

Macroeconomics: Lecture 2

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Agenda

- Goods Market
 - The Demand for Goods
 - The Determination of Equilibrium Output
 - Investments & Savings
- Financial Market
 - Demand for Money
 - Supply of Money
 - The Role of Central Bank
 - Financial Market Equilibrium
- Material: Blanchard, Chapters 3 & 4.

The Composition of GDP

- **Consumption** (C) includes spending on fancy phones, *roti*, *kapda*, but not *makaan*.
- **Investment** (I) includes residential plus non-residential investments.
- **Government spending** (G) includes purchases made by the government.
- **Note:** G does not include **government transfers**.
- **Net exports** ($NX = X - M$)

The Demand for Goods

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- Assumption #1 : All firms produce the same good.
- Assumption #2 : Firms are willing to supply any amount of good at given price level P .
- Assumption #3 : Economy doesn't interact with outside world. ($NX = 0$).

Under these assumptions, the demand is

$$Z \equiv C + I + G$$

Consumption

- Depends crucially on **personal disposable income**.
- Let's just tidy up this messy relationship in form of a neat linear equation.

$$C = c_0 + c_1 Y_D$$

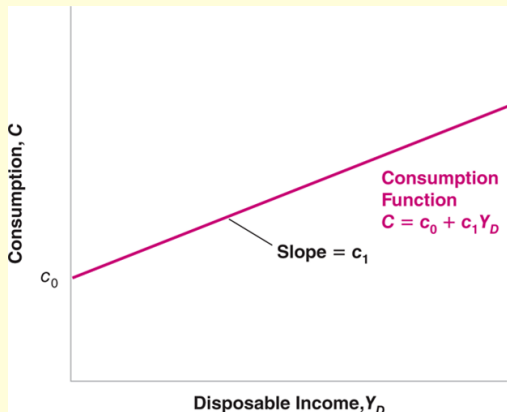
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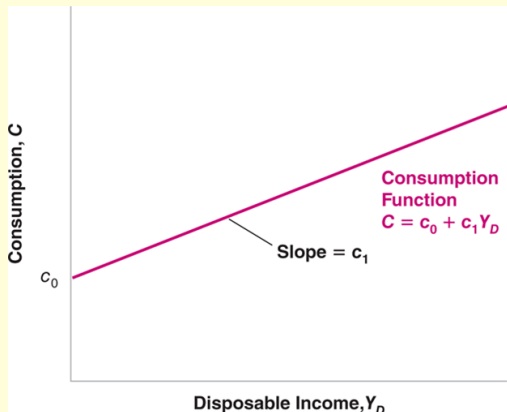


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$$Y_D \equiv Y - T$$

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Investment + Government Spending

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- Just as with investments, we assume that government spending (G) and tax levels (T) are fixed.

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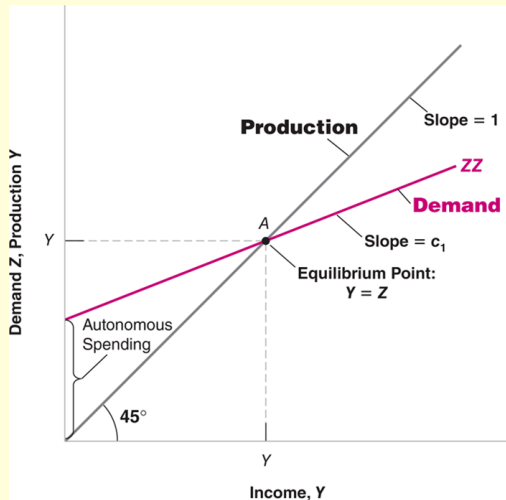
- 1 The first term on the RHS- $1/(1 - c_1)$ - is called **the multiplier**.
- 2 The second term is known as the **autonomous spending**.

Equilibrium: Graphical Approach

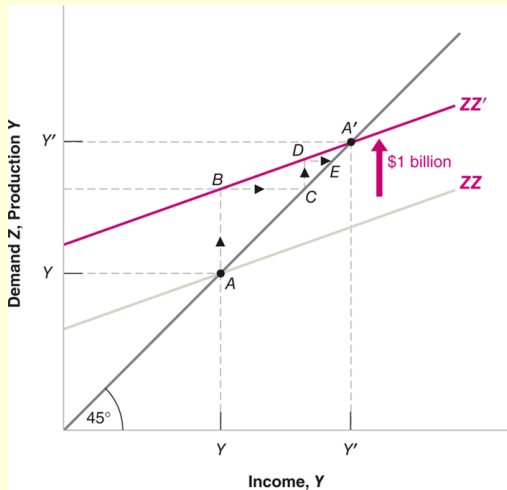
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- 2 Plot Z as a function of income using $Z = (c_0 + \bar{I} + G - c_1T) + c_1Y$.
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Effect of Rising Autonomous Spending on Output



- 1 The first round increase in demand = AB on the graph.
- 2 This increase in demand leads to rise in income = BC on the graph.
- 3 The second round increase in demand = $CD = c_1 * \Delta Y$
- 4 The third round increase in demand = $c_1 * c_1 * \Delta Y = c_1^2 \Delta Y$.

Investment Equals Savings

Nod to John Maynard Keynes.

- **Private Savings** (S): savings by consumers.

$$S^{\text{private}} \equiv Y_D - C$$

- **Public Savings**: Net taxes.

$$S^{\text{public}} = T - G$$

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What goes around comes around!

Investment-Savings Paradigm: Analytics

- The decisions to invest/consume are concomitant and identical.

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$$S = -c_0 + (1 - c_1)(Y - T)$$

- The term $(1 - c_1)$ is known as the **propensity to save**.

Investment-Savings Paradigm: Analytics

- How about investment?
- Investment = private + public savings.

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- How about investment?
- Investment = private + public savings.

$$I = -c_0 + (1 - c_1)(Y - T) + (T - G)$$

- If you solve the above equation by assuming I to be a constant, you will get

$$Y = \frac{1}{1 - c_1} [c_0 + \bar{I} + G - c_1 T]$$

The Meaning of Money

*The best things in life are free
But you can keep 'em for the birds and bees
Now give me money (that's what I want)
That's what I want (that's what I want)
That's what I want (that's what I want) yeah
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Money is the set of assets in the economy that people regularly use to buy goods and services from each other. The cash in your wallet is money because you can use it to buy a meal at a restaurant or a shirt at a clothing store.

Introduction

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- Money works as a **store of value**, a **medium of exchange**, and a **unit of account**.

Functions of Money

Medium of Exchange

A medium of exchange is an item that buyers give to sellers when they purchase goods and services.

When you buy a shirt at a clothing store, the store gives you the shirt, and you give the store your money.

This transfer of money from buyer to seller allows the transaction to take place.

When you walk into a store, you are confident that the store will accept your money for the items it is selling because money is the commonly accepted medium of exchange.

Functions of Money

Unit of Account

A unit of account is the yardstick people use to post prices and record debts.

When you go shopping, you might observe that a shirt costs Rs.500 and a McD burger costs Rs.50.

Even though it would be accurate to say that the price of a shirt is 10 McD burgers and the price of a burger is one-tenth of a shirt, prices are never quoted in this way.

Similarly, if you take out a loan from a bank, the size of your future loan repayments will be measured in dollars, not in a quantity of goods and services. When we want to measure and record economic value, we use money as the unit of account.

Functions of Money

A Store of Value

A store of value is an item that people can use to transfer purchasing power from the present to the future.

When a seller accepts money today in exchange for a good or service, that seller can hold the money and become a buyer of another good or service at another time.

Money is not the only store of value in the economy: A person can also transfer purchasing power from the present to the future by holding non-monetary assets such as stocks and bonds. The term wealth is used to refer to the total of all stores of value, including both money and non-monetary assets

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The question is: how is your wealth-pie going to be divided between these two?

Demand for Money

The proportion will be determined by the following variables:

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The money that you save with mutual funds is used to buy government bonds.

Deriving the Demand for Money

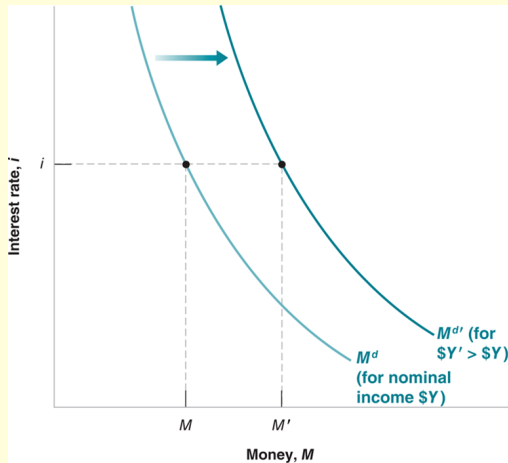
- Depends crucially on **total number of transactions**.
- Transactions, in turn, depend upon the nominal income.
- If income goes up by 10%, rupee value of transactions also moves in similar direction.
- Let's formalize this relationship.

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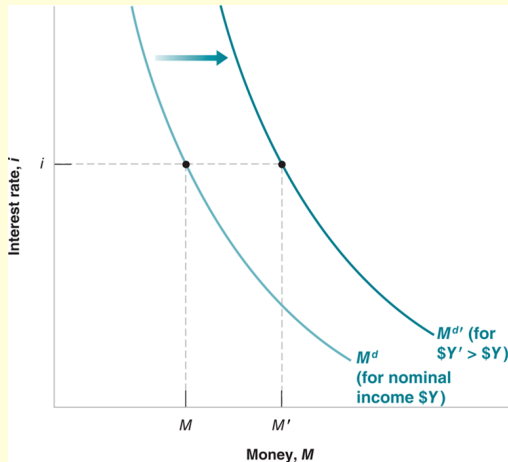
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Summary:

- 1 $\uparrow Y \Rightarrow \uparrow M^d$
- 2 $\uparrow i \Rightarrow \downarrow M^d$



Determining the Interest Rate

- At this point, let's just keep it simple. We assume that RBI supplies a fixed amount of money.

$$M^s = M$$

- $M^s = M^d$ is the condition for financial market equilibrium.

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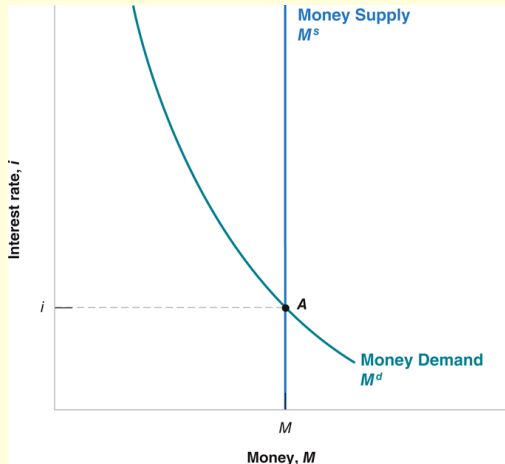
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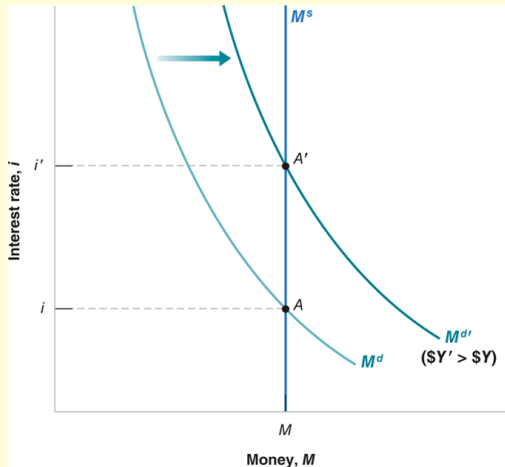
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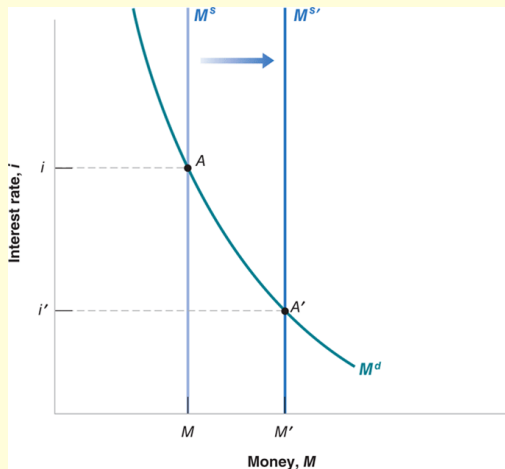
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Monetary Policy and Open Market Operations

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Open Market Operations (OMO): Central banks buy and sell bonds in the bond market.

- **Expansionary OMO:** Central banks **buy** bonds.
- **Contractionary OMO:** Central banks **sell** bonds.

Bond Prices and Bond Yields

- Assume that bonds are just one-year bonds which promise ₹100 a year from now.
- Such bonds are known as **Treasury bills** or **T-bills**.
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Question: Think about central bank's purchase/selling of bonds in this framework.

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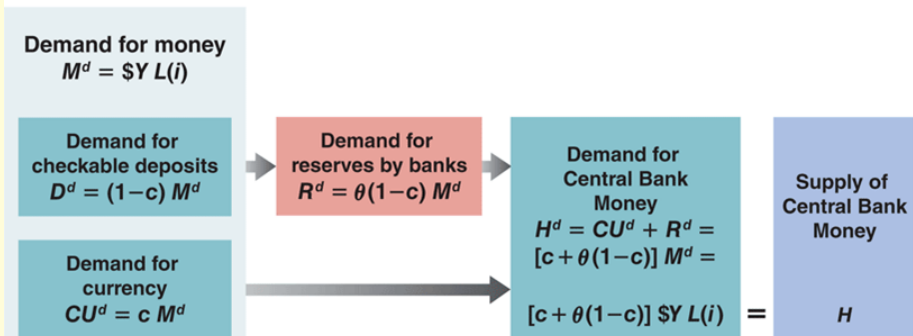
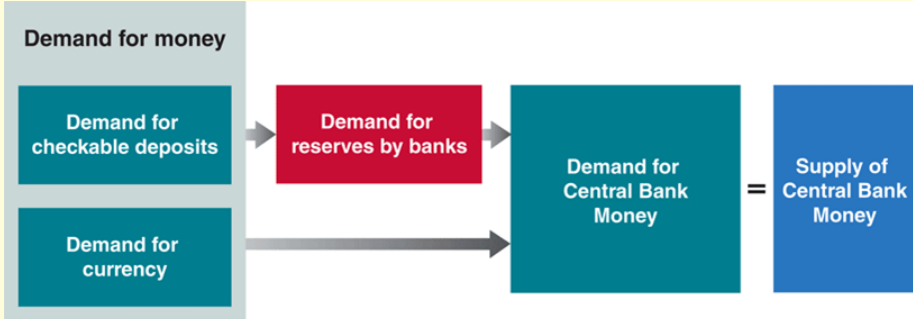
(a) Central Bank	
Assets	Liabilities
Bonds	Central Bank Money = Reserves + Currency

(b) Banks	
Assets	Liabilities
Reserves Loans Bonds	Checkable deposits

The Supply and the Demand for Central Bank Money

We would want to understand now what determines..

- the demand for **checkable deposits** and the demand for **currency**?
- the demand for reserves by banks?
- the demand for central bank money?



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- The demand for deposits: $D = (1 - c)M^d$.

The Demand for Reserves

- $\uparrow D^d \Rightarrow \uparrow$ amount of reserves (R) that banks must hold. (**Why?**)
- Let that fraction be θ . So, the relationship between R and D is

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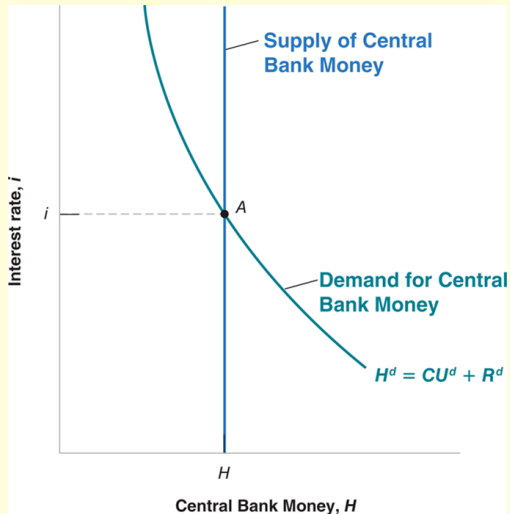
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Mechanics of Central Banking

Suppose there are no banks and there are just coins. To be concrete, let's suppose that the total quantity of currency is Rs.100. The supply of money is, therefore, Rs.100.

Let us suppose in this case that Nubia has Rs.100 in cash and she puts it in a bank account in Abacus Bank.

Abacus Bank's assets	Abacus Bank's liabilities
Base money Rs.100	Payable on demand to Nubia Rs.100

After the bank opens and people deposit their currency, the money supply is the Rs.100 of demand deposits.

Mechanics of Central Banking

Eventually, the bankers at Abacus Bank may start to reconsider their policy of 100-percent-reserve banking. Leaving all that money idle in their vaults seems unnecessary. Why not lend some of it out and earn a profit by charging interest on the loans?

The fraction of total deposits that a bank holds as reserves is called the reserve ratio. This ratio is determined by a combination of government regulation and bank policy.

Let this ratio be 10 percent.

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Abacus Bank's assets	Abacus Bank's liabilities
Loan Rs.90	Deposits Rs.100
Reserve Rs.10	

Money Multiplier

The creation of money does not stop with Abacus Bank. Suppose Nubia from Abacus uses the Rs.90 to buy groceries from Godot who then deposits the currency in Bonus Bank.

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Bonus Bank's assets	Bonus Bank's liabilities
Loan Rs.81	Deposits Rs.90
Reserve Rs.9	

Money Multiplier

If Bonus also has a reserve ratio of 10 percent, it keeps assets of Rs.9 in reserve and makes Rs.81 in loans. In this way, Bonus Bank creates an additional Rs.81 of money. If this Rs.81 is eventually deposited in Jackpot Bank, which also has a reserve ratio of 10 percent, this bank keeps Rs.8.10 in reserve and makes Rs.72.90 in loans. Here is the T-account for Jackpot Bank:

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Jackpot Bank's assets	Jackpot Bank's liabilities
Loan Rs.72.9	Deposits Rs.81
Reserve Rs.8.1	

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What determines the size of the money multiplier?

It turns out that the answer is simple: The money multiplier is the reciprocal of the reserve ratio. If R is the reserve ratio for all banks in the economy, then each dollar of reserves generates $1/R$ dollars of money. In our example, $R = 1/10$, so the money multiplier is 10.