MONEY, INFLATION AND GROWTH

A REVIEW OF THE CONCEPTS AND PAST RELATIONSHIPS

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1. Introduction

Inflation is often referred to as the biggest man made enemy. While some argue that a certain rate of inflation is desirable, others are skeptic as to what such desirable rate is and if such a phenomenon exists. Money is often cited as the cause for inflation while there is also attribution to high oil prices, cost of imported goods and hence "cost push" inflation. Sri Lanka in the year 2006, recorded a rate of inflation of 13.7% p.a. annual average inflation which was the 18th highest in the world for the year 2006. As at end June 2007 the point to point rate of inflation was 13% p.a. with an annual average rate of inflation of 17% p.a.

The growth of money in year 2006, in terms of Broad Money Supply, (M_2), was 20.7% and the country recorded a real growth of GDP of 7.4%. The purpose of this article is to discuss the underlying relationships between money, inflation and the economic growth with supporting concepts and empirical evidence based on Sri Lankan context. A large volume of data for the period 1950 to 2007 have been analyzed to support the observations. In the context of the scope of this paper there appears several interesting relationships either affirming the theories and concepts or disputing popular myths. The research limitations are stated elsewhere in the paper and the author expects this paper to be a framework and basis for further research which will be useful for the analysis of the nitty-gritty within the broader issues.

2. Inflation - What is it?

Inflation is the rate of increase of the general price level. Inflation is measured in terms of changes in price indices. Such an index would indicate the relative cost of a specified basket of goods and services over time, compared with the cost of such basket of goods and services during a particular (base) year.

In Sri Lanka there are several price indices calculated by the Central Bank of Sri Lanka and the Department of Census and Statistics. Few main indices are Colombo Consumer Price Index (CCPI) which is the key index quoted for inflation reporting, Seasonally Adjusted CCPI, Colombo District Consumer Price Index (CDCPI), Sri Lanka Consumer Price Index, (SLCPI) and Wholesale Price Index (WPI).

A price index would consider a representative basket of goods and services of the particular population segment it addresses. The following Table I illustrates the geographical and population coverage of two of the commonly used indices.

Table I – Geographical and Population Coverage of Two Price Indices

Index	Base Year	Geo graphical Coverage	Population Coverage	Price Collecting Centres	No. of Centres	No. of Items
CCPI	1952	Colombo City	Lowest 40%	Pettah, Wellawatte, Kirulapone, Borella, Maradana, Dematagoda, Thotalanga	7	187
CDCPI	Nov. 1996-Oct. 1997	Colombo District	Lowest 40%	Pettah, Kolonnawa, Nugegoda, Maharagama, Homagama, Piliyandala, Dehiwela, Moratuwa, Padukka, Hanwella, Avissawella	11	197

Source : Staff Studies, Central Bank of Sri Lanka Volumes 31 & 32, 2001 & 2002

The Table II below illustrates the weightage given to different categories of expenditure and it is noteworthy that around 60% is allocated for food, and hence food prices will play a vital role in the movement of the indices.

Table II – Weightage given to Different Categories of Expenditure

Category	CCPI	CDCPI
Food	61.89	58.66
Rent	5.70	13.24
Clothing &Footwear	9.42	6.21
Fuel & Light	4.29	4.93
Transport & Communication	1.88	3.68
Education & Recreation	4.21	2.76
Personal Care & Health	2.87	3.83
Liquor, Tobacco & Arecanut	5.02	4.44
Miscellaneous	4.72	2.25
All Items	**100.00**	**100.00**

Source : Staff Studies, Central Bank of Sri Lanka Volumes 31 & 32, 2001 & 2002

An analysis of the coverage and the weightage of the different indices clearly demonstrate that inflation is only a general measure. People of different social and economic standings will have different expenditure habits and also people living in different geographical areas may encounter different prices. Hence the rate of inflation experienced by a rich man and a poor man, during a particular period, will not be the same. Further, the composition of goods within each category may in real life change over time but an index may fail to capture such changes. Regardless of such weaknesses, the inflation indices are fairly well representative of the price movements. Further, research has shown that there is high positive correlation between different measures of inflation as measured by different indices. Hence the author would use CCPI, which gives the largest history of data (since 1952) as the basis for measuring inflation, for the purpose of various analyses in this paper.

2.1 How Much Inflation?

The table below (Table III) provides the current inflation rates:

Table III – Inflation Rates

Item	BASE PERIOD	2006	2007	CHANGE	
				Absolute	Percentage
CCPI	1952 = 100				
June		4,730.5	5,344.3	613.8	13.0
12 Months ending June		4,260.7	4,983.1	722.4	17.0
Seasonally Adjusted CCPI	1952 = 100				
May		4,495.1	4,970.8	475.8	10.6
12 Months ending May		4,199.8	4,917.2	717.4	17.1
SLCPI	1995 – 1997				
June	=100	207.3	241.7	34.4	16.6
12 Months ending June		194.6	224.3	29.7	15.3
CDCPI	1996 Oct.-				
June	Sep.1997=100	178.7	203.6	24.9	13.9
12 Months ending June		167.4	190.0	22.6	13.5
WPI*	1974 = 100				
June		2,331.0	2,891.5	560.5	24.0
12 Months ending June		2,189.0	2,577.3	388.3	17.7

Source : Central Bank of Sri Lanka Monthly Economic Indicators.

The annual average inflation rate is based on the average index value during a given year as compared with the previous year for the same period. This figure is, as the name suggests, an average value and hence the values during the year are less volatile. The point to point inflation measures the percentage change of the index value as of the current point of time compared with the value an year ago. This rate tends to fluctuate during the year somewhat considerably as only the point of time is considered.

The inflation as at June 2007 as measured by CCPI was 17% on an annual average basis and 13% on a point to point basis. The figures were 17.2% and 17.6% respectively as of July 2007.

Inflation rates as measured by average CCPI over selected years in the post independence Sri Lanka are given below in Table IV.

Table IV - Inflation and Growth of Broad Money Supply

End of the Year	Colombo Consumer Price Index (CCPI)	Rate of Inflation based on Change of Average CCPI during the year	Broad Money Supply (M2) Rs Million	Growth Rate of Money during year
1952	100.00		996	-8.6%
1955	100.50	-0.6%	1,225	12.1%
1960	103.50	-1.6%	1,572	6.4%
1965	112.50	0.3%	2,283	6.6%
1970	138.20	5.9%	3,115	9.3%
1975	198.30	6.7%	4,777	4.6%
1977	203.20	1.2%	8,717	37.9%
1978	227.80	12.1%	10,891	24.9%
1980	318.20	26.1%	19,860	31.9%
1985	561.20	1.5%	48,409	11.5%
1990	1,008.60	21.5%	90,546	18.5%
1991	1,131.50	12.2%	110,575	22.1%
1992	1,260.40	11.4%	129,799	17.4%
1993	1,408.40	11.7%	160,136	23.4%
1994	1,527.40	8.4%	191,670	19.7%
1995	1,644.60	7.7%	228,536	19.2%
1996	1,906.70	15.9%	253,201	10.8%
1997	2,089.10	9.6%	288,258	13.8%
1998	2,284.90	9.4%	316,174	9.7%
1999	2,392.10	4.7%	358,076	13.3%
2000	2,539.80	6.2%	404,669	13.0%
2001	2,899.40	14.2%	450,727	11.4%
2002	3,176.40	9.6%	510,395	13.2%
2003	3,377.00	6.3%	580,747	13.8%
2004	3,632.80	7.6%	687,964	18.5%
2005	4,055.50	11.6%	822,932	19.6%
2006	4,610.80	13.7%	993,264	20.7%

Source: Compiled using data from the Annual Report of the Central Bank of Sri Lanka

The following graph (Graph I) shows the movement of the rate of inflation over the period 1953 - 2006.

Graph 1 - Inflation in Sri Lanka 1953 - 2006
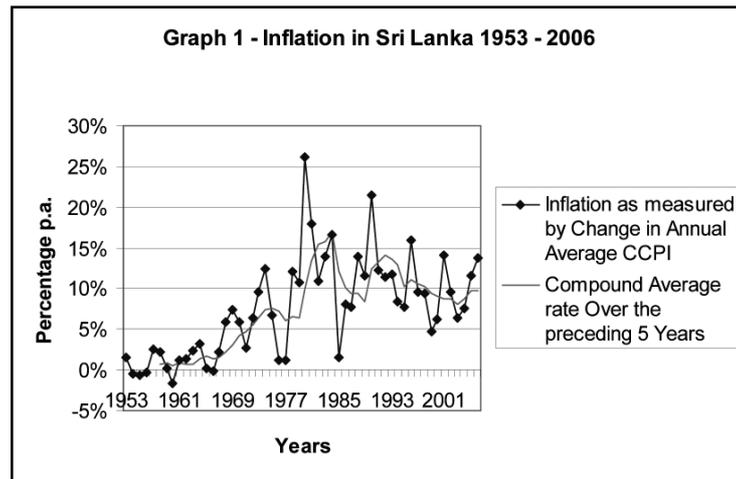
Source : Compiled using Annual Report of Central Bank of Sri Lanka

The compound growth rate of CCPI between 1952 (=100) and 2006 (=4,610.80) was 7.35% p.a. . This low average shows the benefit of low inflation rates that prevailed in the earlier periods. The compound average inflation during the period 1978 to 2006 since opening up of the economy was 11.37% p.a. . The same rate from 1952 to 1977 was 2.88% p.a. . This of course should not lead to a quick favorable conclusion against the open economy, as the pre 1977 era may have the effect of price control on inflation figures. A further interesting analysis is to take a compound average inflation over such other different political eras. The following Table V illustrates the rates.

Table V - Compound Average Inflation Over Different Periods

Period	Annual Average CCPI - Beginning	Annual Average CCPI - End	Compound Average Rate of Inflation p.a.
1952-2006	100.00	4,610.80	7.35%
1952-1977	100.00	203.20	2.88%
1978-2006	203.20	4,610.80	11.37%
1978-1993	203.20	1,408.40	12.86%
1994-2006	1,408.40	4,610.80	9.55%

Source: Compiled by author using CCPI Data

2.2 Inflation in Sri Lanka in the Global Context

What level of inflation would be considered normal? It is a question very difficult to be answered. The rate of inflation and the level of employment is observed to display a negative relationship as per the studies of Alban William Phillips in 1958. These studies identified the "Phillips Curve" that suggests that a certain amount of inflation may be tolerated with a view to achieving a lower unemployment ratio.

The rate of inflation that prevailed in Sri Lanka as of end 2006 of 13.7% would definitely have been above such reasonable levels because Sri Lanka ranked the 18th in the world in terms of (high) inflation. Table VI shows some selected countries and their rates of inflation.

Table VI. Estimated Inflation Rates of Selected Countries including all Countries with an Inflation Rate Higher than Sri Lanka

Rank order of Inflation	Rank Reverse Order	Country	Inflation rate (consumer prices) (%)	Date of Information
1	224	Zimbabwe	976.4	2006 est.
2	223	Iraq	64.8	2006 est.
3	222	Guinea	29	2006 est.
4	221	Burma	21.4	2006 est.
5	220	Congo,	18.2	2006 est.
6	219	Afghanistan	16.3	2005 est.
7	218	Venezuela	15.8	2006 est.
8	217	Iran	15.8	2006 est.
9	216	Serbia	15.5	2005 est.
10	215	Sao Tome and Principe	15	2006 est.
11	214	Liberia	15	2003 est.
12	213	Yemen	14.8	2006 est.
13	212	Haiti	14.4	2006 est.
14	211	Moldova	14.1	2006 est.
15	210	Gambia, The	14	2006 est.
16	209	Eritrea	14	2006 est.
17	208	Malawi	13.9	2006
18	207	Sri Lanka	13.7	2006
19	206	Indonesia	13.2	2006 est.
20	205	Angola	13.2	2006 est.
21	204	Ethiopia	13	2006 est.
22	203	Mozambique	12.8	2006 est.

23	202	Paraguay	12.5	2006 est.
25	200	Madagascar	12	2006 est.
26	199	Ukraine	11.6	2006
37	188	Russia	9.8	2006 est.
48	177	Nepal	8.6	November 2006 est.
56	169	Pakistan	7.9	2006 est.
75	150	Philippines	6.2	2006 est.
77	148	Maldives	6	2005 est.
85	140	India	5.3	2006 est.
88	137	Thailand	5.1	2006 est.
130	95	Greece	3.3	2006 est.
134	91	Libya	3.1	2006 est.
144	81	United Kingdom	3	2006 est.
167	58	United States	2.5	2006 est.
175	50	Korea, South	2.2	2006 est.
176	49	Hong Kong	2.2	2006 est.
189	36	European Union	1.8	2006 est.
191	34	Germany	1.7	2006 est.
194	31	Austria	1.6	2006 est.
196	29	France	1.5	2006 est.
197	28	China	1.5	2006 est.
198	27	Sweden	1.4	2006 est.
203	22	Switzerland	1.2	2006 est.
208	17	Singapore	1	2006 est.
209	16	Taiwan	1	2006 est.
216	9	Japan	0.3	2006 est.
218	7	Israel	-0.1	2006

Source: CIA World Fact Book.

Note : The rank order could change because most of the inflation figures are based on estimates for 2006. The figure and rank for Sri Lanka has been changed from the estimate of 12.10% to the actual published rate of 13.7% as per the provisional figure in the Annual Report of the Central Bank. The inflation rate of Zimbabwe which has been changing rapidly, could well be above the estimate given.

3. Money and Money Supply

Money is generally referred to as anything that serves the functions of money i.e. to be a store of value, medium of exchange, unit of account and a means of deferred payment.

3.1 Commodity Money

Historically, people have used scarce things with intrinsic value as money, referred to as commodity money. Shells, ivory or precious metals, salt & pepper were few such examples. Wikipedia quotes instances of reference to pepper as money in 408 AD. In the modern world history, tobacco, cigarettes and Cola paste have been used as money. Gold, Silver & Copper have been used as commodity money for long periods.

3.2 Coinage

A development of the use of commodity money is the coinage where standardized coins were used for convenience and accuracy of the value.

3.3 Bank Notes

Use of Bank notes came into practice in the era of goldsmiths who practically issued money initially by way of goldsmiths' receipts. The goldsmith would accept custody of gold and issue receipts. Such receipts would normally be presented to convert back to gold. However, people found the easy way out and made an innovation of using the goldsmiths' receipts as money instead of converting the receipts back to gold. It is said that initially the goldsmiths made profits by debasing by clipping the edges of gold coins thereby saving additional gold for themselves. The coins would still fetch full value since the clipping would not make a material difference in weight. Later the goldsmiths turned into banking partnerships and created the origin of the modern day banking. These bankers set the foundation of the money creation process which prevails up to date. This aspect will be discussed in detail, later in this paper.

3.4 Fiat Money

The position of gold has been taken over by Fiat Money today. The government "Fiat" or decree makes such money the legal tender. Today's currency issued by the Central Banks around the world is on the basis of such money being recognized by law as legal tender.

However, even as Fiat Money came into existence, the Central Banks initially followed a gold standard where such money was backed by Gold Reserves. M.H. De Kock refers to two methods evolved by legislatures in connection with regulation of note issues by the Central Banks (Kock,1992;69).

The first was a partial fiduciary reserve requirement introduced in England in 1844 where a fixed amount was laid down by law from time to time which need only be covered by government securities. Any issues beyond this were to be fully backed by gold. However in England in September 1939, the gold reserves were transferred to an Exchange Equalization Account with the outbreak of war and the currency became total fiduciary issues.

The second method was to prescribe a minimum percentage gold reserve against currency issue as well as the deposits (of others) with the Central Bank. Accordingly the deposits with Central Bank were effectively recognized as no less than currency. By 1863, Netherlands had such system of 40% gold reserve against notes and deposits.

When Reichsbank was established in Germany a reserve ratio of one third against currency issues was imposed, with also an upper limit beyond which there would be 100% gold backing. With the setting up of the Federal Reserve System of United States in 1913, a similar proportional gold reserve system was introduced, (Kock,1992;70).

Most countries subsequently have evolved such systems also to include foreign currency reserves as part of the reserves similar to gold. The Currency Board system that prevailed in Sri Lanka between 1864 and 1949 was based on issue of Sri Lankan Rupee currency against gold or foreign exchange received by the Currency Board.

3.5 Bank Deposits as Money

The role of the goldsmiths had gradually been taken over by the banking partnerships where they issued currency notes. Due to failure of many such partnerships arising from excessive note issues not sufficiently backed by gold, the role of the note issues was made a government monopoly over time under the Central Banks of the countries concerned. Hence the currency issue became a Central Banking function. The banks however did not stop the innovation. They resorted to the maintenance of accounts instead. The account balances became an alternative to the currency and the currency (Fiat Money) issued by the Central Banks was the substitute for gold. Bank deposits are considered money as they perform all the functions of money equally well as the currency.

3.6 Money Supply

Money Supply is the stock of money held by public, chasing after goods and services. It is quantified so as to identify the effect of money on the price level that leads to inflation. It is important to note that inflation is caused by money held by public and not by money held in the vaults of the Central Bank or Commercial Banks because it is the money in the hands of the public that chases after goods and services.

The monetary systems and monetary economists have defined different stocks of money such as Narrow Money Supply (M_1), Broad Money Supply (M_2) and Consolidated Broad Money Supply (M_{2b}).

3.7 Narrow Money Supply (M_1)

Narrow money is defined as the sum of currency held by public (C_p) and the demand deposits held by public (DD_p).

$M_1 = C_p + DD_p$

In earlier stages of development of banking and money, the Narrow Money Supply was thought to be an adequate measure of the stock of money.

3.8 Broad Money Supply (M_2)

Broad Money Supply is defined to include Narrow Money Supply plus Quasi Money (QM). Quasi Money is Time and Savings Deposits held by public with Commercial Banks (TSD_p^{KB}).

$M_2 = C_p + DD_p + TSD_p^{KB}$

These two definitions (M_1 & M_2) have long been used by monetary authorities around the world including the Central Bank of Sri Lanka to quantify the stock of money in the country. However, with the advancement of banking and financial systems, other monetary assets may perform the functions of money. Hence is the need to review the composition and expand the scope while, of course, maintaining data relating to such different definitions of money so as to analyze the effect of money on other macro economic factors, particularly inflation.

3.9 Consolidated Broad Money (M_{2b}) and M_4 Money Supply

The M_{2b} measure of Money Supply adds foreign currency deposits held with Commercial Banks with certain adjustment to the M_2 definition to determine Consolidated Broad Money Supply (M_{2b}).

The M_4 definition of Money Supply includes the M_{2b} and incorporates the deposits of public with Licensed Specialized Banks which include National Savings Bank and other Savings Banks, the Development Banks and the Regional Banks and also the deposits of public with Registered Finance Companies.

3.10 Reserve Money (B)

Reserve Money is the total of sight liabilities of the Central Bank to the Commercial Banks and the Public. It is essentially the amount of currency issued by the Central Bank and held by public and Commercial Banks and also the deposits of Commercial Banks with the Central Bank. Earlier it was discussed that the note issuances of the Banks were taken away from Banks and entrusted with the Central Banks. The Central Banks in turn have followed various standards including the Gold standard, fractional (or proportional) Gold reserves and backing of foreign currency in the issuance of Fiat Money so as to ensure that the money has a good backing. The currency so issued is called Reserve Money. The deposits of Commercial Banks with the Central Bank are included in this definition because there is hardly any difference arising from the shift of

the currency held by a Bank to a deposit with the Central Bank upon deposit or vice-versa upon withdrawal.

Accordingly,

Reserve Money (B) $= C_p + C_{KB} + D^{CB}_{KB}$

Where C_p = Currency held by public

                C_{KB} = Currency held by Commercial Banks

                D^{CB}_{KB} = Deposits of Commercial Banks with Central Bank

The Reserve Money is also referred to as High Powered Money, Base Money, Reserve or Monetary Base because of its ability to influence further creation of money through the multiple credit creation process that will be discussed in another section.

3.11 How much Money?

The following Table VII illustrates the amount of money held by public as defined under the different definitions of money supply in the recent past.

Table VII - Monetary Values for the Period 1950 - 2006

LKR
Million

End of the Year	Currency held by Public (Cp)	Demand Deposits held by Public	Narrow Money Supply (M1)	Quasi Money TSDp	Broad Money Supply (M2)	Consolidated Broad Money Supply M2b	M4 - Broad Money	Reserve Money
1950	325	585	911	67	978			533
1955	385	688	1,073	152	1,225			576
1960	595	614	1,209	363	1,572			791
1965	901	814	1,716	567	2,283			1,154
1970	935	1,032	1,967	1,148	3,115			1,324
1975	1,610	1,478	3,088	1,689	4,777			2,144
1980	4,181	5,247	9,428	10,432	19,860			6,286
1985	9,816	8,946	18,761	29,648	48,409			16,895
1990	22,120	17,477	39,597	50,949	90,546			31,579
1995	42,198	33,019	75,217	153,319	228,536			78,586
1996	42,565	35,638	78,203	174,998	253,201			85,509
1997	45,679	40,172	85,852	202,406	288,258	333,667		83,736
1998	51,767	44,502	96,269	219,905	316,174	377,741	480,043	92,866
1999	58,481	50,073	108,554	249,522	358,076	428,319	546,520	100,444
2000	62,646	55,831	118,477	286,192	404,669	483,421	616,030	105,163
2001	65,536	56,675	122,211	328,516	450,727	549,138	699,734	112,522
2002	75,291	64,070	139,361	371,034	510,395	622,495	797,658	126,410
2003	85,601	76,034	161,635	419,111	580,747	717,855	928,274	141,447
2004	99,669	88,784	188,453	499,511	687,964	858,644	1,094,064	170,967
2005	114,070	16,632	230,702	592,230	822,932	1,022,278	1,293,974	197,932
2006	135,020	24,665	259,685	733,580	993,264	1,204,551	1,501,617	239,854

Source: The Annual reports of the Central Bank of Sri Lanka

4. Money Earned or Created?

Who Creates Money?

A simple look at the level of Money Supply over the last 57 years since the establishment of the Central Bank of Sri Lanka would show that there had been phenomenal growth of money.

The compound average growth of Narrow Money from 1950 till 2006 was 10.62% p.a. from a mere Rs. 911 Million to Rs. 259.6 Billion. Broad Money (M_2) has grown from Rs. 978 Million to Rs. 993.2 Billion during the same period at a compound average of 13.16% p.a. Similarly the Reserve Money has grown from   Rs. 533 Million to Rs. 239.8 Billion at an average of 11.53% p.a. Who causes such growth of money? What are the sources of such growth? What is the process involved in creation of money? These are some of the aspects we will discuss.

The following graphs (Graph II and Graph III) illustrate the growth of money:
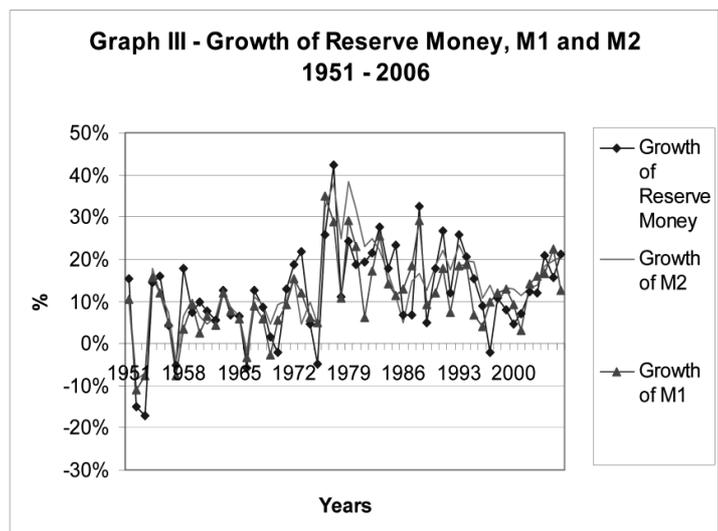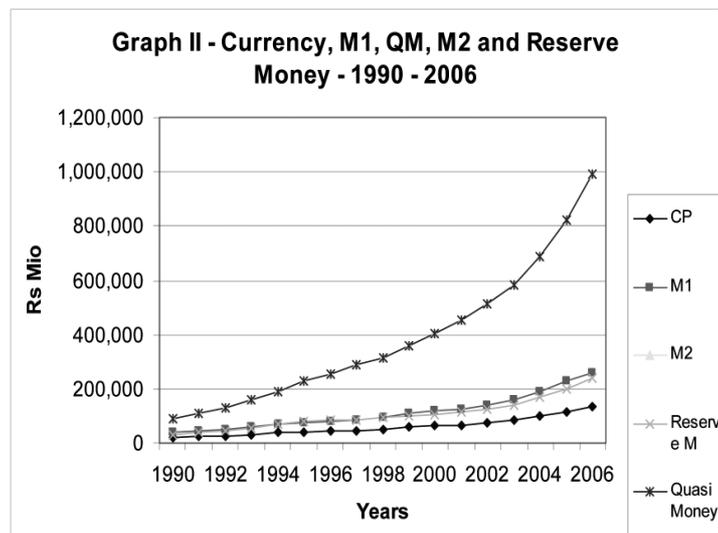
Source : Compiled using Annual Report of the Central Bank of Sri Lanka.

4.1 Multiple Credit Creation – Goldsmiths' Era

Not only the invention of paper money but also the creation of multiple credit and money are both attributed to (somewhat errant) innovation by the goldsmiths who later transformed into Bankers.

A goldsmith would issue a receipt for each unit of gold actually received and such receipts would trade as money. Hence the receipt would be 100% gold backed with effectively a full reserve system. A balance sheet would typically look like the following, (Figure 1), assuming 100 units of notes issued and ignoring other assets and liabilities:

Figure 1. A Simplified Balance Sheet of the Goldsmith

Liabilities		Assets	
Receipts issued	100	Gold	100
	100		100

Ratio of Gold to notes = 100%

The goldsmith (Bank) would soon realize that all the receipts (notes) issued would not be presented for conversion to gold at the same time. Hence he issues notes even without actually receiving gold where it is considered to be a loan given with a promise to receive the gold later from the borrower. Assuming that the goldsmith wants to back only 50% of these notes by gold it will allow him to grow the balance sheet with loans on the asset side and notes issued on the liability side. Let us ignore the proportion of gold holdings in the hands of the public for this moment. The balance sheet would look as follows (Figure 2):

Figure 2. A Simplified Balance Sheet of the Goldsmith

Liabilities		Assets	
Receipts (Notes) issued	200	Gold	100
		Loans	100
	200		200

Ratio of Gold to notes = 50%

The balance sheet in Figure 2 gives him more profits as he earns interest on the loans. Hence his desire is to grow the loan book with more profits and have less liquidity support by having a lower proportion of gold. Of course, again, the ratio of preference for gold in hand against the total notes in the hands of the public will also influence this process, with however the overall effect being the same; grow by giving more loans for better profits!

A somewhat more aggressive banker (goldsmith) would issue more notes (receipts) say holding only 20% against the receipts issued. His balance sheet will then look like the following (Figure 3):

Figure 3. A Simplified Balance Sheet of the Goldsmith

Liabilities		Assets	
Receipts (Notes)	500	Gold	100
		Loans	400
	__500__		__500__

Ratio of Gold to notes = 20%

He has grown his note issues 500% from 100 units to 500 units. He enjoys interest on the loans of 400 units. It obviously made sense to grow even more. However as one would grow with too much greed and hence too little liquidity (gold) to back the notes there would be one fine day when he would not be able to meet the normal withdrawal needs of the receipt (note) holders. The note holders would normally believe that the issuer has adequate gold to back the withdrawals. However if in one remote occasion he fails to do so or displays difficulties due to excessive growth and too low gold backing, then the note holders will be panic driven and demand withdrawal of all notes, the notes being converted to gold. Thus would be a bank run! Such was the fate of the aggressive bankers. Hence was the need for the governments to take over this serious function and entrust the Central Banks to carryout the issue of currency notes.

4.2 Central Banks on the Same Habit!

Central Banks as note issuers have not been too different. The notes issued by the Central Banks were not only believed to have had the gold backing but also the character of legal tender being Fiat Money. Hence the credit quality of the currency issued by Central Banks would be a tremendous improvement compared with the private issuers. A default would almost never arise because the government decrees the notes as legal tender and hence acceptable as good as gold.

Reference is made elsewhere in the article to the different levels of gold reserves and different methods of specifying such gold reserves adopted by the Central Banks in the nineteenth and twentieth centuries. In the early stages of Central Banking, all the currency issues were convertible back to gold and the Central Banks maintained higher if not 100% gold reserves. In 1863 Belgium had 40% gold reserve on the Central Bank notes and deposits. In 1875 Germany had 1/3 (33 1/3%) gold reserve requirement.

M.H.De Kock refers to various reserve percentages required to be maintained in 1920's in different countries as follows: "The Federal Reserve had to maintain minimum reserve of 40 percent against their notes issues and 35% against their deposits, while most countries adopted the same percentage for deposits as for notes, e.g. 33 1/3 percent in Belgium and Bulgaria, 35% in France, Rumania, Yugoslavia, 40% in Netherlands , Italy, Greece and South Africa, 50% in Chile and Peru and 60% in Colombia" .

The balance assets for backing the notes issues and deposits of Central Banks were mainly Government Securities meaning lending to government, and foreign assets. The governments availing themselves of credit from the Central Banks would facilitate the Central Banks issuing more and more notes as well as having more deposits particularly when the requirements for gold and foreign currency reserves are relaxed.

4.3 Economic Depression, War and Lowering of Gold Reserve Requirements

Countries suffered severe losses of gold and foreign currency reserves during the severe depression of 1930 – 33. Hence the Central Banks were unable to meet the reserve requirements and had to pay additional penalties and taxes. Kock (1992;72) refers to such relaxation of reserve requirements as "not only due to the impact of the world depression of 1930 – 33 but also because it was in line with the continuing trend towards greater elasticity in monetary policy and the recommendation made by the International Economic Conference of 1933 in favor of a 25% reserve ratio". Several countries lowered the reserves to a level of 25% in the mid 1930's.

After the outbreak of war in 1939 most countries including France, Canada, Denmark, Norway, Holland, Belgium, England and Japan suspended their reserve requirements. The trend continued with more countries relieving Central Banks of such reserves and also providing Central Banks more discretion with regard to the determination of the level of reserves by way of gold and foreign currency.

In Sri Lanka, prior to establishment of the Central Bank of Ceylon in 1950, there existed the Currency Board System where the issue of currency was backed by gold and foreign currency. The note issues were rigidly linked to the accumulation or disposal of currency which largely was affected by exports and imports and then the overall balance of payments. Following the trend of the time, emphasis in late 1940's was also placed on the balance of payments. Kock (1992;75) refers to the establishment of Central Bank of Ceylon with less stringent reserve requirements as per the prevailing trend in most countries. He states "Likewise the new Central Bank of Ceylon

(1950) was only required to maintain international reserves adequate to meet any foreseeable deficits in the balance of payments; but various criteria were laid down to which the Bank must have regards in judging the adequacy of the reserves, including the estimates of the prospective receipts and the payments of foreign exchange, the volume and maturity of the Central Bank's own liabilities in foreign exchange and the volume and maturity of the foreign exchange assets and liabilities of the government, banking institutions and other persons in Ceylon".

All in all the currency issues and deposits of Central Banks were increasingly made independent of the gold reserves. Such scenario would enable Central Banks to issue more currency and hold more deposits of Commercial Banks thereby increasing the monetary base (Reserve money or high powered money referred to earlier) comprising of currency held by public, currency held by Commercial Banks and deposits of the Commercial Banks with Central Bank.

The Reserve Money in Sri Lanka as at end 2006 was Rs.239 Billion and net foreign assets of the Central Bank was Rs. 229 Billion. More will be discussed on the growth of Reserve Money, its impact on Money Supply and the factors influencing the Reserve Money, later.

4.4 Commercial Banks into Creation of Money

When goldsmiths, who turned into banking partners, were to discontinue issue of notes with the taking over of this function by the Central Banks it would have appeared that the business of money creation would only be within the Central Banks. The outcome was different. The place held by gold is today held by the Reserve Money created by the Central Banks. Banks began to accept currency issued by the Central Banks and create deposit accounts where the deposits could originally have been intended to be fully backed by the currency issued by the Central Banks. A balance sheet of a Commercial Bank under such 100% backing of currency (or deposits with Central Banks as an equivalent) would look like the following (Figure 4):

Figure 4. Simplified Balance Sheet of a Commercial Bank
100% backed by Reserves

Liabilities		Assets	
Deposits of Customers	100	Currency and deposits with the Central Bank	100
	100		100

Such a balance sheet would not make much business sense as there is no room for profits. Besides, Banks would have in no time realized that there was no need for 100% backing because not all the depositors would come for withdrawal at once. Hence the banks made the innovation again. Instead of the earlier method of creating money, banks began to do so by creating more deposits and loans with the help of the Reserve Money. If a bank was to have only 50% of its deposits backed by Reserve Money then the bank could grow the balance sheet by 100% now with loans generating interest income (Figure 5).

Figure 5.   A simplified Balance sheet of a Commercial Bank
50% backed by Reserves

Liabilities		Assets	
Deposits	200	Currency and Deposits with the Central Bank	100
		Loans	100
	<u>200</u>		<u>200</u>

The additional deposit of 100 units in the above example is money created by the Commercial Bank. Hence is multiple credit and money creation!

4.5 Multiple Credit and Money Creation in Today's Context

The relationship between money (Money Supply (MS)) and Reserve Money or Base Money (B) can be given in the following equation:

$$MS = m \times B$$

Where MS =   Money Supply which can be
M_1, M_2 or any other measure of Money Supply

m   =   Money multiplier (as appropriate for M_1 or M_2)
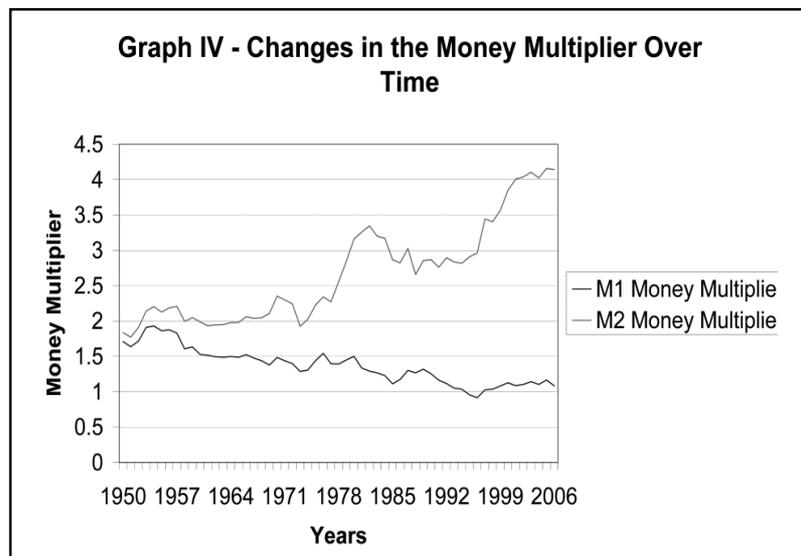B   =   Base Money (Reserve Money)

Although the equation suggests an instantaneous relationship, there is a causation effect where there is a lag period over which a given additional amount of Base Money may turn into a stock of money.

The Base Money or Reserve Money as stated earlier, substitutes the function of gold in the hands of the Commercial Banks. This is the raw material provided by the Central Bank to the banking system that helps create more money.

Mainly arising from the fact that Commercial Banks maintain only a fraction of their deposits in the form of currency, liquid assets and reserve deposits with the Central Banks, Commercial Banks are in a position to create multiple deposits and credit with a given amount of Reserve Money. The fact that deposits with Commercial Banks are recognized as Money, enables a bank to grant a credit facility by simultaneously debiting a loan account and crediting a current account. While the deposits go up by the full amount of the transaction the resources required for this by way of liquid assets and statutory reserves to be maintained with the Central Bank are only fractions (20% and 10% respectively at present) of the new deposit created. This process is also affected by the preference for currency of the Public.

As per the current monetary data, the magnitude of the money multiplier was 1.08 times for Narrow Money Supply (M_1) and 4.14 times for Broad Money Supply (M_2). There had been a tendency of the M_1 money multiplier going down while the M_2 money multiplier has been going up. The following Graph IV shows the changes of the two money multipliers over time.


Source : Compiled using published data of the Annual Reports of the Central Bank

The reason for the reducing M_1 money multiplier can be explained with the suggestion that a good share of the Reserve Money will be in the statutory reserve deposits with the Central Bank and also in the vaults of Commercial Banks and hence the portion left out for currency held by Public which is counted under M_1 would be less. The Reserve Money supports both M_1 and M_2

but the reserve requirement is based on M_2. Further, with new banking innovations such as sweeping accounts and internet banking, the need to maintain high current account balances which is the other key component of M_1 can be minimized. The Growth of M_2 money multiplier can be mainly attributed to a continuous reduction of the ratio of currency held by public to total deposits which is called preference for currency. With Banking development and reach, people would be comfortable having their money in bank deposit form than in currency. Hence the ratio goes down. With the reduction of the ratio, the ability for the system to create more deposits with a given amount of high powered money goes up and the money multiplier goes up accordingly. The correlation coefficient between the preference for currency (%) and M_2 multiplier considering the data between 1950 and 2006 was (-0.9318). This proves the strong negative relationship. In 1950, the preference for currency was 33% and M_2 money multiplier was 1.83. In 2006 the preference for currency was 14% and the M_2 multiplier was 4.14.

The following graph (Graph V) illustrates the reduction of preference for currency over time.
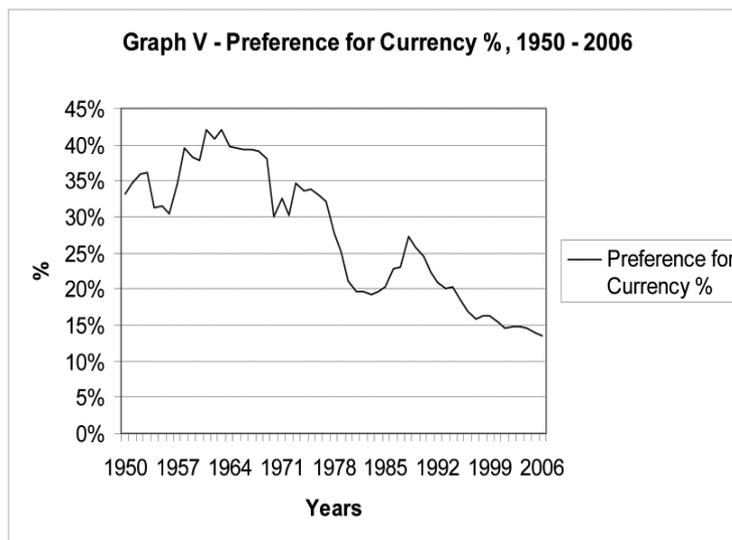
Source: Compiled using Money Supply data

5. Factors Affecting Reserve Money, Money Supply and the Trends

5.1 Factors Affecting the Reserve Money

Reserve Money represents the sight liabilities of the Central Bank. By simplifying the other items in the balance sheet of the Central Bank the contributing factors affecting the Reserve

Money are identified as Net Credit to Government by the Central Bank (NCGCB), Net Foreign Assets of the Central Bank (NFACB), Advances to Commercial Banks by Central Bank(AKB), if any, and the Net Other Assets of the Central Bank (NOACB). Any growth of these four factors will increase the Reserve Money.

The contribution of these factors to the Reserve Money over the last 12 years is given in Table VIII, along with the growth of these factors. Net Foreign Assets of the Central Bank has grown from Rs. 74.3 Billion to Rs. 229.8 Billion over the period. It has at times fully backed the Reserve base, while at times it has gone below the Reserve with a share of 96% by end 2006. Net Credit to government by Central Bank has gone up from Rs. 24.4 Billion in 1994 to Rs. 112.9 Billion by 2006. The percentage contribution has gone up from 31% to 47%. This provides evidence on the government's role in adding to the Reserve Money, which is called printing money, that has continued, of course with a reduction in the percentage share between year 2000 – 2006.

The Net Other Assets figure has been a negative figure suggesting it is a Net Other Liability. This figure mainly represents the capital and equity reserves of the Central Bank. In 2006, the Net Other Liabilities was Rs. 102.9 Billion whereas the capital and reserves (equity) was Rs. 103.3 Billion.

The retained earnings of the Central Bank included in the above equity figure acts to reduce the expansion of base money caused by the other two sources, NFACB and NCGCB. The NCGCB figure of Rs. 112.9 Billion suggests a virtual borrowing against the equity.

While the growth of Reserve Money through foreign assets may provide some backing to Reserve Money, the growth caused by Government borrowings would definitely result in adverse effects in terms of the value of currency, both internal and external.

Graph VI - Movement of Reserve Money and Factors Affecting Reserve Money
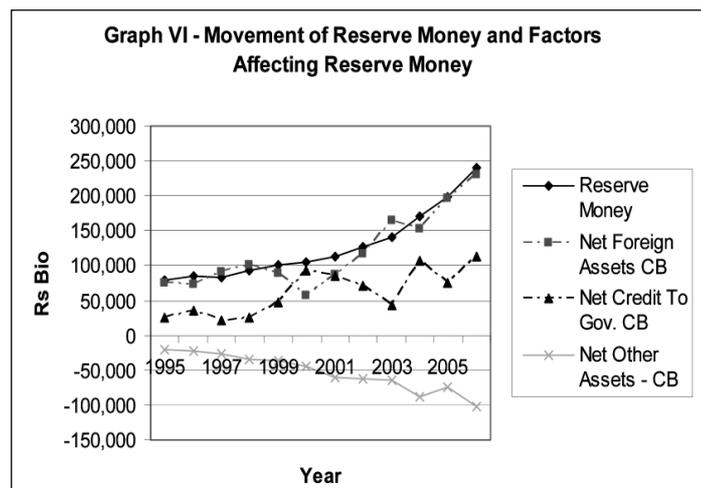
Source : Compiled using published statistics

Table VIII - Movement of Factors affecting Reserve Money

Table VIII - Movement of Factors Affecting Reserve Money

LKR Bio

Year	Reserve Money	NFA CB	% Growth	NCGCB	% Growth	NOA CB	% NFACB over Reserve Money	% NCGCB over Reserve Money
1995	78,586	74,301		24,418		(20,132.90)	95%	31%
1996	85,509	73,786	-0.7%	34,291	40.4%	(22,568.00)	86%	40%
1997	83,736	89,936	21.9%	20,300	-40.8%	(26,500.00)	107%	24%
1998	92,866	101,744	13.1%	25,909	27.6%	(34,787.00)	110%	28%
1999	100,444	89,287	-12.2%	46,716	80.3%	(35,559.00)	89%	47%
2000	105,163	57,947	-35.1%	91,956	96.8%	(44,740.00)	55%	87%
2001	112,522	84,346	45.5%	84,668	-7.9%	(59,438.60)	75%	75%
2002	126,410	117,377	34.5%	70,934	-16.2%	(61,900.70)	93%	56%
2003	141,447	164,596	40.2%	42,149	-40.6%	(65,298.00)	116%	30%
2004	170,967	151,694	-7.8%	107,144	154.2%	(87,871.00)	89%	63%
2005	197,932	196,925	29.8%	74,423	-30.5%	(73,415.90)	99%	38%
2006	239,854	229,860	16.7%	112,942	51.8%	(102,947.38)	96%	47%

Source: Compiled by Author using the data published by the Central bank of Sri Lanka

Source: Compiled by Author using the data published by the Central bank of Sri Lanka

5.2 Factors Affecting Money Supply; Reserve Money and Multiplier Effect

Growth of Money Supply is essentially an outcome of the additional Reserve Money supplied and the effect of any change in the size of the money multiplier.

In 1950, the Reserve Money was Rs. 533 Million and the money multiplier was 1.83 times making a Money Supply (M_2) of 978 Million. Since then the Reserve Money has gone up to Rs. 239.85 Billion by end 2006, with an increase of Rs. 239.32 Billion. The money multiplier has gone up to 4.14 by end 2006. At this new money multiplier the quantum of additional money supplied through the increased Reserve Money is Rs. 990 Billion, (Rs. 239.54 Billion x 4.14) which virtually explains the money growth.

Taking a more recent comparison between 1996 and 2006 the Reserve Money has gone up by Rs. 154.35 Billion (from Rs. 85.5 Billion to Rs. 239.85 Billion). This increase multiplied by the money multiplier of 4.14 times explains an increase in Money Supply by Rs. 639 Billion out of Rs. 993.2 Billion as of end 2006. The M_2 as of end 1996 was Rs. 253.2 Billion with a total increase up to now of Rs. 740 Billion. The difference between Rs. 740 Billion increase and the figure Rs. 639 Billion explained above is attributable to an increase in money multiplier where the previous Reserve Money of Rs. 85 Billion goes through an additional effect of 1.18 times (4.14 – 2.96) making the difference of Rs. 101 Billion.

While money multiplier itself could be controlled through measures such as Statutory Reserve Ratio (SRR), the growth of Money Supply is by and large an outcome of the growth of Reserve Money. Hence if the need is control over monetary growth, then there need to be a control over growth of Reserve Money. While the causation relationship was already discussed, it is also possible to look at the correlation between the two. During the period 1950 to 2006 the M_2 and Reserve Money displayed a correlation coefficient of 0.9935 (99.35%). M_1 and Reserve Money had a correlation coefficient of 0.98 (98%). Hence it is no doubt that Reserve Money targeting is an important aspect of monetary policy. This in fact is the basis of the current monetary policy framework of monetary targeting. Reserve Money is the immediate and intermediary target with resultant targets of Money Supply and price level.

5.3 Factors Affecting Broad Money (M_2) – The Source Side

While the growth of M_2 is caused by the availability of excessive quantum of Reserve Money it will be interesting to see how this excessive growth has got converted into Money Supply. For this purpose, let us analyze the sources of Money Supply M_2.

A consolidated balance sheet of all the Commercial Banks further merged with the balance sheet of the Central Bank would give us a total picture of the assets and liabilities of the banking system. When the components of the M_2 which are on the liability side of this balance sheet are isolated then we would have the following as the causing factors or sources of M_2.

1. Net Foreign Assets of the Baking System (NFABS)
2. Net Credit to Government by the Banking System (NCGBS)
3. Credit to Government Corporations by the Banking System (CCBS)
4. Credit to Private Sector by the Banking System (CPSBS)
5. Net Other Assets of the Banking System (NOABS)

The causation can be explained using the consolidated balance sheet of the banking system, as all the components of M_2 are monetary liabilities with corresponding assets in the balance sheets. It is also useful to look at the correlation of the data.

When the above stated factors affecting Money Supply were analyzed against the growth of Money Supply (M_2) for the period 1950 – 2006 the following observations were made

1. NFABS had a correlation coefficient of 0.977 (97.7%) with M_2
2. NCGBS had a correlation coefficient of 0.974 (97.4%) with M_2
3. Credit to corporations had a correlation coefficient of only 0.848 (84.8%) with M_2
4. CPSBS had a correlation coefficient of 0.9973 (99.73%) with M_2
5. NOABS had a correlation coefficient of (-0.989), (-98.9%) with M_2 because the figures were negative meaning net other liabilities.

The above strong correlations suggest that these factors do contribute to the Money Supply. The following table (Table IX) shows the factors affecting Money Supply in selected years over the period 1950 – 2006

**Table IX – Factors affecting (Sources of) Money Supply (M2) 1950 – 2006**

Rs
Million

End of the Year	Broad Money Supply (M2)	Factors Affecting (Sources of) M2				
		NFABS	NCGBS	CCBS	CPSBS	NOA BS
1950	978	739	66	-	148	25
1955	1,225	868	186		270	(99)
1960	1,572	232	1,004	46	468	(178)
1965	2,283	106	1,711	54	732	(320)
1970	3,115	(599)	2,559	297	1,320	(462)
1975	4,777	(362)	2,810	1,013	2,390	(1,074)
1980	19,860	3,631	8,972	4,123	12,709	(9,575)
1985	48,409	9,273	20,348	4,438	34,441	(20,091)
1990	90,546	3,419	35,357	15,636	64,970	(28,836)
1995	228,536	66,532	35,447	8,527	179,825	(61,795)
1996	253,201	61,861	48,537	9,938	193,842	(60,977)
1997	288,258	89,292	46,365	10,278	216,090	(73,767)
1998	316,174	93,724	58,591	8,681	244,353	(89,175)
1999	358,076	83,892	85,881	12,707	275,532	(99,936)
2000	404,669	59,448	134,484	26,986	307,613	(123,862)
2001	450,727	80,019	161,602	22,934	328,788	(142,616)
2002	510,395	101,717	153,171	28,010	367,397	(139,900)
2003	580,747	129,487	143,444	28,879	430,575	(151,638)
2004	687,964	129,152	181,111	27,258	526,236	(175,793)
2005	822,932	167,147	168,048	15,651	680,693	(208,608)
2006	993,264	185,005	256,553	25,410	856,842	(330,546)

Source: Compiled using data published in the Annual Reports of the Central Bank.

The following graph (Graph VII) shows the changes of the factors affecting Money Supply (M_2) during the period 1994-2006:

Graph VII - The Factors Affecting Money Supply (M2) 1994 - 2006
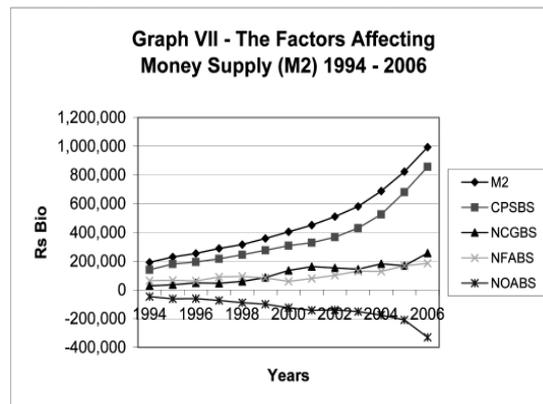
Source: Compiled using data published in the Annual Reports of the Central Bank

5.4 Changes of Composition Over Time

The different components of Money Supply had changed the significance over years except for the CPSBS. CPSBS has grown steadily and accounted for 86% by end 2006. NCGBS has varied from a high level of even 82% of the total M_2 to 26% by end 2006. So has been the fluctuations of NFABS. The NOA which has mostly been a negative figure (NOL) has had some fluctuations as a percentage of total but has shown some steady share ending with (-33%) by 2006.

The graph below (Graph VIII) shows the percentage changes of the composition over time.

Graph VIII - Composition of the Factors affecting M2 in Percentage Terms 1950 - 2006
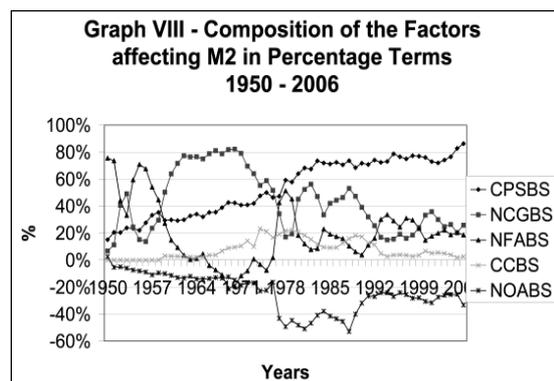
Source: Compiled using data published in the Annual Reports of the Central Bank

5.5 The Evolving Process of Money Creation

Annex 1 to this paper provides a schematic presentation of the evolving process of money creation. This encompasses the shift from the gold standard and evolution up to the current day Money Supply.

6. Does Excessive Money Growth Create Inflation?

It is very well established theory that excessive money growth creates inflation. A.D. Bain quotes the famous theory of Irving Fisher (1911) illustrated by way of the quantity equation suggested by Quantity Theory of Money, as follows:

$$MV = PT$$

Where,
M = Quantity of money
V = Velocity of circulation
P = Price level
T = Volume of transaction

If "V" is considered a constant and if the economy is at full level of employment then

$$P = \frac{V}{T} M$$

Hence, any increase in quantity of money will lead to an increase in the price level, causing inflation.

6.1 Relationship between Rate of Inflation and Monetary Growth

A statistical analysis of the historical data from 1950 – 2006 showed the following correlations (Table X):

Table X – The Correlation between Different Items

Observation	Data Series 1	Data Series 2	Correlation coefficient
(1)	M_2 absolute value	CCPI (Same year)	0.982 (98.2%)
(2)	M_2 absolute value	CCPI – following year	0.986 (98.6%)
(3)	% change of M_2	% Change of CCPI (same year)	0.440 (44.0%)
(4)	% change of M_2	% Change of CCPI (following year)	0.597 (59.7%)
(5)	M_1 absolute value	CCPI (same year)	0.991 (99.1%)
(6)	M_1 absolute value	CCPI (following year)	0.994 (99.4%)
(7)	% change of M_1	% Change of CCPI same year	0.28 (28%)
(8)	% change of M_1	% Change of CCPI following year	0.46 (46%)
(9)	Reserve Money Absolute value	CCPI (same year)	0.9924 (99.24%)
(10)	Reserve Money Absolute value	CCPI (following year)	0.9954 (99.54%)
(11)	% change of Reserve Money	% change of CCPI (same year)	0.28 (28%)
(12)	% change of Reserve Money	% change of CCPI (following year)	0.435 (43.5%)
(13)	% change of Reserve money	% change of M_1	0.820 (82%)
(14)	% change of Reserve money	% Change of M_2	0.793 (79.3%)
(15)	% change of M_1	% change of M_2	0.845 (84.5%)

Source : Compiled by the author

The above correlations amply illustrate the links between Reserve Money, Money and Prices.

In terms of absolute values the Reserve Money, M_1, M_2 and CCPI are highly positively correlated.

However, a better analysis could be to look at the correlation of percentage changes. In this regard though quarterly or monthly figures could have given a better insight, annual figures were used to cover a long period.

With a one year lag, 59.7% correlation is shown between rate of inflation as measured by percetage change in CCPI and the percetage change of M_2. This is somewhat high positive correlation. Similarly, with a lag of one year percetage change of M_1 and percetage change of CCPI showed a positive correlation of 46%. Though this is not high it is neither too low to ignore. Similar comparison with change of Reserve Money also showed a positive correlation of 43.5%. Percentage changes of Reserve Money, M_1 and M_2 are strongly positively correlated.

The weakness of using annual data, where appropriate with a one year lag, is that the lag period may not be properly taken. Hence is the desirability for the more frequent (quarterly or monthly) data to perform the analysis. However the above analysis itself suggests that money causes inflation, a well accepted phenomenon.

The following graph (Graph IX) shows the movements of the percentage changes of Reserve Money, M2 and CCPI over the period 1953 - 2006

Graph IX - The Percentage Changes of Reserve Money, M2 and CCPI 1953 - 2006
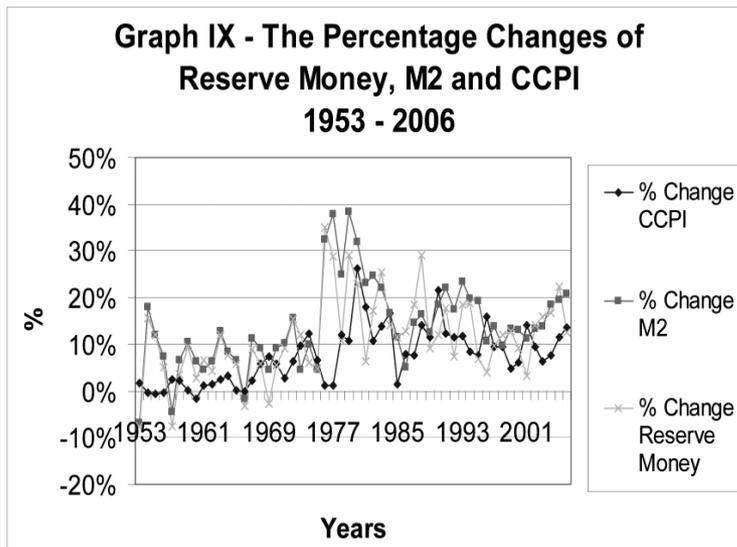
Source : Compiled using published data
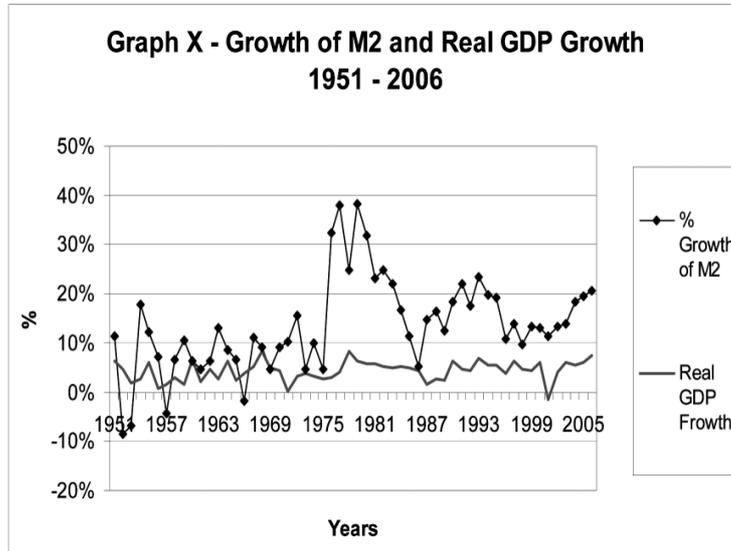
7. Does Money Help Growth?

If inflation is bad, then why have it at all? Some answers to this might come from the Keynesian economics where it is believed that deficit financing and supply of money would kick -off economic activities. It is commonly believed that a reasonable growth of money will stimulate economic growth and vice-versa hence monetary authorities would concentrate on development and stabilization objectives at different times where the two objectives require exactly opposite approaches. The development requires making money available at low cost while stabilization would require controlling availability of money and increasing the cost of money (interest rate). The objectives of the Central Bank have been changed with the amendments to the Monetary Law Act in 2002. The objectives include "(a) Economic and price stability; and (b) Financial system stability, with a view to encouraging and promoting the development of the productive resources of Sri Lanka". However the key principles of using money as an economic stimulant would still prevail.

7.1 Does Money Growth Trigger GDP Growth?

The underlying theory would be that when economy is not in full employment, availability of money will trigger increased economic activities. Let us look at empirical evidence by analyzing the data of Sri Lanka. The correlation between GDP at constant prices and the money supply was observed to be 0.87 or 87%. This however is not the best measure because both numbers tend to go up over time in any case even without a causation.

In the alternative, the correlation between the growth of M_2 (with one year lag) and the real growth of GDP were statistically analyzed which gave a correlation coefficient of 0.470 or 47%. This can be considered medium positive correlation and cannot be ignored as an indication of the role of money in the economic growth.

The following graphs (Graph X and Graph XI) show the relationship between growth of money and real GDP growth, and also inflation and real GDP growth.

Graph X - Growth of M2 and Real GDP Growth 1951 - 2006

Source : Compiled using published data

Graph XI - Inflation and Real GDP Growth 1953 - 2006
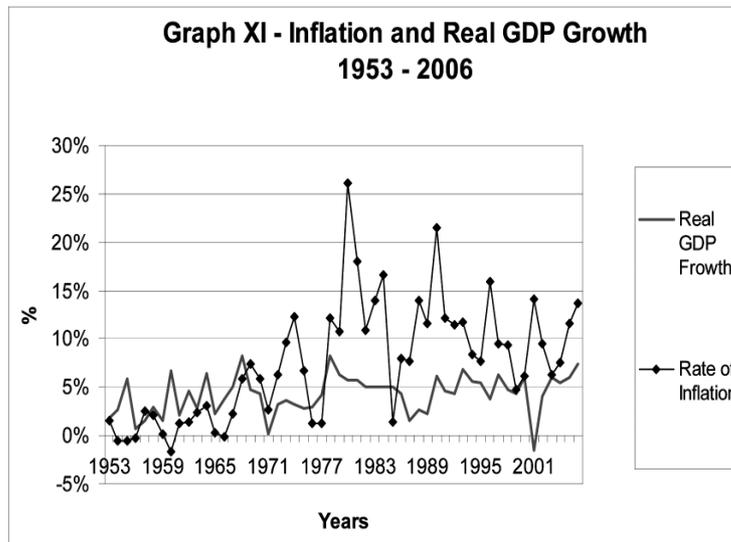
Source : Compiled using published data

A study by Michael Schedlock referring to similar studies looks at the possibility of changes of money supply being used as a predictor of economic growth or recessions. The study provides some significant evidence of the relationship. This study has been based on the use of a revised definition of money using different types of monetary assets, having evaluated the relationships with standard definitions of the Money Supply as well. His study shows a significant relationship between low growth of money and recessions that follow.

7.2 Inflation and Growth Rate; Any Observations Across Countries?

A very basic study was carried out by the author using the inflation data and the real growth of GDP of 184 countries. The data available were the estimates of inflation and estimated real GDP growth for the year 2006 or 2005, most cases being for 2006.

The country ranking as per the GDP growth (higher growth lower number) and the country ranking as per the inflation (higher inflation lower number) gave a positive correlation of 0.375 (37.5%) suggesting a weak but possible relationship of high inflation and high growth. It also gave a very low positive correlation of 0.125 (12.5%) between inflation rate and the growth rate suggesting very weak correlation. This study cannot be conclusive due to the vast diversity of the economies and also the non incorporation of lag effects. However it may be useful to form a basis for further research.

8. Conclusion

The discussion is a preliminary attempt to revisit the relationships between money, inflation and growth. Evidence reconfirms the monetary growth through the growth of high powered money. Further, the factors that have contributed to high powered money growth were identified. The evidence also confirms a strong positive relationship between money and prices. Money has caused inflation.

The study also looked at the conceptual relationships between the different variables. This includes a discussion on how banks create multiple deposits and credit and the evolution of the credit creation process.

A weak relationship could be established between growth of money and the real economic growth.

While the study has been largely based on the annual data of the economic variables, further refinement and incorporation of lag effects will be possible with monthly or quarterly data.

Money is created and inflation is also created, by man. Despite both being man made, there is still a lot of debate as to how the ill effects of inflation can be dealt with.

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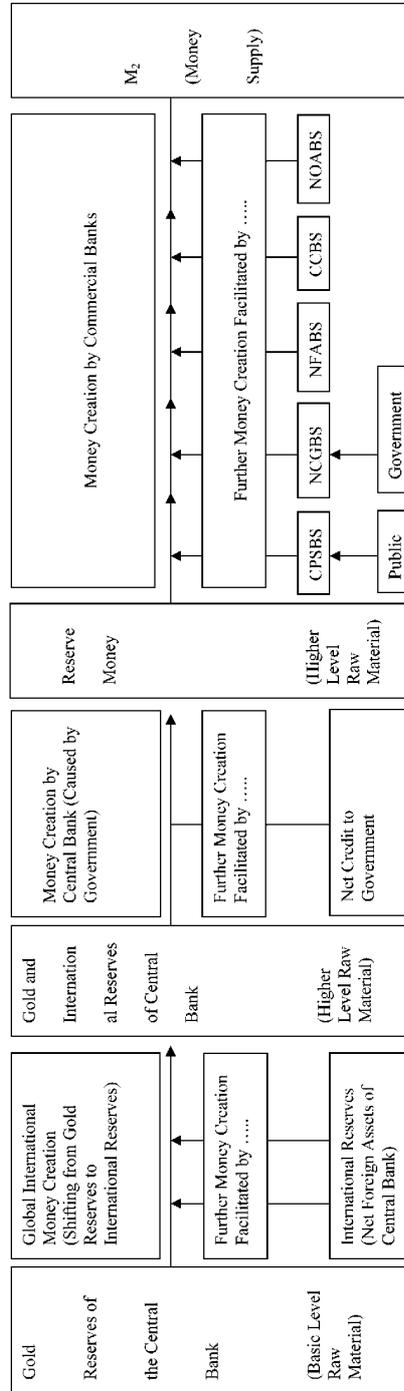
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Acknowledgement

A Schematic Presentation of the Evolving Money Creation Process

Gold Reserves of the Central Bank

(Basic Level Raw Material)

Global International Money Creation (Shifting from Gold Reserves to International Reserves)

Further Money Creation Facilitated by …..

International Reserves (Net Foreign Assets of Central Bank)

Gold and International Reserves of Central Bank

(Higher Level Raw Material)

Money Creation by Central Bank (Caused by Government)

Further Money Creation Facilitated by …..

Net Credit to Government

Reserve Money

(Higher Level Raw Material)

Money Creation by Commercial Banks

Further Money Creation Facilitated by …..

CPSBS | NCGBS | NFABS | CCBS | NQABS

Public | Government

M₂

(Money Supply)

Source : Compiled by the author

Central Banks, Governments, Commercial Banks and the General Public, all contribute to this process!