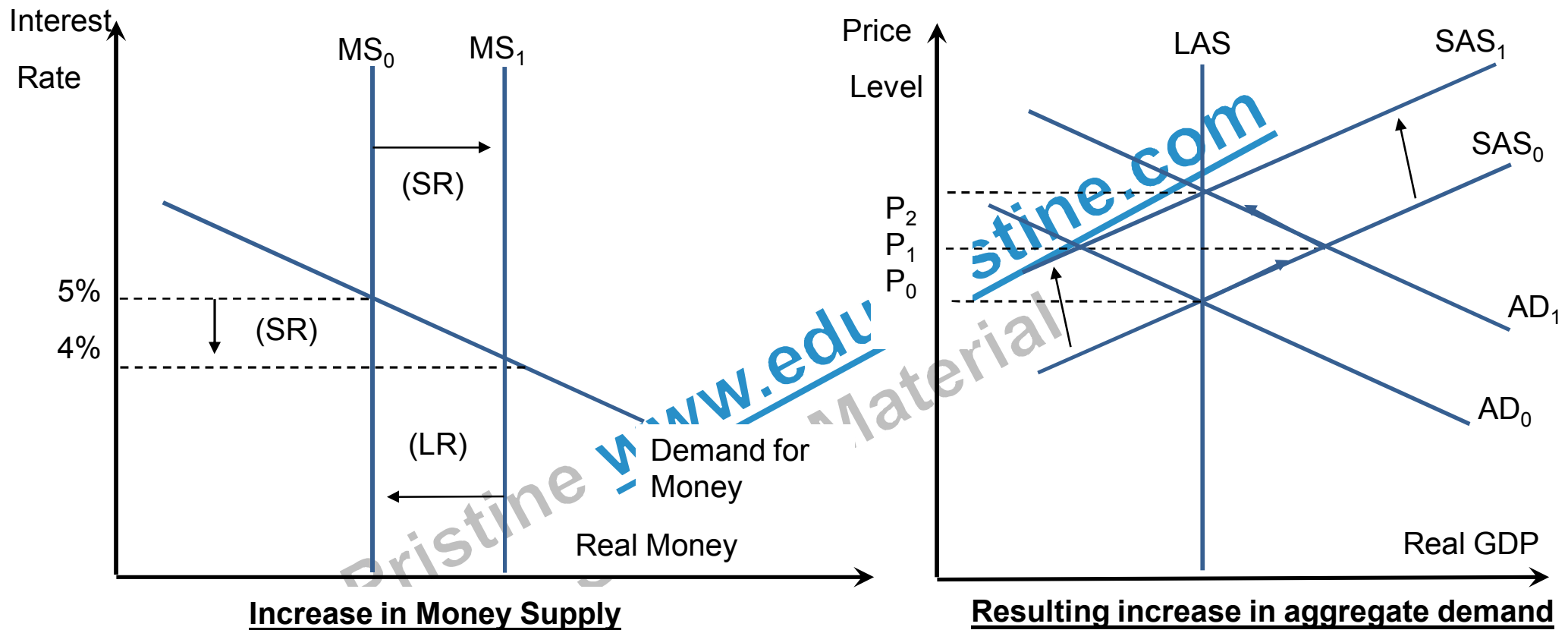
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- Effect of interest rate decrease in the short run will have multiplier impact and GDP increases much higher than initial increase
- How
  - Increase in AD and expenditures will increase incomes leading to
    - Increased consumption and investment
    - Increase in someone's income
    - Due to this repeated process consumption and AD will increase much greater than the initial increase

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- Increases in money supply when economy is operating at full-employment (LAS) causes
  - **Temporary increase in real GDP and**
  - **Increases level of inflation (price level)**  
(as explained in next slide)

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- if increase in AD increases real GDP > full-employment GDP,
  - **Cost of money and other productive resources** will rise which
    - Causes SAS shift to move upward and intersects demand curve at full employment GDP level (LAS) hence GDP returns to full employment GDP
    - Hence there is only a temporary increase in GDP
  - **But price level (rate of inflation) increases and move upward to LAS**

## Quantity theory of money

- Equation of exchange = Money supply (M) x Velocity (V) = GDP = Price (P) x Real Output (Y)
- $MV=PY$ 
  - Velocity: Nominal GDP / Money Supply
    - Represents average number of times each dollar is used to buy goods and services in an year
  - Quantity theory of money (QTM) states that increase in money supply will cause a proportional increase in prices (inflation) since
    - Velocity (V) and real output (Y) change very slowly
  - This can be understood by rearranging equation of exchange where
    - $P = MV/Y$
- Monetarists believe M should be increased only at the growth rate of real output (Y) so as to maintain price stability.
- In the long run the QTM will describe the results of money supply growth in excess of the growth rate of real output. If real GDP grows at 3% over time and the money supply is increasing at 5%, we can expect long-run inflation of 2% (5% - 3%).