

Generic Elective (Hon) Economics

II Semester

Paper: Introductory Macroeconomics

Note: *Dear Students, We have been covered Unit-4 in the previous class. Now we will discuss Unit-2 & 3 as I already suggested the reading of Mankiw .N .G, Chapter. 4.1 and 5.1 & Oliver Blanchard Chapter-4 according to University of Delhi Syllabus,.*

TOPIC

Unit 2 : Money: Functions of money; quantity theory of money; determination of money supply and demand: credit creation; tools of monetary policy.

What is Money ?

When we say that a person has a lot of money , we usually mean that he or she is wealthy. By contrast, economists use the term “Money” in a more specialised way. To an economist, money does not refer to all wealth but only to one type of it .

Money is anything generally accepted by the society as a medium of exchange, i.e. anything used to pay for goods and services or settle debts. Coins and rupee notes (currency) which are widely accepted by the society as means to settle

transactions thus form a part of money supply. Traveler's checks, checks against current accounts are other commonly used forms of money.

Liquidity is the term economists use to describe how cheaply and easily an asset may be converted into a medium of exchange. Saving account balances are a liquid asset, since they can be quickly and easily converted into a medium of exchange. On the other hand is real estate, an illiquid asset, as it is difficult to convert it into medium of exchange.

Definitions

According to **Walker** "Money is what money does"

Crowther defined that "Money can be defined as anything that is generally accepted as a means of exchange and at the same time as act a measure and as a store of value.

Robertson "as anything that is acceptable in discharge of obligation.

Functions of Money

You now have an overview of what money is and recognise the distinctions among money, income and wealth. We now examine four roles of Money in an economy.

1. Medium of exchange:

The use of money in an economy as a medium of exchange is its primary function. Goods, services, financial assets etc. are all paid for by using money.

Barter, where goods and services are exchanged for other goods and services without the intermediation of money is another way of making transactions. However, there exist two problems with it i) Double coincidence of wants- Each party involved in the transaction must have something the other desires, even if one party doesn't want the good other is trading, transaction won't happen.

(1) Transaction costs- Barter is highly inefficient because parties involved will have to spend considerable time searching for others who are willing to accept the good one is trying to sell as payment for something that he wants to have. This search time forms a part of transaction cost (cost borne in making exchange).

Monetary economies i.e. the economies that use money as a medium of exchange are capable of solving both the above problems because now a person can simply exchange the good he produces for money and then use this to buy what he wants instead of trying to find double coincidence of wants.

2. Unit of account:

The value of all goods and services can be stated in terms of money. Generally since the medium of exchange is virtually common to all transactions thus it is convenient to state all prices in terms of it. The use of money reduces the amount of information that individuals need to operate in the market. In the absence of a common unit of account there would be more prices than goods in the economy. (If there are n goods, then there will be $n*(n-1)/2$ prices). The presence of money as a unit of account reduces the price information needed and thus reduces transactions cost associated with exchange.

3. Store of value:

Money is a means of storing today's purchasing power to purchase tomor-

row. In the absence of money (or other assets) goods will have to be stored to trade in future, even those goods which they personally didn't wish to consume but thought that others would demand for something they wished to purchase. Storage of commodities has two issues- (a) perishability i.e. some goods (like fruits, milk) will be of no/little value in future; (b) high cost of maintenance for non-perishable goods like cars. Both these problems are eliminated by the use of money. Money has its upper hand as a temporary store of value because of its liquidity property, it can be used anytime in the future to make transactions, but there exist other better store of values (over longer periods) like savings accounts, stocks etc. which even pay interests and dividends.

4. Standard for deferred payment:

Money is used to state payments that are deferred to the future. In the absence of money, future payments would have to be made in terms of other goods. Having a common standard for deferred payments as medium of exchange and unit of account makes it easier to determine exactly how much a deferred payment will be. Money however is not the best standard for all purposes.

ORIGINS OF MONEY

Religious objects of value used as medium of exchange → Barter System → Monetary Economy (use of gold as medium of exchange) → Paper Currency

Types of Money:

1. ***Commodity Money:*** Any physical commodity that is used as money but at the same time has alternative non-monetary uses is called commodity money e.g. gold

and silver coins (they are also used in jewelry so have independent value). Commodity money can be of two types-

(a) **Full-bodied money**- When commodity itself circulates as money then it is known as full bodied money. Monetary value = non-monetary value of full bodied money.

(b) **Representative full bodied money**- When paper money that represents a claim to a specific quantity of some commodity circulates as money then it is known as representative full bodied money e.g. gold certificates. Here the non-monetary value of the actual item exchanged is negligible but is more conveniently used as money.

2. **Fiat Money**: Anything that is money by legal tender and is unbacked by any commodity like unbacked paper money or token coins is called fiat money. It has no value as a commodity and doesn't represent a claim to any physical commodity. It is backed only by its general acceptance by society as a medium of exchange.

How the Quantity of Money is Controlled.

The quantity of money available in an economy is called the **money supply**. In a system of commodity money, the money supply is simply the quantity of that commodity. In an economy that uses fiat money, such as most economies today, the government controls the supply of money. The government's control over the money supply is **monetary policy**.

The primary way in which the central bank controls the supply of money is through open market operations—the purchase and sale of government bonds.

When the central bank wants to increase the money supply, it uses some of the dollars it has to buy government bonds from the public.

Conversely, when the Fed wants to decrease the money supply, it sells some government bonds from its own portfolio.

How the Quantity of Money is Measured

One of our goals is to determine how the money supply affects the economy, we turn to that topic in the next chapter. As a background for that analysis, let's first discuss how economists measure the quantity of money.

The most obvious asset to include in the quantity of money is **currency**, the sum of outstanding paper money and coins. Most day-to-day transactions use currency as the medium of exchange.

A second type of asset used for transactions is **demand deposits**, the funds people hold in their checking accounts. So demand deposits are therefore added to currency when measuring the quantity of money.

Measures of Money Supply

From April 1977 following the recommendation of its second working group in money supply, RBI has presented 4 measures of money supply. These are defined below in decreasing order of other liquidity.

M1 = currency (with public) + demand deposits

+ other deposits with RBI

M2 = **M1**

+ savings deposit with post office savings bank

M3=M2

+ time deposits

M4=M3

+ all deposits with post office savings organization

The existing monetary aggregates **M1-M4** were revisited by The Working Group on Money Supply: Analytics and Methodology of Compilation in 1998. (Chairman – Y.V. Reddy). This was because during financial liberalization, banks were resorting to non-traditional sources of funds under increasing competitive pressures. Financial institutions were operating differently. Hence, **M1-M4** was not in appropriate.

New monetary and liquidity aggregates

Differentiated on the nature and functioning of institutions issuing such instruments.

NM0 = Monetary Base = Currency in circulation

+ Bankers' deposits with the RBI

+ 'Other' deposits with the RBI.

NM1 = Currency with the public

+ Demand deposits with the banking system

+ 'Other' deposits with the RBI.

NM2 = NM1 + Short-term time deposits of residents (including and upto the contractual maturity of one year)

+ time liability portion of savings deposits + Certificate of Deposits.

NM3 = NM2 + Long-term time deposits of residents (contractual maturity of over one year)

+ Call/Term funding from financial institutions and call borrowings from non depository financial corporations.

L1 = NM3 + All deposits with the post office savings bank (excluding National Savings Certificates).

L2 = L1 +Term deposits with term lending institutions and refinancing institutions (FIs)

+Term borrowing by Financial Institutions (FIs)

+ Certificates of deposit issued by Financial Institutions (FIs).

L3 = L2 + Public deposits of non-banking financial companies.

The Role of Banks in the Monetary System

Earlier, we introduced the concept of “money supply” in a highly simplified manner. We defined the quantity of money as the number of dollars held by the public and we assumed that the central bank controls the supply of money by increasing or decreasing the number of dollars in circulation through open market operations.

In this section, we see that the money supply is determined not only by central bank but also by the behaviour of households (which hold money) and banks(in which money is held).

We begin by recalling that the money supply includes both currency in the hands of the public and deposits (such as checking account balances). At banks that households can use on demand for transactions. If M denotes the money supply, C currency, and D demand deposits , we can write

Money Supply= Currency+Demand Deposits

$$M. = C + D$$

c^d = Desired Currency to deposit ratio. Public desire to hold cur. rency in proportion to deposits.

$$\text{Hence, } C = c^d * D$$

Total reserves (**R**) = Excess Reserves (**ER**) + Required Reserves (**RR**)

rr = Required reserve ratio

e^d = Desired excess reserve ratio = They are proportional to deposits.

Hence, **RR = rr*D** and **ER=e^d*D**

Since **R = RR + ER**, implies, **R = rr*D + e^d*D = (rr+ e^d)*D**

Monetary Base (high powered money) **MB = C + R**

Calculating Complete Deposit Multiplier

MB = C+R = c^d*D+(rr+e^d)*D=(c^d +rr+e^d)*D

Hence, **D= [1/(c^d +rr+e^d)]*MB**

This implies, change in deposits = **ΔD = [1/(c^d + rr + e^d)] * ΔMB**

[1/(c^d + rr + e^d)] is known as the Complete Deposit Multiplier.

Calculating Complete Currency Multiplier

C=c^d*D=c^d*[1/(c^d +rr+e^d)]*MB=[c^d/(c^d +rr+e^d)]*MB

This implies, change in currency = **ΔC = [c^d/(c^d + rr + e^d)] * ΔMB**

[c^d/(c^d + rr + e^d)] is known as the Complete Currency Multiplier.

Calculating Complete Money Multiplier

M=C+D=[{c^d/(c^d +rr+e^d)}*MB] +[{1/(c^d +rr+e^d)}*MB]

Hence **M = {(1+c^d)/(c^d + rr + e^d)} * MB**

This implies, change in money = **ΔM = [(1+c^d)/(c^d + rr + e^d)] * ΔMB**

$[(1+c^d)/(c^d + rr + e^d)]$ is known as the Complete Money Multiplier.

Money Supply Equation

$$\text{Money Supply} = [(1+c^d)/(c^d + rr + e^d)] * \text{MB}$$

MONEY MULTIPLIER (as discussed by N. Jadhav)

$$\mathbf{M = m(.) * H}$$

Where, M = nominal money stock, H = nominal reserve money, m(.) = money multiplier.

$$\mathbf{H=C+R}$$

Where, C = Currency held by general public, R = Bank Reserves

Broad money multiplier

$$\mathbf{m(.) = M/H}$$

$$= (C + DD + TD) / (C + R)$$

$$= \frac{C+DD+TD}{C+r(DD+TD)}$$

$$= \frac{1+C/DD+TD/DD}{C/DD+r(1+TD/DD)}$$

= Dividing numerator and denominator by DD =

$$= \frac{1+c+t}{c+r(1+t)}$$

Where, M = C + DD + TD, DD = Demand Deposits, TD = Time Deposits, r = reserve to deposit ratio, t = time deposit to demand deposit ratio, c = currency to demand deposit ratio.

The Quantity Theory of Money

The theory we develop in this section, called the quantity theory of money, has its roots in the work of the early monetary theorists, including the philosopher and economist David Hume(1711-1776)

Classical economists assigned a very positive role to money. Before the Keynesian revolution, classical theory was supported by all classical and neo-classical economists. Various eminent classical economists analysed and explained the quantity theory of money but the real credit goes to **Irving Fisher**, who presented **Quantity Theory of Money in his Book “The Purchasing Power of Money”** in 1881.

The quantity theory of money shows direct positive correlation between the quantity of money in circulation and price level.

Transactions and Quantity Equation

The starting point of the quantity theory of money is the insight that people hold money to buy goods and services. The more money they need for such transactions, the more money they hold. Thus, the quantity of money in the economy is related to the number of repp exchanged in translation.

The link between transactions and money is expressed in the following equation, called the **quantity equation**.

$$\text{Money X Velocity} = \text{Price X Transactions}$$

$$M \times V = P \times T$$

Let's examine each of the four variables in this equation.

The right-hand side of the quantity equation tells us about transactions. T represents the total number of transactions during some period of time, say a year. In other words, T is the number of times in a year that goods or services are exchanged for money. P is the price of typical transation—the number of rupee exchanged. The product of the price of a transaction and the number of transactions. PT , equals the number of rupees exchanged in a year.

The left-hand side of the quantity equation tells us about the money used to make the transactions. M is the quantity of money, V called the transactions velocity of money, measures the rate at which money circulates in the economy. In other

words, velocity tells us the number of times a rupee bill changes hands in a given period of time.

This transition equation is justified as one of the best known logics of demand of money in economics. It is a tautological as it asserts that **total monetary expenditure is equal to the monetary value of all goods and services traded.**

From Transactions to Income

The problem with the first equation is that the number of transactions is difficult to measure. To solve this problem, the number of transactions T is replaced by the total output of the economy Y .

If Y denotes the amount of output and P denotes the price of one unit of output, then the rupee value of output is PY . We encountered measures of these variables when we discussed the national income accounts. Hence, Y is real GDP, P is the GDP deflator; and PY , nominal GDP. The quantity equation becomes

$$\mathbf{Money \times Velocity = Price \times Output}$$

Because Y is also total income, V in this version of the quantity equation is called the **Income velocity of money.**

The Money Demand Function and The Quantity Equation

When we analyse how money affects the economy it is often useful to express the quantity of money in terms of the quantity of goods and services it can buy. This amount, M/P is called *real money balances*.

A money demand function is an equation that shows the determinants of the quantity of real money balance people wish to hold. A simple money demand function is

$$(M/P)_d = kY$$

Where k is a constant that tells us how much money people want to hold for every dollar of income. This equation states that the quantity of real money balances demanded is proportional to real income.

This money demand function offers another way to view the quantity equation. To see this, add to the money demand function the condition that the demand for real money balances $(M/P)_d$ must equal the supply M/P . Therefore,

$$M/P = kY$$

A simple rearrangement of terms changes this equation into

$$M(1/k) = PY$$

Where $V = 1/k$, These few steps of simple mathematics show the link between the demand of money and the velocity of money. The equation states that quantity of real money balance demanded is proportional to income. Higher income implies greater demand for real money balance and vice versa.

$$\text{Money Supply} = \text{Money demand}$$

$$\mathbf{M} = \mathbf{Md}$$

or

$$M = kPY$$

Where

k= fixed in short-run

Y= determined by supply conditions.

The equation states that there is **proportional relationship between price level and money supply.**

References:

1. *N.Gregory Mankiw (2013). Macroeconomics(8th edition): Section 4.1(pp.79-85) and section 5.1 (pp.100-106).*
2. *Oliver Blanchard (2006) Macroeconomics (6th edition); Chapter:4.*

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