

CHAPTER –IV

VARIATION OF MONEY SUPPLY

AND

INFLATION

4.1 Introduction

Money supply operates in India as a global opportunity and global challenges. Globalisation has expanded economic interdependence and interaction countries greatly. Milton Friedman, the father of monetarism, said that inflation is always and everywhere a monetary phenomenon and argued that the changes in overall price level and with the change of monetary stock or money supply. This chapter is to make an attempt to study the inter relationship between the rate of inflation and the rate of monetary growth in money supply in India with a simplistic approach, which is rely on the use of simple statistical tools like growth rate ,averages, correlation etc. With taking of econometrics. In previous studies carried out only the econometrics model in the context of inter-relationship between money, output and prices. In this portion the study to attempt is based on the econometric analysis of inflation rather than the analysis of descriptive.

Firstly a brief notation of quantity theory of money is attempted, which is mainly the part of Indian data pertaining to the rate growth in money supply and rate of inflation as measured the WPI data.

4.2 The Relationship between Money Supply and Price Level in Theory:

The relationship between money supply and the general price level which is implied in the refined the quantity theory of money that associated with Milton Friedman in his equation.

$$MV = PY$$

Where,

M = Money supply/Quantity of money

V = Velocity of circulation of money

P = General Price level

Y = Real national income

The equation is called the equation of exchange and the total value of payments in the form of quantity of money times the velocity, MV , equals the money value of national output (output times price, PY). It is meaningful theory which explains the impact of changes in money supply on the price level. If V is assumed to be constant, then every change in M will produce an equal change in the price level or the real national income. If the economy is full of employment or close to full employment level of output, then changes in Y are too difficult with every change in M will cause only the P changes. On the other hand, if the economy operates at less than full employment level of output, then a change in M will be reflected more in Y than in P . Money supply always produces changes in either P or Y . According to Friedman, money does matter and it appears when there is an excessive increase in P (inflation), it is primarily because of the increase in the money supply. In the version of quantity theory of money, the proportionality hypothesis states that V and Y in the equation remain constant. In the general price level would vary proportionately with the changes in money supply which is actually a rise in 10% in quantity theory of money will bring the 10% rise in general price level.

The velocity of money is assumed to be constant which shows that the relationship between the money supply, general price level and real national income as per the velocity of money remains stable. In the state of the economy, only the velocity of money does not change to neutralize the growth in money supply. The example of our vision is that during the depression of U.S. economy in 1930's, the narrow money stock increased 35% and the consumer prices registered a decline of 20% was due to the velocity of money. So it indicates that a given change in quantity of money on price level and real national income changes with the behaviour of velocity of money. A given change in stock of money will have widely differing effects on the price level and real national income in the economy that's depending up on the movement in the velocity of money.

Stability of the velocity of money alternatively means the demand for money is stable, both are inversely related. If the demand for money goes up then the people wish to hold more money in terms of cash, and they will spend less and ultimately the rate of money (velocity of money) goes down. So in this way the demand for money changes, velocity of money will also change in the opposite direction and in the later will also stable. It interprets the two type of velocity like transaction velocity and income velocity. The income velocity of money is denoting with Y/M where Y refers to national income at current prices and for a period and M refers to the average money stock in the economy during the same period.

The monetarist version of the quantity theory of money which is an attempt to establish the relationship between the money supply in terms of both narrow money(M2) and broad money(M3) measure and the growth in price level(inflation rate) .

4.3 Money Supply and price level in India:

It has been shown that the different literature pertaining to study which is reflected the excessive growth in money supply is one of the Important and prime reason behind the inflationary price experienced in the past. The monetary expansion or increase in money stock which has been directly consequence of borrowings of the central Govt. from the Reserve Bank or deficit financing by the Govt.

In the link between growth in money supply and price is well establish whether the link is positive and stable or not. In this portion we have to study historical base of data and later the portion of inflation rate based on WPI and money supply relationship.

4.4 Income velocity of Money in India:

The velocity of money assumes the main part of the relationship between money supply, price level and real national income. There is a full impact of growth in money supply, in the broad money (M3), which has not covered the price level and real national income. This is really a true fact that decline the income velocity of money only for the broad measures of money supply. The calculation of Velocity of Money Income -

$$V1 = \frac{\text{GDP at Market price}}{M}$$

The data contains on GDP at MP, Narrow money (M1), Broad money (M3), Interest rate with their income velocity shown in the following table.

Table No. 4.1 Growth Rate of Money Supply, Inflation, Income, Interest Rate and Their Variation.

Year	GDP at MP (YG)	M1	M3	WPI INFI	R(interest rate)	V1	V3
1970-1971	4.90	11.36	12.53	4.2	6.25	87.39	58.47
1971-1972	1.62	11.40	13.18	5.6	6	78.69	51.60
1972-1973	-0.56	14.20	15.45	10	6	67.15	43.39
1973-1974	3.19	13.39	14.82	20.2	6	60.07	38.18
1974-1975	1.17	6.47	9.85	25.2	7.375	56.85	34.82
1975-1976	8.38	10.13	13.04	-1.1	8	55.77	33.06
1976-1977	1.64	16.84	19.08	2.1	8	47.14	27.19
1977-1978	6.76	-11.37	15.57	5.2	3	56.31	24.62
1978-1979	5.40	16.79	17.96	0	6	49.53	21.35
1979-1980	-5.53	13.54	15.06	17.1	7	40.58	17.19
1980-1981	6.31	14.62	15.33	18.2	9	36.99	15.53
1981-1982	5.67	6.07	11.12	9.3	10	36.83	14.63
1982-1983	3.36	12.61	14.25	4.9	10.25	33.30	12.98

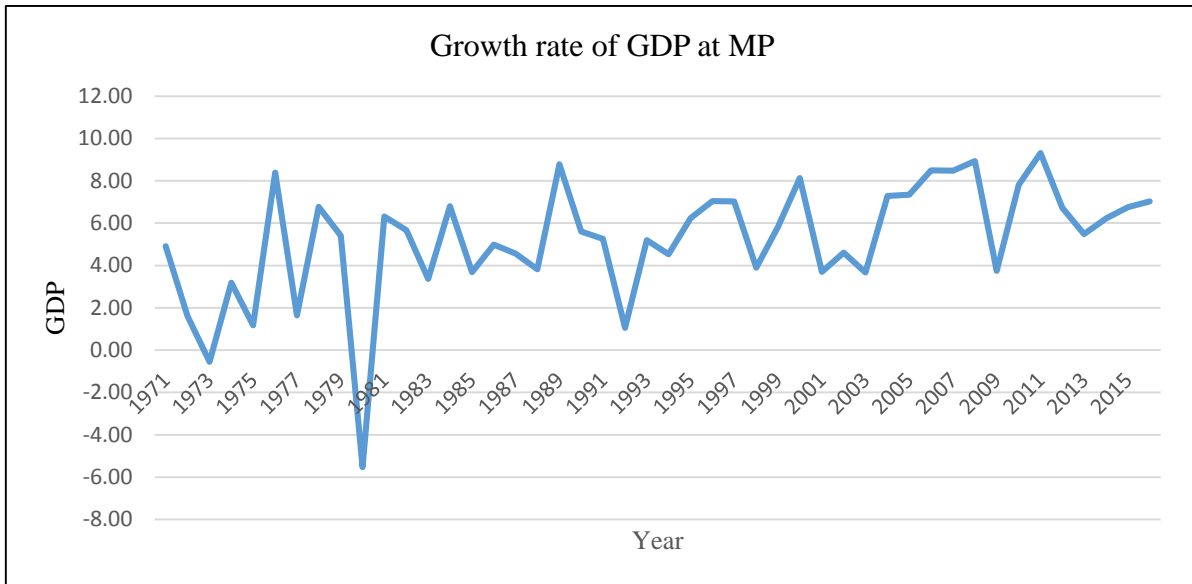
1983-1984	6.79	14.56	15.42	7.5	11.5	30.53	11.78
1984-1985	3.68	16.33	15.94	6.5	12	26.52	10.28
1985-1986	4.99	9.48	13.79	4.4	11	25.27	9.33
1986-1987	4.56	14.41	15.70	5.8	10	22.66	8.24
1987-1988	3.81	12.02	13.78	8.1	11	20.73	7.39
1988-1989	8.78	12.32	15.10	7.5	12	19.92	6.88
1989-1990	5.60	17.61	16.22	7.5	9.5	17.39	6.10
1990-1991	5.26	12.74	13.12	10.3	9.5	16.01	5.60
1991-1992	1.05	18.80	16.16	13.7	9.5	13.14	4.74
1992-1993	5.20	7.79	12.90	10.1	9.5	12.78	4.36
1993-1994	4.54	17.72	15.56	8.4	8.75	11.02	3.85
1994-1995	6.24	21.58	18.29	12.6	8.75	9.22	3.36
1995-1996	7.04	10.51	11.95	8.0	8.5	8.87	3.18
1996-1997	7.02	10.71	13.91	4.6	8.5	8.52	2.95
1997-1998	3.89	10.17	15.26	4.4	8.5	7.96	2.60
1998-1999	5.82	13.34	16.27	5.9	8.5	7.33	2.31
1999-2000	8.13	9.58	12.74	3.3	9	7.21	2.19
2000-2001	3.70	9.92	14.39	7.2	8	6.75	1.95
2001-2002	4.60	10.26	12.36	3.6	5.125	6.35	1.79
2002-2003	3.66	10.71	12.78	3.4	4.625	5.88	1.62
2003-2004	7.29	18.17	14.35	5.5	5.5	5.19	1.50
2004-2005	7.34	10.94	10.69	6.5	6.5	5.01	1.44
2005-2006	8.50	21.37	17.42	4.4	7.625	4.29	1.30
2006-2007	8.48	14.62	17.84	6.6	8.5	4.00	1.17
2007-2008	8.93	16.26	17.62	4.7	8.5	3.68	1.06
2008-2009	3.75	8.25	16.20	8.1	6.5	3.51	0.92
2009-2010	7.82	15.42	14.42	3.8	8.625	3.22	0.86
2010-2011	9.31	9.10	13.86	9.6	9.25	3.22	0.81
2011-2012	6.72	5.70	11.93	8.9	8.875	3.24	0.76

2012-2013	5.48	8.44	11.98	7.5	9	4.86	1.10
2013-2014	6.23	7.88	11.85	5.9	8.625	4.78	1.03
2014-2015	6.75	10.15	9.79	1.9	7.375	4.60	1.00
2015-2016	7.03	11.92	9.19	-2.5	7.35	4.35	0.97
Averages	5.22	12.06	14.26	7.27	8.23	22.71	11.03
St. Deviation	2.7	5.2	2.3	5.1	1.9	22.75	14.57
Correlation	M1&GDPat MP	M3&GDPatMP		M1&WPI		M3&WPI	
	-0.0634	-0.07011		0.01387		0.001974	

Source: Calculation of RBI data 2015-16 Hand book

In the above table shows all the pertinent growth of the money supply, WPI price inflation, income, interest rate and their inter-state variation of income velocity of GDP at MP with m1 and m3 of money supply in the economy as per the data of the year from 1970 to 2016. Over the entire period of combined growth in WPI inflation and real GDP at market price comes to 7.27 percent in averages where 5.22 percent in GDP at market price, that's why there is a close to the growth rate. Thus the growth of GDP at market price and WPI Price inflation together influence the growth of money supply in India. The variation of M1 (22.71percent) is increase heavily than the M2 (11.03percent), they together influence the inflation in India. In Indian context it shows that growth on money supply is the most part of the increase in price level and real GDP. In Long period there is a proportional relationship between the growth of money supply and combined growth in price level and real GDP.

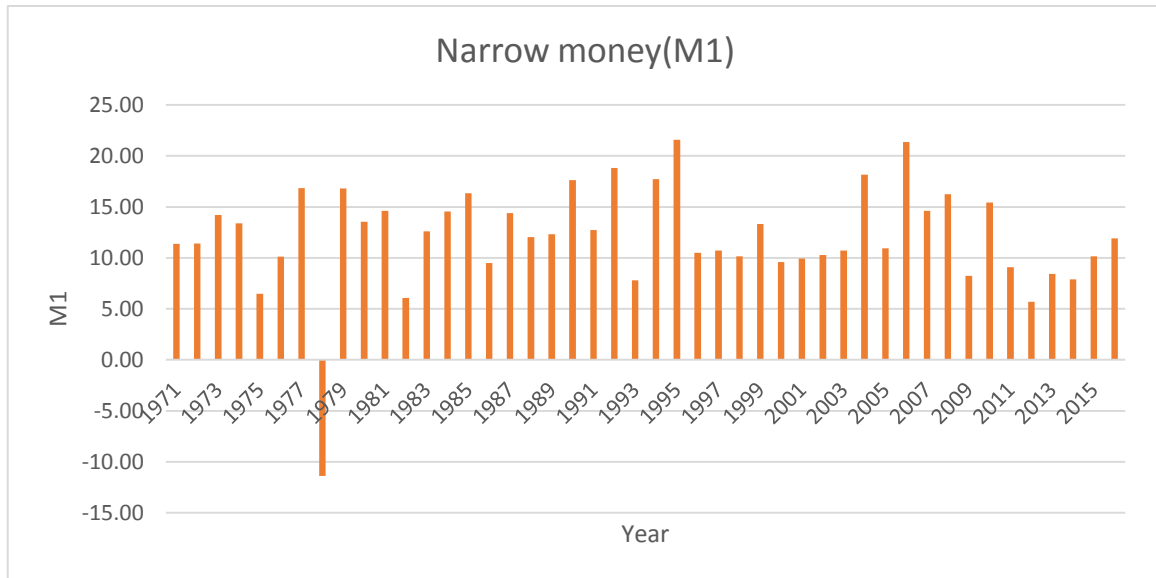
Figure No: 4.1.1 Growth rate GDP at MP



Source : Own calculation

In the above figure the GDP at MP in constant prices at the period from 1970-71 to 2015-16 with analyzing of others. During the period 1978-80(-5.53), M3 was (15.06) and WPI inflation is zero, positive in M3 and negative in M1 and the real GDP was close to 7 percent. In that year there was a close relationship between M1 measure of money supply and price level and real national income. In the year 2015-16 there is a drastic change in the GDP at MP(7.3), M1 is (11.92), M3 is (9.19), WPI is (-2.5) it is due to WPI inflation carried out of the growth of money supply M1 and real national income. It has been argued that in case of India the over all inflation is due to increase in the price of food, which in turn shortage of food resulting droughts, floods, low agricultural productivity, heavy population pressure etc. In that contrary the inflation can go up.

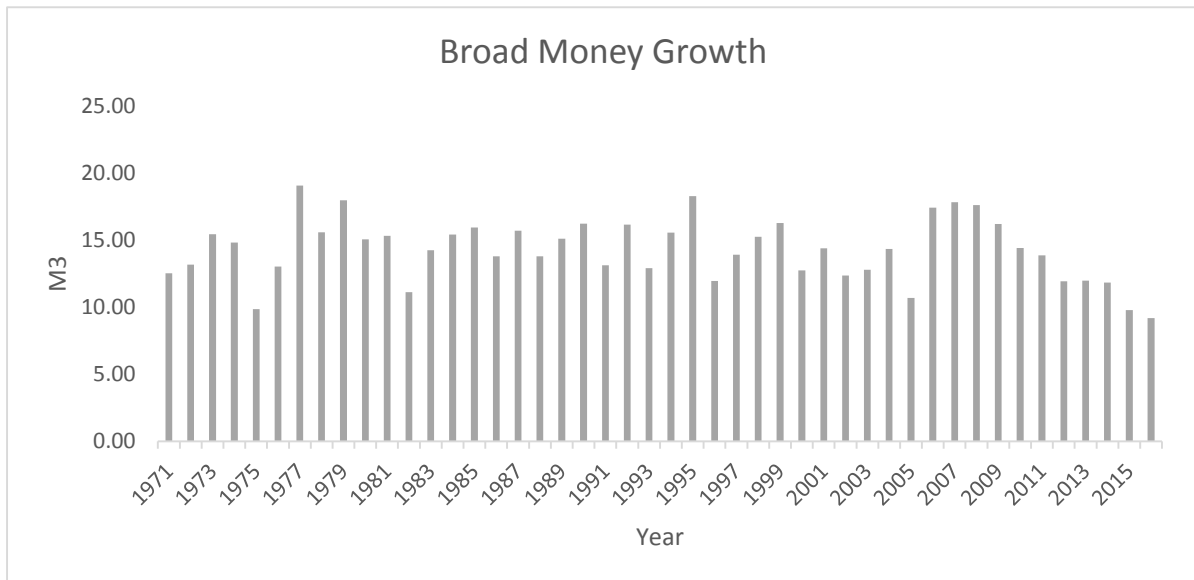
Figure No: 4.1.2 Growth Rate of Narrow Money



Source: Own calculation

In the above figure shows the M1 growth in the country in the year from 1970-71 to 2015-16. It includes only the liquid assets like currency in circulation, notes, and coins in the hands of public. There is proportional relationship between M1 growth and combined growth of WPI and real GDP. Now the position of M1 is 11.92 due to increase in the market need, financial transaction, inter- national trade to rapid the economic growth one . It is increasing per year by year due to OMO, credit structure of the govt, balancing the situation, current deficit etc.

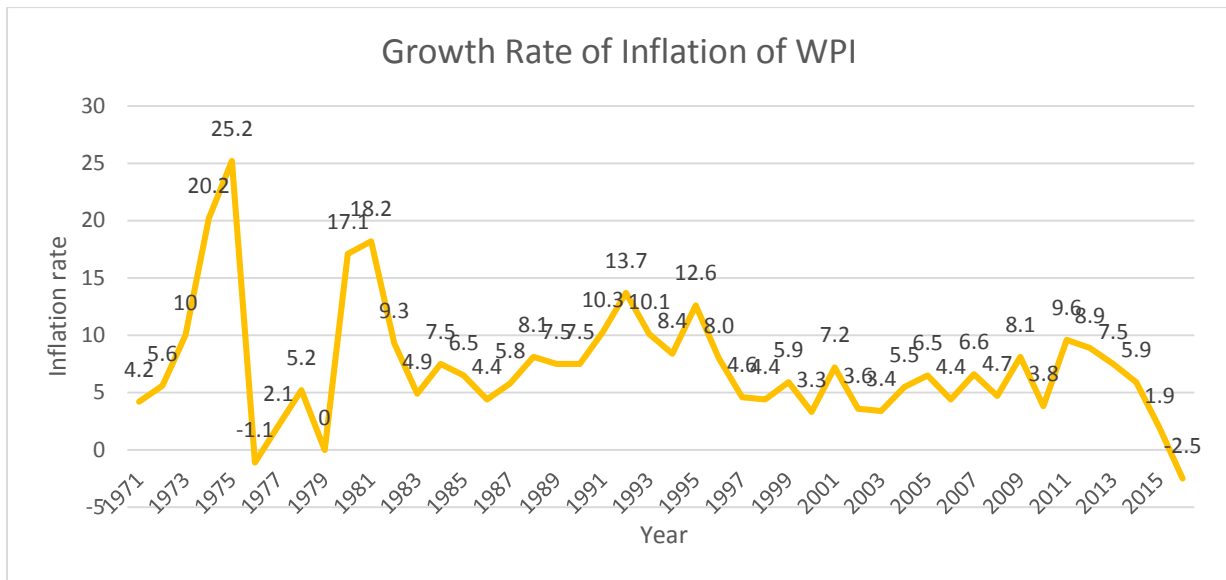
Figure No:4.1.3 Growth Rate of Broad Money



Source :Own calculation

In the above shown figure which indicates that the broad money includes a set of less liquid assets like term deposits with the banks. In the year 1978-79 witnessed an M3 growth was positive and considerable like 19.5 percent. In the same way the WPI inflation appears to have whole effect on increase in the money supply. It was true that due to oil price hikes and also saw a substantial increase in the money supply. Growth of money supply was very large, while the price level was half or one third of it. It is due to the deficit financing by the govt, during the post independence period, which was leading to substantial growth of money supply and price level in the economy. The money supply momentum continued, when the price level slowed down to 6.7 percent in annual averages in terms against 8.3 percent in previous. It shows there is positive association with inflation in India.

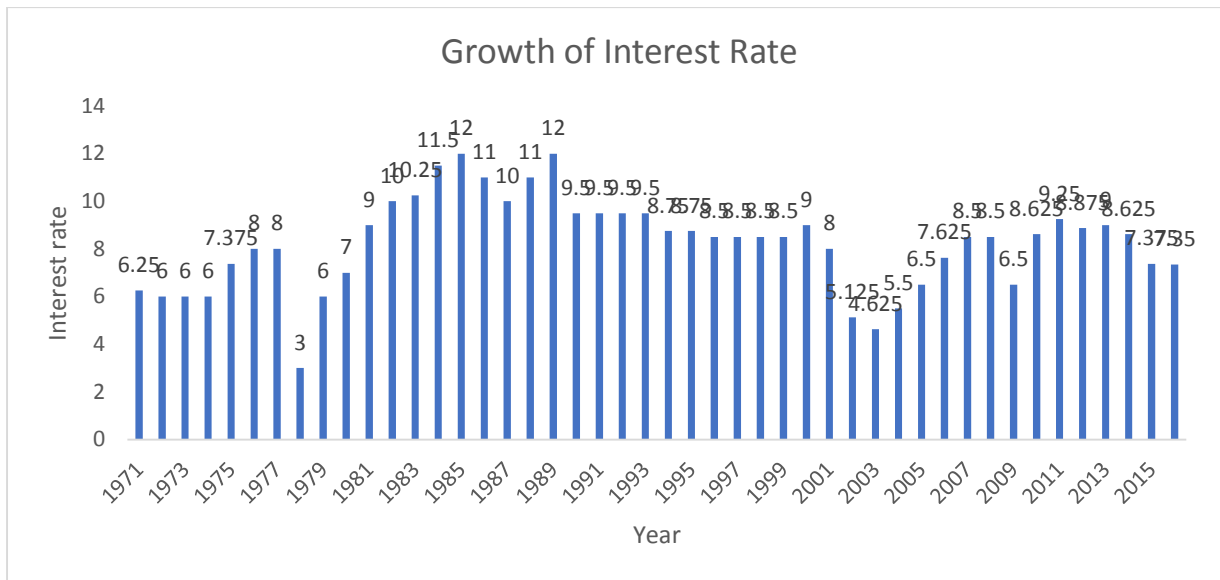
Figure No: 4.1.4 Growth Rate of WPI Inflation



Source: Own Calculation

In the above figure shows the WPI Price inflation rate of India is going to turn a great assessment of monetary policy, which shows that there has been large successful meeting of its key objectives in the post-reform period. Just as like as 1990s witnessed a fall has closed to the 5 percent per annum in the decade gone by, notably lower than that of 8 percent in the previous four decades. It shows there is a structural reforms with improved monetary–fiscal interface and reform in the govt securities markets with better monetary management as key role to stabilize the inflation, tolerance in the economy has come down. Another thing is that there is a huge international crude oil prices remains low and also the inflation remains stable. Since the inflation are a key determinant of actual inflation out come, the lags of monetary transmission is taking pre-emptive actions to keep the inflation expectations stable. Some other factors are like increased competition, productivity gains, and strong corporate balance is also contributed to low and stable inflation environment, and the monetary measures take a substantial role to play in the same level.

Figure No:4.1.5 Growth Rate of Interest rate

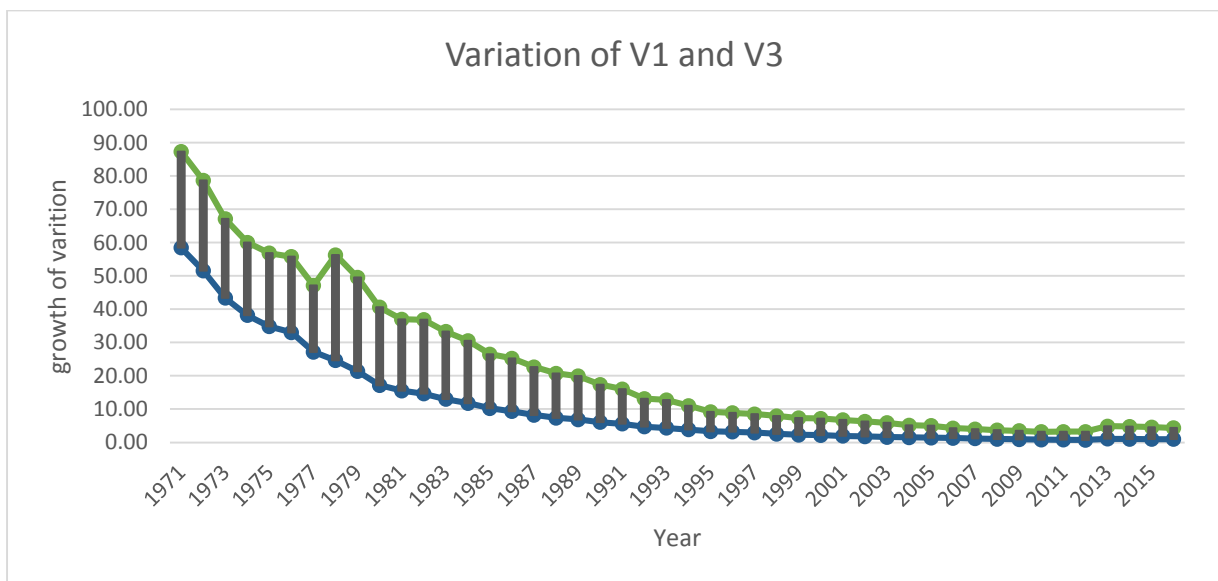


Source : Own Calculation

In the above figure shows the real growth of interest rate structure of banks is totally determined in the market, the major factor is that the interest rate influenced the decline the inflation rate in the recent period. In year to year it is fluctuations, which has been distinct downward in the inflation rate during the period of 1990s. The WPI on an average basis has declined from an about 10.5 percent per annum between 1990 to 1995 to about 5 percent per annum over the last year. In the same trend also happening in the context of interest rate that has to be decline. The yield on the rate of interest rate on the year 1980 to 1990 it was always 11.5 percent where as in post reforms period it was drastically changed like always 8 to 9 percent. The banks have already reduced their deposit rates. The term deposit rates of public sector banks have declined their one year maturity from the range of 8-10 percent and now it is just to 6-8 percent. The fall in the interest rate in the recent period is consonance with the monetary policy with the soft and flexible interest rate. It has an impact of both inflation and money supply in the economy.

The velocity of money is the central place in this theory, which is seek to influence the money supply, price level, and income. In past figure shown that not only the broad money(M3), narrow money(M1) influence the price level and real national income but also the reason is that the decline in the velocity of money for both the broad money and narrow money of money supply.

Figure No 4.1.6 Variation of Money



Source: Own calculation

It can be seen that there is sharp decline in the velocity of money in the year 1970-71 was V1 (87.39) where as V3(58.47) and in same consideration of the year 2015-16 it is V1(4.35) where as V3(0.97). The important factor of India is recognized that there is a decline in income velocity of money is due to increase in the degree of monetisation as a necessary part or result of progressive widening use of the money in the economy, which is influence for the negative on the velocity of money. It is actually true fact because of the post- bank nationalization period and rapid growth of branch expansion and deposit mobilization or active service in the economy

4.5 Money Supply and Alternative Indicators of Inflation

Now the manipulation of the relationship between the changes in money supply, WPI inflation and GDP at MP and establish that there is a increase in the price level, defined the money supply in India.

Over the entire period of from 1970 to 2016 the annual average combined growth in WPI and GDP at market price is 7.8%. This table is showing all WPI and GDP at MP which is closely acquainted with the growth of money supply in the economy.

In case like India the growth of money supply is an important part of the growth of price level and real GDP. Over a long period there is a proportional relationship between the growth of money supply and combined growth in price level and real GDP. The larger part is the real GDP. To quote by C. Rangarajan, the Former governor of RBI “ Money has an impact on both prices and output. The process of money creation is a process of credit creation. Money comes in to existence because credit is given either to the Govt. or the private sector or the foreign sector, since credit facilities is the production process, it has favourable impact on output. But in the same manner, the increased in money supply raises the demand with an upward pressure on prices.” The growth of money supply is due to the price level rather than the output. In the over the period of time, money supply and price level are positively co-related. However in the short run that is break down because on the account of the transmission of lags of changes in money supply, which can be long and variable. In Indian context the principal evidence shows that there is a full impact of changes in money supply on inflation rate can take long time, now it is increasing, the working group of Money supply (1998) set up by the RBI studied on this like inflation in India is reasonably influenced by money supply in the short run and prices effect in short run and deviate from long run on account of supply shocks .