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MONEY AND OUTPUT: IMPACT ON PRICE LEVEL IN INDIA DURING 1970-71 TO 2012-13

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ABSTRACT

This paper aims to examine the relationship among the macro economic variables like real gross domestic product (GDP), broad money (M_3) and price level (WPI) has been examined for the Indian economy using time series data for the pre and post reform period 1970 to 2013. Three variants of the price equation specified in logarithmic form have been estimated following a partial adjustment mechanism. Various tests conducted on the price equation show that the behaviour of price is well explained by changes in output and broad money. Results show that Static and dynamic price equation technique established that increase in money supply has been a quite an important factor in the emergence of inflationary situation in India as well this indicates that an increase of GDP may be effective in reducing the price level in India. This paper suggest that a rise in the real output accompanied by a control of money supply would reduce the price level.

KEYWORDS

money supply, output, price level, partial adjustment model.

1. INTRODUCTION

It has been a great interest in studying the relationship between money, output and price in macro-economic theory and policy. In an economy, Money and Income are important macroeconomic variables, which play a crucial role particularly in determining the level of prices. An unbroken and substantial increase in money supply in India has been a chief contributory factor in the occurrence of inflationary rise in prices during the period of planning, particularly since the beginning of the second plan. (K.K. Dewett et.al., 1992). It is observed through Empirical studies that there has been a high degree of correlation between increase in money supply and increase in real national income. (Zacharish, 1969; Sarma, 1991; Ramanjaneyulu, 2012). The close relationships between these two important macro variables lead us to the effect on price. As would be bought out below, if the percentage increase in real income in a year is lesser than the percentage increase in money supply of that year, the price level in the next shows a growing tendency. If the percentage increase in money supply is lesser than the percentage increase in real national income, the opposite is real, If the percentage increase in money supply is smaller than the percentage increase in real national income. (Dewett, et.al., 1992 p. 391-393)

Brahmanada (1987) confirmed the relationship between money supply and price that being presence of almost constant annual growth in real national income results in the increased rates of growth in money supply in association with rising rates of rise in the price level. C.Rangarajan (1994) stated that "The impact of money can be found in both price and output. The process of money creation is a process of credit creation. The creation of money is carried out so that the credit can be given to either to government or private sector or the foreign sector. Credit facilitates the production process and hence it has a favorable impact on output. However, the price effect of a given expansion of money supply raises the demand with an upward pressure on price".

2. LITERATURE REVIEW

There have been several studies in the literature trying to explore how money, price and output relate in an economy. Empirical findings are mixed on the nature of these relationships. Researchers have used India with variation in sample sizes and econometric methodology. This section briefly reviews some of the latest empirical studies on this topical issue.

Rangarajan and Arif (1990) verified the relationship among money supply, output, and prices by formulating an econometric model for the Indian economy. The empirical results show that the price effect of an increase in money supply was stronger than the output effect. Further, they found that since government revenue collections did not keep pace with government expenditures, as nominal income rose, it widened the resource gap and hence influenced the price level. The results of policy simulations showed that while a substantial increase in government capital expenditure increases output, its impact on output and prices depends upon the extent of the resource gap met by borrowing from the Reserve Bank. The increase in borrowing from the RBI worsens the trade-off between output and price level.

Pulapre Balakrishnan (1991) report that bearing on the interest-sensitivity of demand for money and the role of money supply in the inflationary process which must be addressed by those who argue for a money-based monetary policy, especially in approaching the problem of inflation.

Sarma (1991) observed that interaction between money, output and price has received considerable attention both in theoretical and empirical analysis. The alternative theories regarding the role of money in economic activity however, emphasis that variation in money supply is an important cause of the variation in nominal income. The causality or the nature of transmission mechanism between the three macro-economic variables, money output and price, has a bearing on the goals of economic growth and price stability. Deficit financing by the government has a significant influence on money supply. Deficit financing or net reserve bank credit to government is itself determined, among others, by prices as government receipts and expenditure are influenced by inflation. Thus, the objective of price stability along with stepping up the rate of economic growth assumes importance.

Deepak Mohanty and Rajiv Ranjan (1993) in their paper entitled the inflationary process in the ACU countries during the period 1970 to 1990, in an effort to identify the influence of both monetary and structural factors. The study reveals that the moderate inflation rate of ACU countries, excepting Iran, camouflaged

some intense inflation episodes during the last two decades. While the income elasticity of demand for money showed wide variation across low income ACU countries, the interest rate showed the desired inverse relationship with money demand. Apart from money supply, structural factors such as agricultural output, import prices and food price were found to have has major influences on price. The observed negative correlation between growth and inflation would mean that monetary policy has to bear the responsibility of containing inflation whenever fiscal actions or external shocks or supply rigidities become destabilizing since any accommodative action would generate price increases.

Dhanasekaran. K (1996) observed that a rise in the growth rate of national output accompanied by a control of money supply would reduce the price level in the country. In the work of Das (2003), the long-run relationship between money, price and output was determined for India, the study come out with three fold results; first a bidirectional causality between money and price; second, a bidirectional causality between output and price, and finally, a unidirectional causality from money to output showing that output is a result and not a cause.

Ashra et al., (2004) conducted a study on same topic for India and found a bidirectional causality running from money to price and conclude that money is not neutral and that money is not exogenous in the long-run.

Sharma et al., (2010) in their paper examined the causality between prices, output, and money in India. They viewed that a unidirectional causality between money and output, the study also found a unidirectional causality between money and prices. Mishra et al., (2010) in their own study on same topic for India employing VAR/VECM modeling technique and found a long-run bidirectional causality between money and output. They also found a long-run unidirectional causality running from price to money and from price to output. Also, their findings revealed a short-run bidirectional causality between money and price and short-run unidirectional causality running from output to price.

Umanath Kumarasamy (2012) noted excess supply of a commodity or product usually reflected in downside pressure on its price, and the same is true for money. Excessive supply of money leads to its debasement, to a decline in its value that otherwise is known as inflation. Where money supply generally is an underpinning of economic activity, it also is the ultimate determinant of prices and inflation. On another hand, the gross domestic product (GDP) is one the crucial sign used to determine the strength of a country's economy.

Ramanjaneyulu (2012) examined the Changes in the stock of money deserve to be carefully watched and controlled, because such changes exert a powerful influence on changes in money income, prices and output.

3. METHODOLOGY AND FRAMEWORK

3.1. OBJECTIVES OF THE STUDY

To examine the impact of money supply and output on price level in India over the period 1970-2013.

1. To test the inter relationship between the key economic variables viz., money supply, output and price level in the pre and post 1990 reform periods.
2. To measure the degree of responsiveness of Indian money supply and economic growth (GDP) to changes in the general price level

3.2. RELATIONSHIP OF MONEY, OUTPUT AND PRICES

The association between movements of prices, money supply and GDPR is mentioned in the data Table 1 declare the data relating to the annual compound growth rate of M3, GDPR and price during the 1950-51 to 2012-13 and the whole period were as follows:

TABLE 1: ANNUAL COMPOUND RATE OF GROWTH (in percent)

YEARS	GDPR	M_3	WPI
1950-51 TO 1959-60	3.59	5.95	1.23
1960-61 TO 1969-70	3.9572	9.57	6.04
1970-71 TO 1979-80	2.9442	17.28	9.74
1980-81 TO 1989-90	5.584	17.22	7.97
1990-91 TO 1999-00	5.84	17.18	8.12
2000-01 TO 2012-13	7.13	16.75	6.12
TOTAL AVERAGE OVER ALL PERIOD 1950 TO 2013	4.97	14.25	6.605

Source: Computed by the Author

The annual data on the prices for the period (1950 – 2013) reveal that India has undergone severe inflation. The annual growth of money supply was 5.95 percent and the inflation rate 1.23 percent with the annual output expanding by 3.59 percent during fifties. During sixties, the annual growth rate of output was 3.95 percent and the inflation was increased to 6.04 percent due to the fact that enamors growth in money supply with 9.57 percent. During seventies, inflation was at the peak with 9.74 percent because of the decrease in output with 2.94 percent and multiple growth of money supply with 17.28 percent. During eighties, the annual growth rate of money supply was 17.22 percent and the inflation was dropped to 7.97 percent despite acceleration in growth of output 5.58 percent. During nineties, the growth of output was 5.84 percent and a rise in inflation with 8.12 percent since there was a slight variation of money supply with 17.18 percent. During the period 1990-91 to 1991-92, price rose sharply; it rose from7.46 percent in 1989-90 to 10.25 percent in 1990-91and further to 13.74 percent in 1991-92 the devaluations of the Indian rupee in July 1991 and the severe important compression that followed, along with the reduced GDPR growth rate from 5.07 percent in 1990-91 to 1.38 percent in 1991-92 gave rise to a high degree of inflation during these years. During the first decade of 21th century the growth of output was at the peak with 7.13 and the inflation was dropped to 6.12 percent. During the same period the growth of money supply was also witnessed a slight fall. (See Table1). In this context, an attempt is made to analyze the relationship between money, output and prices in India.

There are various theories concerning in an inflationary state emerges. Modern economists use the equation approach to understand the course of economic magnitudes. One of the fundamental equation of macroeconomic theory is the equation of exchanges, MV=PT. This equation states that the aggregate volume of money (M) held on an average during a year, multiplied by the velocity of circulation of a unit of money (V) equals the quantities of good and service exchanged for money (T) during the year multiplied by their money prices (P). If we assume that over long periods of time V remains constant, and that T is a constant proportion of Y (real GDP), then the equation from a growth angle can be reformulated as follows:-

$$\ln P = \ln M - \ln Y \quad (1)$$

Where Y refers to the real gross domestic product produced during a year, M refers to money and P refers to the level of price. Over short periods, the assumption as above do not hold; we do not expect the proportionality relation between the money and prices to hold true in short periods. If it does, then it is clear that the monetary approach hold true short periods as well (P.R.Brahmananda, 1994, p-25)

3.3. METHODOLOGY AND DATA SOURCE

For the present study the data series on money supply (BM) price level (WPI) and output (GDP) were collected from the following sources (1) Annual Reports of Reserve Bank of India, (2) Reports on Currency and Finance of Reserve Bank of India (various issues) and (3) Economic Survey of Government of India (various issues). The study is based on annual data for the period of 43 years (1970-71 to 2012-13), the choice of the period depends on the availability of data at the time of study. Static and Dynamic equations have been estimated using, ordinary least squares (OLS) method. All our empirical tests have been carried out using the E-views econometrics package.

Price Equation Static and Dynamic Models: Monetarists prefer small-scale econometric models. Since the changes in the stock of money are dominant in explaining changes in nominal income, their focus is on the behaviors of the demand for real cash balances (George Macesich, 1983, p.184). The relationship between money and real output can be expressed in the form of a simple real money demand function on the assumption that the elasticity of price with respect to money is unity:-

$$(M_t / p_t)_D = \alpha Y R_t^{\beta} \quad (2)$$

Where M is nominal money stock, P is the price level, YR is the real income 'α' is constant, and 'β, is the income elasticity of demand for money. The equation 2 states that the quantity of real balance demanded $(M_t / p_t)_D = \alpha YR_t^{\beta}$ is a function of real income. The increase in real income necessitates an increase in the demand for real money balances and so long as money supply expands to this extent; there is no increase in the price level.

From the equation – (2), a price equation is formulated as follows:

$P_t = f(YR_t, M_t)$, ln

Taking natural logarithm on both sides of the equation – (2) we get

$$\ln M_t - \ln P_t = \ln\alpha + \beta \ln YR_t \quad (3)$$

Equation – (3) can be rearranged to obtain a price equation – (4) of the form

$$\ln P_t = -\ln\alpha + \ln M_t - \beta \ln YR_t \quad (4)$$

Where 'β' is the elasticity of price with respect to real income and also the income elasticity of demand for money assuming an unitary elasticity of price with respect to money (Rangarajan 1994, Sarma 1991 and Dhanasekaran 1995).

For the present study, the equation (4) can be restated in the form of following econometric models (equations 5 and 10)

$P = \beta_o X_1^{\beta_1} X_2^{\beta_2} e^u$ (5)

Where

P = price level

X_1 = Nominal Broad Money (M_3)

X_2 = real GDP

u = error term

According to this formulation, other things remaining constant, an increase in real output (real GDP) lowers the price level and an increase in money supply (M_3) raises the price level. That is the above equation assumes the following a priori hypothesis.

$$\lambda p / \lambda X_1 > 0 \; and \; \lambda p / \lambda X_2 < 0$$

In estimating the above equation (5), this article also considers partial adjustment model. The following equation has been used in a partial adjustment framework for the period 1970-71 to 2012-13.

Consider the following price equation

$$P_t^* = \beta_0 X_1^{\beta_1} X_2^{\beta_2} e^{\beta_3 D + u} \quad (6)$$

Where

P^* = Long run price level

X_1 = Nominal broad money (M_3)

X_2 = real GDP

D = dummy and

u = error term

A dummy variable (D) is included in the equation to take into consideration the effect of a special factor like new economic reform, dummy variable taking the value 1 in the pre-reform period (1970-71 to 1989-90) and 2 for the post reform period (1990-91 to 2012-13) which had an adverse impact on the price level.

For statistical evaluation, the equation (6) is expressed in logarithmic form as

$$\ln P^* = \ln\beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 D + u \quad (7)$$

Since the long run price level is not directly observable, let us consider the following partial adjustment hypothesis

$$\left(\frac{p_t}{p_{t-1}}\right) = \left(\frac{p^{*}_t}{p_{t-1}}\right)^{\lambda} \quad 0 \le \lambda \le 1 \quad (8)$$

In log form, equation (8) is expressed as

$$(\ln p_t - \ln p_{t-1}) = \lambda(\ln p_t^* - \ln p_{t-1}) \quad (9)$$

Substituting the equation (7) in the equation (9) and rearranging it without considering the dummy variable we obtain equation (10)

$$\ln p_t = \lambda \ln\beta_0 + \beta_1 \lambda \ln X_1 + \beta_2 \lambda \ln X_2 + (1-\lambda) \ln p_{t-1} + \lambda u \quad (10)$$

The equation (10) is the short-run price relationship with money and output. Once we estimate the short-run function (10) and obtain the estimate of the adjustment coefficient λ, from the coefficient of (ln P_{t-1}) we can easily derive the long-run function by simply dividing λ ln β_0, $\beta_1\lambda$, $\beta_2\lambda$, by λ and omitting the lagged P term which will give the equation (6).

A dummy variable (D) is included in the equation (10) to take into consideration the effect of a special factor - new economic reform; we obtain equation (11)

$$\ln p_t = \lambda\ln\beta_0 + \beta_1\lambda\ln X_1 + \beta_2\lambda\ln X_2 + \beta_3\lambda\ln D + (1-\lambda)\ln p_{t-1} + \lambda u \quad (11)$$

A dummy variable (D) is included in the equation to take into consideration the effect of special factor like new economic reform, pre-liberalization period(1970-71 to 1989-90) and post-liberalization period(1990-91 to 2012-13). Which had an adverse impact on the price level? The equation (11) is the short-run price relationship with money and output. Once we estimate the short-run function (11) and obtain the estimate of the adjustment coefficient λ, from the coefficient of (ln P_{t-1}) we can easily derive the long-run function by simply dividing λ ln β_0, $\beta_1\lambda$, $\beta_2\lambda$, $\beta_3\lambda$ by λ and omitting the lagged P term which will give the equation (6)

4. RESULT AND DISCUSSIONS

The equation (5) and (10) are estimated by the method of least squares. The results of the static modal (equation-5) are given below:

TABLE 2: REGRESSION RESULTS OF THE PRICE EQUATION – STATIC MODEL

VARIABLE	CO-EFFICIENTS	"t" VALUE	R^2	$\bar{R}_2$	F
Intercept ln β_0	5.474031*	7.5457	0.9956	0.9954	4580.819 *
ln x_1 BM	0.717653*	19.8301			
ln x_2 GDP	-0.782635*	-7.4351			

Source: computed by the author

* Significant at the one percent level
** Significant at the five percent level

The price equation, which regress P on broad money and real GDP in India, Clearly brings out the significant impact of rise in prices. The parameter estimates have the predictable signs and found to be significant. The money elasticity for price works out to be 0.72 implying that for a one percent increase in money supply, price would increase by 0.72. The output elasticity shows that for a one percent increase in real GDP there would be 0.78 percent decrease in prices.

The price equation has also been estimated in a partial adjustment framework the empirical results of the equation (10) are given below

TABLE 3: REGRESSION RESULTS OF THE PRICE EQUATION – DYNAMIC MODEL

VARIABLE	CO-EFFICIENTS	"t" VALUE	R^2	$\bar{R}_2$	F
Intercept ln β_0	1.8954*	2.6987	0.9980	0.9978	6383.116*
ln x_1 BM	0.2286*	3.1956			
ln x_2 GDP	-0.2593*	-2.5288			
ln p_{t-1}	0.6801*	7.2642			

Source: Computed by the author

* Statistically Significant at one percent level
** Statistically Significant at five percent level

The above results show that the estimated equation is in line with a priori and statistical criteria. That is all the regression coefficient of lnx_1,ln x_2 and ln p_{t-1} have the expected positive, negative and positive signs respectively. The long run elasticity's are obtained by dividing the regression coefficients by λ. The short-run and long-run elasticity's of price with respect to broad money and real GDP are given below.

The price equation has also been estimated in a partial adjustment framework the empirical results of the equation (11) are given below

TABLE 4: REGRESSION RESULTS OF THE PRICE EQUATION – INCLUDED (DMY) DYNAMIC MODEL

VARIABLE	CO-EFFICIENTS	"t" VALUE	R^2	$\bar{R}_2$	F
Intercept ln β_0	2.0052*	2.6987	0.9982	0.998	5133.908*
ln x_1 BM	0.2432*	3.4993			
ln x_2GDP	-0.2662*	-2.6865			
DMY	0.0495**	1.9347			
ln p_{t-1}	0.6288*	6.6731			

Source: Computed by the author

* Statistically Significant at one percent level
** Statistically Significant at five percent level

The Lagged price variable in this equation represents the influence of the past value's output and money supply on the current period price level. A dummy variable (DMY) is including regression coefficient is statistically significant consequently to take into consideration of the special effect factors like New Economic Reforms in 1991 which had an adverse impact on the price level. The above results show that the estimated equation is in line with a priori and statistical criteria. That is all the regression coefficients such as ln x_1, ln x_2, DMY and lnp_{t-1}have the expected negative and positive signs respectively. The long run elasticities are obtained by dividing the regression coefficients by λ. The short-run and long-run elasticities of price with respect to broad money and real GDP are given aside.

TABLE 5: SHORT-RUN AND LONG-RUN ELASTICITIES OF PRICE WITH RESPECT TO BROAD MONEY AND REAL GDP

PRICE	SHORT-RUN ELASTICITY OF PRICE WITH RESPECT TO		LONG-RUN ELASTICITY OF PRICE WITH RESPECT TO		IMPLIED INCOME ELASTICITY OF DEMAND FOR M_3
	BROAD MONEY	REAL GDP	BROAD MONEY	REAL GDP	
EQUATION: 10	0.2286	-0.2593	0.7146	-0.8106	1.1342
EQUATION:11	0.2432	-0.2662	0.6573	-0.7195	1.0945

Source: Computed by the author

The above table 5 shows that for a one percent rise in money supply, price would rise by 0.2286 in the short run and by 0.7146 in the long run. The results show that the long run price elasticity with respect to money is almost unity and the implicit income. Elasticity of demand for money works out to 1.1 i.e., (0.2593/0.2286=1.1342). A rise in real GDP by one percent would result in decrease of prices by 0.2593 in the short run and 0.8106 percent in the long run. When the log p_{t-1} is included in the equation, the goodness of fit of the model has improved. The price behavior is well explained by money supply and real GDP according to a partial adjustment mechanism. The coefficient of multiple determination (R^2=0.99) indicates that about 99 percent of the variation in the price level is explained by money supply and real GDP.

The above table: 5 equations 11 also show that for a one percent rise in money supply, price would rise by 0.2432 in the short run and by 0.6573 in the long run. The results show that the long run price elasticity with respect to money is almost unity and the implicit income. Elasticity of demand for money works out to 1 i.e.,(0.2662/0.2432.=1.0945) A rise in real GDP by one percent would result in decrease of prices by 0.2662 in the short-run and 0.7195 percent in the long run. When the log DMY is included in the equation, the goodness of fit of the model has improved. The price behavior is well explained by money supply and real GDP according to a partial adjustment mechanism. The coefficient of multiple determination (R^2=0.99) indicates that about 99 percent of the variation in the price level is explained by money supply and real GDP.

EQUATION- 10 like ln p= f (ln m3, ln GDP, ln p_{t-1}) (10)

TABLE 6: DISTRIBUTED LAG EFFECT ON PRICES OF A ONE PERCENT ONCE- FOR- ALL CHANGE IN THE EXPLANATORY VARIABLE (PERCENT)

	For a change in M3, GDP held constant			For a change in GDP, M3 held constant		
	P_t/GDP_t = Constant	$M3_t$	P_{t-1}	$P_t / M3_t$ = Constant	GDP_t	P_{t-1}
0	0	0	0	0	0	0
1	0.23	1	0	-0.259	1	0
2	0.16	0	0.23	-0.176	0	-0.259
3	0.1088	0	0.16	-0.1197	0	-0.176
4	0.074	0	0.1088	-0.0814	0	-0.1197
5	0.050	0	0.074	-0.0554	0	-0.0814

Source: computed by the author

EQUATION-11 like ln p= f(ln m3, ln GDP, ln p_{t-1},DV.) (11)

TABLE 7: DISTRIBUTED LAG EFFECT ON PRICES OF A ONE PERCENT ONCE- FOR- ALL CHANGE IN THE EXPLANATORY VARIABLE (PERCENT)

	For a change in M3, GDP held constant			For a change in GDP, M3 held constant		
	P_t/GDP_t= Constant	$M3_t$	P_{t-1}	$P_t / M3_t$ = Constant	GDP_t	P_{t-1}
0	0	0	0	0	0	0
1	0.24321	1	0	-0.2662	1	0
2	0.1529	0	0.24321	-0.1674	0	-0.2662
3	0.0961	0	0.1529	-0.1053	0	-0.1674
4	0.0604	0	0.0961	-0.0662	0	-0.1053
5	0.03797	0	0.0604	-0.0416	0	-0.0662

Source: computed by the author

The distributed lag effect on prices of a one percent once for all change in M3 and output (GDP) have been worked out from the two price equations. These are shown in tables 6 and 7. It is found that the lagged effects of a change in M3 and GDP are significant for about three years following the changes and peter out progressively in the subsequent years.

TABLE 8: ILLUSTRATION OF DISTRIBUTED LAG EFFECT OF THE INCREASE OF 16.089 PERCENT IN M3 DURING 2010-11 ON THE PRICE LEVEL IN SUCCEEDING YEARS WITH NO CHANGE IN OUTPUT PERCENT

YEARS	EQUATION-10	EQUATION-11
2010-11	0	0
2011-12	0.23 ×16.089 = 3.7005	0.24 × 16.089 = 3.9128
2012-13	0.16 ×16.089 = 2.5742	0.15 × 16.089 = 2.46
2013-14	0.11 × 16.089 = 1.7505	0.1 × 16.089 = 1.5462
2014-15	0.07 ×16.089 = 1.1906	0.06 × 16.089 = 0.9718
2015-16	0.05 ×16.089 = 0.8045	0.04 × 16.089 = 0.6114

Source: Computed by the author

Illustratively, M3 rose by 16.09 percent in 2010-11 other factors remaining constant, the effect of the rise in M3 would be felt on the price level at least in the next four to five years table 8. According to the first equation, it is estimated that the price would have risen by 3.7 percent in 2011-12, 2.6 percent in 2012-13, 1.75 percent in 2012-14, 1.19 percent in 2012-15 and 0.80 percent in 2015-16.

According to the second equation, price would have been raised by 3.9 percent in the 2011-12, 2.46 percent in 2012-13, 1.54 percent in 2012-14, 0.97 percent in 2012-15 and 0.61 percent in 2015-16.

TABLE 9: ILLUSTRATION OF DISTRIBUTED LAG EFFECT OF THE INCREASE OF 9.32 PERCENT IN GDP DURING 2010-11 ON THE PRICE LEVEL IN SUCCEEDING YEARS WITH NO CHANGE IN M3 PERCENT

YEAR	EQUATION-10	EQUATION-11
2010-11	0	0
2011-12	-0.259 × 9.32 = -2.4139	-0.2662 × 9.32 = -2.4810
2012-13	-0.176 × 9.32 = -1.6403	-0.1674 × 9.32 = -1.5602
2013-14	-0.1197 × 9.32 = -1.1156	-0.1053 × 9.32 = -0.9814
2014-15	-0.0814 × 9.32 = -0.7586	-0.0662 × 9.32 = -0.6170
2015-16	-0.0554 × 9.32 = -0.5163	-0.0416 × 9.32 = -0.3877

Source: Computed by the author

It is found that the lag effects of a change in GDP are significant for about three years following the change and peter out progressively in the subsequent years. Illustratively, GDP rise 9.32 percent in 2010-11, When other factors remaining constant, the effect of the rise in GDP would be felt on the price level at least in the next four to five years table:9.According to the first equation, it is estimated that the prices would have reduce by -2.4 percent in the 2011-12,-1.64 percent in 2012-13, -1.12 percent in 2013-14, -0.76 percent in 2014-15 and -0.52 percent in 2015-16.According to the second equation, price would have fall down by -2.48 percent in 2011-12, -1.56 percent in 2012-13,-0.98percent in 2013-14,-0.62 percent in 2014-15,-0.39 percent in 2015-16.

5. CONCLUSION AND POLICY IMPLICATIONS

The behavior of price in India is well explained by changes in money supply and real GDP. Monetary theories always indicate that an increased money supply in an economy often help to increase or moderate inflationary targets. The supply side of inflation is a key ingredient for the rising inflation in India and the parameter estimates of GDP carry expected negative sign in three equations. This indicates that an increase in GDP may positively influence the control of inflation in India. This study concluded that a rise in the growth rate of real output accompanied by a control of the money supply would reduce the price level.

1. One of the foremost measures should be adopted to increase the production of essential consumer goods like food, oil and vegetables.
2. Effort should also be made to increase productivity of all sector of the economy.
3. Government should reduce unnecessary expenditure on non- development activities.
4. The government should provide storage facilities for all types of editable goods in order to curb the seasonal variation of the products.
5. RBI should follow qualitative measures rather than quantitative measures in credit control measures.

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