High Powered Money & Money Supply [Monetary Aggregates]

CONCEPT: APPLICATION: DETERMINANTS:

Part – II

Unit [7], Chapter [1]

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Learning Key [3]

[3.1] Money Supply [M]: [Defining Money Supply]

Money supply refers to the total stock of money [1] in circulation [2] among the general public [3] of an economy at a given point of time. Money supply is a 'Stock Concept'. Which is also conceptualized as 'Monetary Aggregates'.

Application: Importance & Nature of [M]

- Money supply is critically connected with key macroeconomic variables (interest rates, aggregate demand, supply, inflation rates, FOREX rates) and objectives, thus its effective and prudent management is a major macroeconomic policy consideration.

- Money due to its perfect liquidity may be held by the public in many non-homogeneous forms, i.e. in the form of financial assets with varying levels of liquidity, thus money supply definitions may rage from a narrow to broad definition [M1 – M4].

Multiple Definitions (or Types): Background Story

The definitions used in the process of estimating the money supply are subject to change frequently, mainly due to two reasons which can be stated as follows.

- Changes which take place within the financial structure of a country, in terms of new financial instruments, financial institutions and with such innovations the creation of new financial assets.

- Changes on a conceptual and theoretical basis in terms of the how to define and identify perfectly liquid assets which should be considered as money.

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[1] In this context generally **money** refers to valid **Currency** [coins and notes] and **bank deposits** [bank and near money]

[2] **Circulation:** money held and used by the **general public** to perform the **functions of money,** in principle to perform **transactions.**

[3] **General Public**: at a given point of time all other economic agents/operators, apart from the central government, central bank, and commercial banks.

Accordingly, to practically estimate a given country's money supply or stock of money many different definitions or categories need be employed.

As per the CBSL Act No. 16 of 2023, the right to determine the types of assets which should be included within the money supply estimates of Sri Lanka is given to the monetary board of the Central Bank of Sri Lanka (CBSL).

Accordingly, the CBSL defines the money supply under the following classifications or categories. These types of money supply are listed in a descending order from the definition comprising of highly liquid assets to the lowest liquid assets.

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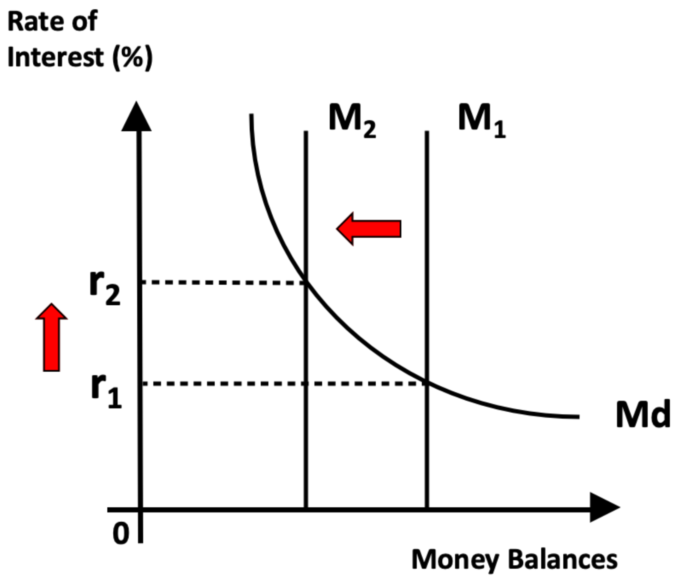
Special Note:

In actual monetary policy the rate of interest (price of money) tends to be used as the policy 'instrument' with the money supply becoming the policy 'objective'.

Since the financial authority of the country (CB) decides the money supply, this is a fixed value (stock) for a given period (i.e., the money supply curve is parallel to the axis showing the rate of interest).

The demand for money or liquidity preference curve is downward sloping in relation to the rate of interest. The central bank can change the money supply to its target levels, by changing the interest rate up and down the general public's demand curve for money balances.



Monetary Policy (MP) Process :
Interest Rate (r): Instrument
Money Supply (M): Policy Objective

[3.2] Money Supply **'Components'**

Illustrating the money supply definitions [M1 to M4]

[1] NARROW MONEY SUPPLY ( )

The narrow money supply consists of two main elements within an economy at a given point of time, which can be identified in the form of

1. **Currency** in circulation held by the general public - (Cp)
2. **Demand Deposits** of the general public in commercial banks – (DDp)

[2] BROAD MONEY SUPPLY ( )

The broad money supply definition which was introduced in 1980 by the Central Bank of Sri Lanka consists of three main elements within an economy at a given point of time, which can be identified as follows,

1. Currency held by the general public (Cp)
2. Demand Deposits held by the general public in commercial banks (DDp)
3. Time and Savings deposits held by the public in commercial banks – (TSDp)

KEY OBSERVATION

In comparison to most countries with developed financial systems, the composition of M_1 in Sri Lanka is dominated by currency with the public (Cp), i.e. Cp is around 60% of M_1. The main reasons for this trend can be identified as:

- Lower level of acceptance of cheques in performing routine transactions
- Relatively underdeveloped banking network (specially LCBs) and routine banking practices specially among rural masses.

In the case of M_2 the main components tend to TSDs in comparison to M_1, i.e. more than 80% of M_2 is TSDs. Mainly because of the interest income from TSDs

[3] CONSOLIDATED (AGGREGATE) BROAD MONEY SUPPLY ( )

The consolidated broad money supply which was introduced in 1998 consists of four main elements within an economy at a given point of time, which can be given as follows,

1) Narrow Money Supply (M1)
2) Time and Savings Deposits of the public held in LCBs/Commercial Banks (TSDs)
3) Share of (usually Half) of Time and Savings Deposits of the public held in LCBs/Commercial Banks in the form of Non-Resident Foreign Currency: NRFC accounts (TSD_{NRFC})
4) Deposits of resident category maintained as Foreign Currency Banking Units: FCBUs (RD_{FCBU})

Formula

Formula [Alternative]

Note:

Adjusted Foreign Currency Deposits:

Includes deposits of Resident Category of Offshore Banking Units (OBUs), i.e., element (4) above, and a share of foreign currency deposits with Domestic Banking Units (DBUs), i.e., element (3) above.

(M2) Vs. (M2b):

Essential difference between M_{2b} and M_2 is the consideration of TSDs in the form FCBUs. M_{2b} is not a completely different money supply definition, rather an extension of M_2.

[4] FINANCIAL SURVEY (M4)

In 1999 the Central Bank of Sri Lanka launched a financial survey on an experimental basis, with objective of identifying the true extent of the stock of money and its liquidity, held by the public at that point of time. Based on the findings of this financial survey the concept of a More Broader Money Supply or Financial Survey (M4) was introduced.

According to this definition of the money supply, the deposits (savings and time deposits) of the general public in Licensed Special Banks: LSBs (NSB, NDB,DFCC and RDB) and Licensed Financial Companies: LFCs, will be included in estimating the economy's money supply.

The financial survey consists of five main elements within an economy at a given point of time, which can be given as follows,

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Formula

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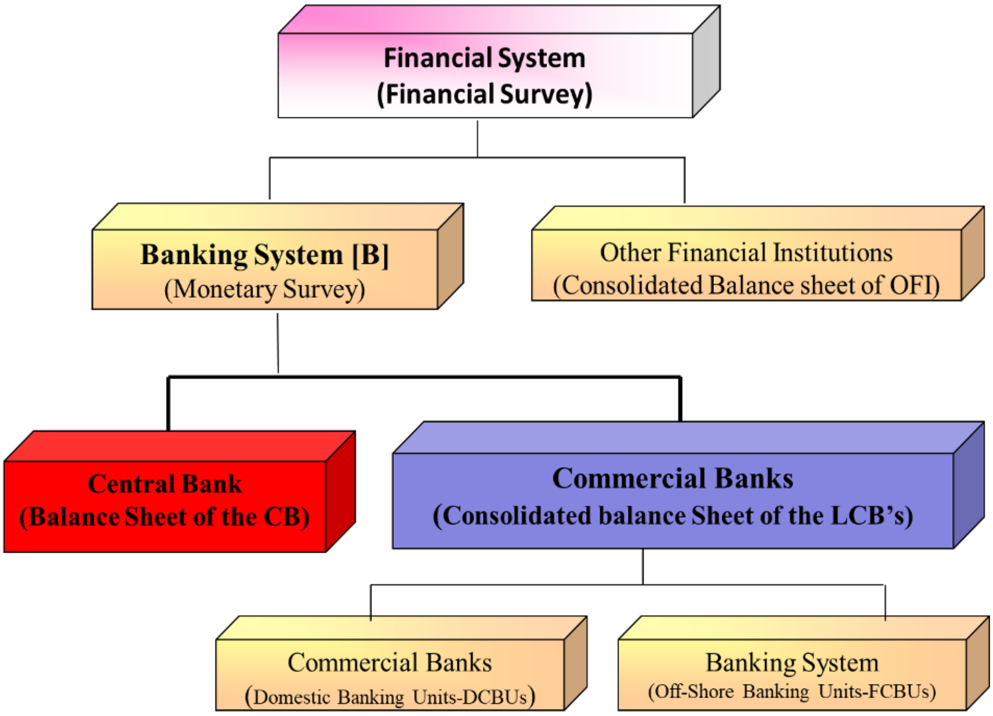
[3.3] **Sources** side <u>**Determinants**</u> of **Broad Money Supply (M2b):**

$$\boxed{Ms = NFA_B + NCG_B + CPS_{KB} + NOA_B}$$

[NFA_B] = Net Foreign Assets of the Banking System
[NCG_B] = Net Loans given by the banking system to the government
[CPS_{KB}] = Loans given by Commercial Banks (LCB's) to the Private sector
[NOA_B] = Net other assets of the banking system

Schematic [2.1]



Source: CBSL -Min-ventures Workshop/2011/12

[1] Net Foreign Assets of the Banking System (NFA $_B$)

- NFA held by the CB
- NFA held by the LCB's

Consolidated Balance-sheet of the **Banking System**

- **Δ High Powered Money**
- **Excess Reserves (LCB Deposit Expansion)**

Positively *related to* **[M]**

Difference between Foreign 'Assets' and 'Liabilities' of CBSL, LCB's and FCBU's of the Banking System

[2] Net Lending to the Government by the Banking System (NCG $_B$)

- **Net Loans supplied by CBSL to the GOSL**
- **Net Loans supplied by LCB's to the GOSL**

Positively *related to* **[M]**

Net: *Loans/provisional advances given* ***minus*** *currency deposits (DD balances) of the GOSL (General Treasury) at the CBSL and loan Repayments*

[3] Lending to the Private Sector by the Commercial Banks (CPS_{KB})

* LCB's discounting bills (Bills of exchange)
* LCB's providing Overdraft (OD's) facilities
* Providing other credit facilities

Positively *related to* **[M]**

[3.4] High Powered Money: [**H**] or [B]

High powered money is identified as the direct financial responsibility or liability (Sight Liabilities) of the Central Bank.

This is the amount of money or currency released to the economy by the central banks (held as currency in circulation and commercial banks' deposits at the CB). The amount of (H) in the economy shall act as a monetary base for the country's money supply at a point of time.

AKA: Base Money (or Monetary Base)
Reserve Money

Key Features of (H):

- An estimate of the stock of money supplied or released (printed and issued) by the Central Bank (CBSL)
- Direct Financial Responsibility of CB (consists of main liability items from the CB balance sheet)

- Two methods of deriving the value of (H): Liability (Uses) side and Assets (Sources) side Approach.
- Two channels of Issuing or methods of creating (H)
- Determinants are based on CB's Balance Sheet

- Link between (H) and (M) is indicated by the Money Multiplier (m):
  [M = H x m] and [m = M/H]

Estimating High Powered Money [H] Stock:

[A] Uses-side Approach

Estimating reserve money through **liabilities** of the Central Bank

Liability **(Components)**	**2022 (Rs.Billion)**
Currency Outstanding (in Circulation)	
[1] Currency held by the general Public – (Cp)	
[2]. Currency with Commercial Banks – (C_{KB})	
[3] Commercial Banks' Deposits with the Central Bank – (**RR**)	
[4] Government Agencies Deposits with the Central Bank **-** (G_{AD})	
Reserve Money (High Powered Money) - (H)	

[B] Sources - side Approach

Presenting reserve money through **net assets** of the Central Bank

Assets **(Components)**	**2022 (Rs.Billion)**
[1 Net Foreign Assets of the Central Bank - (NFA_{CB})	
[2] Net Domestic Assets of the Central Bank - (NDA_{CB})	
Reserve Money (High Powered Money)	

There are two main methods of creating and releasing (channels) high powered money by the Central Bank (CBSL) to the economy, which can be stated as follows.

(1) Acquisition of Domestic Assets (DA_{CB})

(2) Acquisition of Foreign Assets (FA_{CB})

The Process in Practice:

(1) Acquisition of domestic financial assets (by CBSL)

(A) When the CBSL lends to GOSL, currency is directly released to the economy (i.e. when the government spends such loan funds or money on fiscal activities or public expenditure). The public shall ultimately receive such currency (new currency or HPM) and may deposit a certain proportion in their commercial bank deposits.

(B) When the CBSL provides loans to LCBs or Commercial Banks (generally by CBSL purchasing government securities held by LCBs), there will be outflow of new currency or HPM from the CBSL to LCBs, and eventually to public circulation (through LCB deposit/credit creation).

(2) Acquisition of foreign assets (by CBSL)

(A) When the CBSL purchases foreign currency (FOREX) from GOSL, new currency (i.e. HPM) equal to the value of FOREX purchased, based on the exchange rate will eventually reach public circulation, through government spending.

(B) When the CBSL purchases foreign currency (FOREX) from LCBs, new currency (i.e. HPM) equal to the value of FOREX purchased, based on the exchange rate will eventually reach public circulation, through LCBs extending loans.

[3.6] Determinants of High-Powered Money (H)

[A] Broader Approach [CBSL Balance Sheet]

$$H = A_{KB} + NCG_{CB} + NFA_{CB} + NOA_{CB}$$

- Loans given by the Central Bank to commercial banks (A-KB).
- Net loans given by the Central Bank to the government (NCG – CB)
- Net foreign assets of the Central Bank (NFA – CB)
- Net other assets of the Central Bank (NOA – CB)

Alternative Approach: **Based on: M = H x m**

- Central Bank Lending to the GOSL
- Central Bank Lending to the LCBs
- Central Bank engaging in **REPO** and Reverse REPO agreements with LCBs
- CB buying and selling foreign Currency [in USD, with GOSL & LCB's]
- Changes in other assets of the CB (such as issuing securities)
- Transferring CB Profit to the GOSL

Determinants in Practice

Liabilities		Assets	
Currency with public	Cp	Loans to LCBs	A_{KB}
Currency with LCBs	C_{KB}	Loans to Government	CG_{CB}
LCBs' deposits at CB	RR	International reserves	FA_{CB}
Gov. agency deposits at CB	G_{AD}	Other assets	OA_{CB}
Government deposits at CB	DG_{CB}		
Foreign Loans	FB_{CB}		
Other liabilities	OL_{CB}		
Total Liabilities	TL_{CB}	Total Assets	TA_{CB}

Relationship between CB's Liabilities & Assets [Equation]:

$$[Cp + C_{KB} + RR + G_{AD} + DG_{CB} + FB_{CB} + OL_{CB}] = [A_{KB} + CG_{CB} + FA_{CB} + OA_{CB}]$$

Deriving the determinants of HPM (H):

$$H = Cp + C_{KB} + RR + G_{AD}$$
$$H = A_{KB} + (CG_{CB} - DG_{CB}) + (FA_{CB} – FB_{CB}) + (OA_{CB} – OL_{CB})$$
$$H = A_{KB} + NCG_{CB} + NFA_{CB} + NOA_{CB}$$

Money Supply & Base Money:

- Base Money or Monetary Base (H) is the financial asset considered to the base of a country's overall Money Supply (M).
- The Money Supply (M) of a country is multiple number of times greater than the stock of High-Powered Money [I.e., M = m x H].
- Accordingly, money multiplier is the ratio between money supply and base money, at given point of time [m = M ÷ H], which indicates the rate of money creation (or LCB multiple deposit expansion)

[3.5] Money Multiplier [m] OR [K]

- Money multiplier refers to the ratio of money supply (M) to the monetary base (H) of a given economy, at a given point of time.

- In simple terms this is the process of estimating or presenting the number of times a given country's money supply would expand or change, due to a change in the level of base, reserve or high powered money.

- In a more practical sense the money multiplier indicates the maximum expansion or contraction in a country's money supply, when the CBSL sells or buys government securities to and from LCBs [i.e. when there is a direct change in the stock of (H)].

KEYNOTE

1) The money multiplier (m) represents the functional, and multiplier-based relationship between money supply (M) and high-powered money (H).

2) The determinants of money supply (M) can be derived based on the money multiplier (m) and high-powered money (H).

$\longrightarrow$

[3.7] Velocity of Circulation [V]

This refers to the average number of times a unit of currency is used as a medium of exchange in performing transactions, during a given period. This is also known as the circulation velocity of transactions. The value of velocity of circulation can be estimated by dividing GDP at current market price, by the money supply.

IMPORTANCE OF VELOCITY OF MONEY

- Represents the average level of transactions derived or performed from one unit of currency.
- The existence of a certain relationship between the demand for money (Md) as a liquid asset and circulation velocity (V), i.e., there is a negative relationship between liquidity preference and circulation velocity.
- The ability identifies the presence of high rates of inflation or interest rates. When there is a high rate of inflation and in turn high interest rates, the circulation velocity shall increase due to the reduction in the demand for money.
- In the process of determining aggregate demand not only money supply but circulation velocity of money also plays an important role, accordingly, becomes an important consideration in the **monetary policy** formulation process (since monetary policy is a demand management policy).

Developments in Monetary Aggregat

Rs. billion

Item	End 2020	End 2021	End 2022 (a)	2022 Amount	2022 %
1. Currency Outstanding	834.8	1,005.1	1,026.6	21.5	2.1
1.1 Currency held by the Public	641.0	784.4	742.0	-42.4	-5.4
1.2 Currency with Commercial Banks	193.8	220.6	284.5	63.9	28.9
2. Commercial Banks' Deposits with the Central Bank (b)	129.6	300.7	322.8	22.1	7.4
3. Government Agencies' Deposits with the Central Bank (c)	0.03	0.01	0.01		
4. Reserve Money (1+2+3)	**964.4**	**1,305.8**	**1,349.4**	**43.6**	**3.3**
5. Demand Deposits held by the Public with Commercial Banks	536.1	675.4	711.6	36.1	5.3
6. Narrow Money Supply, M_1 (1.1+5)	**1,177.2**	**1,459.9**	**1,453.6**	**-6.3**	**-0.4**
7. Time and Savings Deposits held by the Public with Commercial Banks	7,318.6	8,179.0	9,043.5	864.4	10.6
8. Broad Money Supply, M_2 (6+7)	**8,495.8**	**9,638.9**	**10,497.1**	**858.1**	**8.9**
9. Adjusted Foreign Currency Deposits (d)	909.9	1,008.4	1,792.6	784.2	77.8
10. Consolidated Broad Money Supply, M_{2b} (8+9)	**9,405.7**	**10,647.3**	**12,289.6**	**1,642.3**	**15.4**
Money Multiplier, M_{2b}	9.75	8.15	9.11		
Velocity, M_{2b} (e)	1.84	1.73	2.05		

[E1] Application Exercise

The following is some information relating to monetary aggregates and the balance sheet of the Central Bank within a hypothetical economy.

Loans given to the government		5000
Loans given to commercial banks	4200	
Foreign assets		4000
Other assets		2000
Central government deposits at CB		3600
Borrowings from abroad		2200
Demand deposits held by the public		12,000
Other liabilities		1200
Cash in hand of LCB's		800
Money multiplier		4
Statutory Reserves Ratio		10%

<u>**Requirements**</u>

(A) Estimate the value of High-Powered Money
(B) Estimate the value of currency in public circulation
(C) Estimate the Money Supply

[E2] Application Exercise

In a hypothetical economy, the money supply (M) is Rs. 7,200 Bn. Total bank deposits (D) are Rs. 6,400 Bn, the statutory reserve ratio (SRR) is 10% and the bank do not hold any excess reserves.

(A) Estimate the value of the money multiplier (m) of this economy
(B) What should the CB do to reduce the (M) by 200 Bn

[E3] Application Exercise

Assume that in a hypothetical economy during a given period, total money stock (M) was Rs. 6,400 Bn, total amount of bank deposits (D) held by the public was Rs. 5,200 Bn, statutory reserve ratio (SRR) was 10% and the value of excess reserves (ER) held by the banks was Rs. 280 Bn.

(A) What was the total amount of high-powered money (H) in the economy
(B) What was the value of the money multiplier

[E3] Application Exercise

ALTERNATIVE APPROACH

$$\text{Money Multiplier (m)} = \frac{1 + c}{c + r + er} = \frac{1 + 0.23}{(0.23 + 0.10 + 0.05)}$$

$$= \mathbf{3.24\ (= 3.2)}$$

(c): Currency to deposits ratio (C/D) = 1200/5200 = 0.23

(r): Statutory Reserve Ratio = 10 % (0.10)

(er): Excess Reserve Ratio (ER/D) = 280/5200 = 0.05

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MVSEP / MNB (C1) P2 / ORIGINAL PUBLICATION / 01/ 06/ 2024
MIND-HUB, COL.6 / THEORY (24)