Inflation Versus Prime Lending Rates: An Empirical Analysis

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Abstract

The inflation rate in our country increased significantly during the last six years. The Reserve Bank of India has been using high interest rate policies to contain the excessive instability and the excessive money supply in the economy. In this context, the present study has attempted to analyze the relationship between inflation rate and prime lending rate in India. The study was mainly limited to the prime lending rates of SBI and ICICI Bank. The time period of the study is from 2004 to 2011. For the purpose of analysis, the inflation rate was compared with the prime lending rates of SBI and ICICI Bank with the help of correlation, regression, and ANOVA tools. The analysis lead to the finding that for most of the years, inflation and prime lending rates of the 2 banks were negatively correlated. However, after testing the fit of the regression line, a conclusion was at arrived that there was no significant relationship between inflation rates and SBAR; whereas, there was a significant relationship between inflation rates and IBAR. Thus, the study tries to provide necessary guidance regarding the relationship between the inflation rates and the prime lending rates.

Keywords: ICICI benchmark advance rate, inflation, prime lending rates, state bank advance rate

JEL Classification: E31, E43, E52, E58

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Inflation is a rise in the general level of prices of goods and services in an economy over a period of time. Inflation can also be described as a decline in the real value of money - a loss of purchasing power in the medium of exchange, which is also the monetary unit of account and the monetary store of wealth. When the general price level rises, each unit of a currency buys fewer goods and services. A CPI is a measure of price inflation, which is the inflation rate, the annualized percentage change in a general price index (normally, the consumer price index) over time. It is important to note that some amount of inflation is actually desirable for the economy because of its relationship with employment and economic growth. However, too much inflation is not good for the economy. Rising inflation, an economic disease, has disturbed the minds of governments, economists, and the public as they feel the punch of inflation due to rise in price of all commodities. The rise in prices has made life miserable in India and other developing and poor countries (Rao & Naikwadi, 2010). However, a high rate of inflation is harmful for the growth of the economy, but its mild dose may be able to sustain high growth. There is a trade-off between inflation and growth (Maheshwari & Biyani, 2012).

Prime lending rate is the interest rate that commercial banks charge from their most credit-worthy customers. In banking parlance, BPLR means benchmark prime lending rate. Generally, a bank's best customers consist of large corporations (Reserve Bank of India, 2009). The prime rate is also important for retail customers, as the prime rate directly affects the lending rates which are available for mortgage, small businesses, and personal loans. The rate of interest a bank charges from its customers depends upon a number of factors like category of customers, schemes, advance amounts, and so forth. As there are numerous interest rates, a base rate is needed to make a relation between the different rates. So, a base rate, that is, a prime lending rate is evolved. It is the best rate a bank gives to its prime customers. All other rates of interest depend upon the prime lending rate, and it is usually noted by the bank, like 1% below the PLR or like 2% above PLR. Time to time, the bank announces only the PLR rate, but all other rates will change accordingly.

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In order to enhance transparency in banks' pricing of their loan products and also to ensure that the BPLR truly reflects the actual costs, banks should be guided by the following considerations while determining their benchmark PLR: Banks should take into account their (i) actual cost of funds, (ii) operating expenses, and (iii) a minimum margin to cover regulatory requirement of provisioning / capital charge and profit margin while arriving at the benchmark PLR. Banks should announce a benchmark PLR with the approval of their Boards. The benchmark PLR will be the ceiling rate for credit limit up to Rs.2 lakhs. All other lending rates can be determined with reference to the benchmark PLR arrived at by taking into account term premium and / or risk premium.

The theoretical as well as empirical relationship between the interest rate and inflation rate has been a debatable issue among economists. According to the Mundell-Fleming model, an increase in interest rate is necessary to stabilize the exchange rate depreciation and to curb the inflationary pressure and thereby helping to avoid many adverse economic consequences. The high interest rate policy is considered important for several reasons. Firstly, it provides information to the market about the authorities' resolve not to allow sharp exchange rate movement that the market expects, given the state of the economy, and thereby reduce the inflationary expectations and prevent the vicious cycle of inflation and exchange rate depreciation. Secondly, it raises the attractiveness of domestic financial assets as a result of which, capital inflow takes place and thereby limits the exchange rate depreciation. Thirdly, it not only reduces the level of domestic aggregate demand, but also improves the balance of payment position by reducing the level of imports.

Our Indian government gets involved in it to control inflation by adjusting the level of money in our economic system. The most noticeable way to increase the money flow in the system is to print more currency, and then the rupees will become more relative to goods. Inflation is an autonomous occurrence that is impacted by money supply in an economy. The Central government uses interest rates to control money supply and consequently, the inflation rate. When the interest rates are high, it becomes more expensive to borrow money and savings become attractive (Ramahi, 2010). When the interest rates are low, banks are able to lend more, resulting in an increased supply of demand. The central bank of the country alters interest rates with the broader purpose of stabilizing the national economy. Investors need to keep a close watch on interest and inflation to ensure that the value of their money increases over time.

Objectives of the Study

- 🤝 To investigate whether a relationship exists between inflation rates and the prime lending rates in India,
- To assess whether this relationship is significant or not,
- To explore whether and how far the interest rate depreciates or appreciates due to an increase in inflation rate and vice versa.

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Review of Literature

The review of literature of the study is a structure that can hold or support a theory of a research work. Many authors in the developing countries have carried out several studies on inflation and on the impact of interest rate on economic and monetary policies. Studies relevant to the topic of research are reviewed and the concept of each work is summarized in it.

Choudhri and Hakura (2006) argued that the pass-through problem does not only affect inflation alone, it is also related to the effectiveness role played by exchange rate as a shock absorber. The study extended the concept of effectiveness of nominal exchange rate as a shock absorber in inflation targeting regime. In other words, exchange rate will act as an effective shock absorber if pass-through into domestic prices leads to depreciation in real exchange rates. Hence, the expenditure switching effect is witnessed. Gul and Ekinci (2006) analyzed empirically the relationship between nominal interest rates and inflation in the Turkish economy using high-frequency data of nominal interest rate and inflation. The co-integration results provided evidence of a unique co-integrating vector, that is, a long-run stable relationship. This means that nominal interest rates and inflation move together in the long-run. Monetary policy for any country plays a key role in its overall economic growth. It achieves this goal by targeting monetary aggregates (broad money supply growth as an intermediate target and reserve money as an operational target) in accordance with real GDP growth and inflation targets set by the Government. Qayyum (2006) investigated the linkage between excess

money supply growth and inflation in Pakistan. Also, he examined that is inflation a monetary phenomenon? His results from the correlation analysis indicated that there is a positive association between money growth and inflation. He observed that the money supply growth in the first-round affects real GDP growth and in the second round, it affects inflation in Pakistan. The important finding from the analysis is that excess money supply growth has been an important contributor to the rise in inflation in Pakistan during the study period. This supports the monetarist proposition that inflation in Pakistan is a monetary phenomenon.

Adolfson (2007) found that the lack of credibility of monetary authority may lead to an exchange rate volatility problem. The author argued that many emerging countries that officially announce themselves to be free floaters are, in fact, managed exchange rate regimes. This problem is known as fear of floating. The reason is that they are reluctant to allow their currencies to float. Under these circumstances, the monetary authority is likely to place additional constraints on emerging-market countries' monetary policies by smoothing the exchange rate floating. Hossein, Kohnehshahri, and Karami (2007) stated that high interest rates have been an essential component of many stabilization programs in countries with chronic inflation during the 1980s. The results of the study showed a unidirectional causality from interest rate to inflation rate in 40 Islamic countries. The findings presented practical policy implications for decision makers in the area of macroeconomic planning, particularly for Islamic countries. The results implied that banks must reduce interest rates to decrease inflation.

Leduc, Sill, and Stark (2007) presented evidence on the impact of expectation shocks to oil prices, fiscal policy, and monetary policy. The tightening of monetary policy causes both inflation and short-term expectations to fall, inflation more so than expectations. An expectations shock has only temporary effects on inflation. According to Clark and Davig (2008), shocks to inflation cause both short- and long-term expectations to rise. Other factors such as monetary policy, economic activity, and food price inflation also affect expectations and inflation. Ayodele and Idowu (2010) found that interest and inflation rates were non-stationary at levels. The paper concluded that proper control of interest rates by the monetary authority could sustain price stability in Nigeria. The relationship between inflation targeting regime and exchange rate regime led some analysts to conclude that one of the costs of inflation targeting adoption is the increase in exchange rate volatility. However, some studies show that the adoption of a free-floating exchange rate does not necessarily imply increased effectiveness of nominal and real exchange rate floating. Su and Huang (2010) argued that inflation targeting would lead to higher exchange rate volatility. Irfan and Amen (2011) conducted a study and discovered how much money supply, interest rate, and inflation impacted the overall growth of GDP in Pakistan. The study proved that interest rate has a minor relationship with GDP, but the growth in money supply greatly affects the GDP of an economy. Furthermore, various unknown factors also affect the GDP.

Jha and Dang (2011) revealed that (1) for developing countries, there is a significant evidence to suggest that when the rate of inflation exceeds 10%, inflation variability has a negative effect on economic growth, (2) for developed countries, there is no significant evidence that inflation variability is detrimental to growth. Sek, Ooi, and Ismail (2012) conducted an empirical analysis on the relationship between exchange rate flexibility/ regime and monetary policy of inflation targeting in several emerging and developed economies. Applying a multivariate GARCH model, the results show significant correlation between exchange rate movements and inflation and output movements in both sub-periods. IT also has a significant impact on the movements of inflation, output, and exchange rate. IT is associated with higher volatility in exchange rate movement in majority of the economies. The implementation of IT does not lead to trade off of inflation-output in Asia, but the trade-off relationship is detected in developed economies.

Research Methodology

The study is mainly based on historical research design, which used historical data for eight years starting from 2004 to 2011 for analysis. The study is limited to the prime lending rates (PLR) of two banks, which includes state bank advance rate (SBAR) of State Bank of India and ICICI benchmark advance rate (IBAR) of ICICI Bank. The study mainly uses secondary data for the analysis of the relationship between inflation rates and prime lending rates. Data related to inflation was mainly collected from the websites of Reserve Bank of India and statistical departments. The various prime lending rates have been collected from the websites of the respective commercial banks like SBI and ICICI. For the analysis of the data collected from the secondary sources, various statistical measures were used in different contexts.

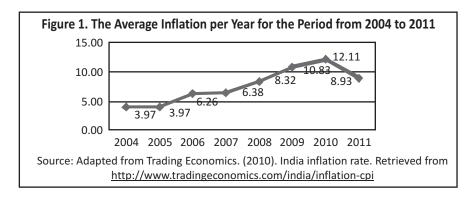
Hypotheses

- ♥ Ho₁: There is no significant linear relationship existing between inflation rates and SBI prime lending rates.
- 🔖 HO,: There is no significant linear relationship existing between inflation rates and ICICI prime lending rates.
- Time Period of the Study: The period of the study is for eight years from 2004 to 2011. The inflation rates and prime lending rates of SBI and ICICI for these periods were considered for the study.

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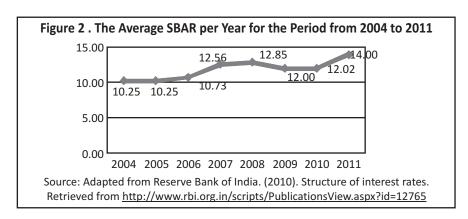
Analysis and Results

For the purpose of analysis, data were collected from various relevant secondary sources. Inflation rate is selected as the *X* variable and prime lending rates are selected as the *Y* variable. For arriving at a generalized conclusion, PLR of both the private sector and public sector banks are considered. For this, PLR of State Bank of India and PLR of ICICI were collected and analyzed separately. PLR of SBI is known as SBAR - State Bank advance rate and PLR of ICICI Bank is known as IBAR - ICICI benchmark advance rate. Data were collected on a monthly basis for eight years starting from 2004 to 2011. Thus, for each variable, there are 96 monthly rates. The monthly data were grouped together for arriving at the average yearly data and there are eight average yearly rates for each variable.

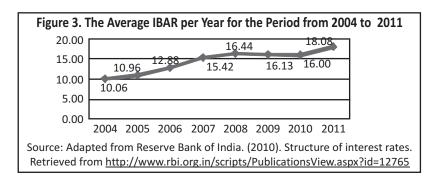


The Figure 1 represents the average inflation for eight years. Starting at the rate of 3.97% in the year 2004, average inflation was in a stable position up to 2005. Then, it began to rise. In 2006, average inflation was 6.26%, and it increased to 6.38% in 2007, reached a figure of 8.32% in 2008, and attained a value of 10.83% in 2009. It was seen at its peak during the year 2010, when it stood at the rate of 12.11%, and showed a considerable decline to 8.93% in the next year 2011. The average inflation per year showed an increasing trend for eight years, with an exception of the year 2011, when the rate of inflation showed a decline.

From the Figure 2, it can be inferred that the average SBAR per year was stable at 10.25% in the first two years starting from 2004 to 2005. It began to rise in the year 2006 and reached 10.73%. It again increased to 12.56% in 2007



and to 12.85% in 2008. It showed a decline in 2009 and was stagnant at 12.02% in 2010. Suddenly, the rate increased to 14% in the year 2011. Thus, the average SBAR was highest at 14% in the year 2011 and was lowest at 10.25% in the year 2004. From the Figure, it is clear that the average SBAR per year shows a fluctuating trend for the past eight years.



The Figure 3 shows that average IBAR of 10.06% in the year 2004 is the minimum average rate for eight years. But thereafter, it began to rise and reached an average rate of 10.96% in 2005, 12.88% in 2006, 15.42% in 2007, and 16.44% in 2008. Then, for the next two years, it showed a decline and fell to 16.13% in 2009 and 16% in 2010. During 2011, it increased greatly and reached its maximum average rate at 18.08%. The Figure clearly depicts the increasing trend of the average IBAR per year for eight years starting from 2004 to 2011.

Analysis of the Relationship Between Inflation and Prime Lending Rates: Correlation and regression methods were used to estimate the relationship between inflation and SBAR and between inflation and IBAR. In order to find out whether the relationship is significant or not, testing of the fit of the regression model was done with the help of ANOVA.

Table 1. Correlation Between Inflation Rate V/s SBAR & IBAR

Year	2004	2005	2006	2007	2008	2009	2010	2011
Inflation & SBAR	0	0	0.698	-0.399	0.622	-0.849	-0.884	-0.079
Inflation & IBAR	0.234	-0.245	0.782	-0.439	0.852	-0.682	-0.814	-0.058

Source: Adapted from Trading Economics. (2010). India inflation rate. Retrieved from

http://www.tradingeconomics.com/india/inflation-cpi & from Reserve Bank of India. (2010). Structure of interest rates. Retrieved from http://www.rbi.org.in/scripts/PublicationsView.aspx?id=12765

♦ Correlation Between SBAR and Inflation, and Between IBAR and Inflation: The Table 1 shows the correlation between inflation and SBAR calculated on the basis of monthly data. For 2004 and 2005, the correlation is zero. But the correlation is positive correlation for two years - it is 0.698 for 2006 and 0.622 for 2008. Apart from these, in all the other years, inflation and SBAR are negatively correlated. Among these, two years have a high degree of negative correlation, which is -0.849 for 2009 and -0.884 for 2010. The correlation coefficient calculated on the basis of the monthly data gives a mixed relationship, including positive, negative, and zero correlation. Among these, two years have a high degree of negative correlation, and two years have a low degree of negative correlation. There is positive correlation for the year 2006 and 2008.

From the above discussion, it is clear that inflation and SBAR were moving in the opposite direction for most of the years. It means that whenever there is an increase in the inflation rate, instead of increasing, SBAR shows a declining trend. This resulted in the expansion of money supply in the economy, which in turn lead to inflation in the year 2009, 2010, and 2011. Therefore, SBAR has not helped much in controlling inflation in the Indian economy. The Table 1 also shows correlation between inflation and IBAR calculated on the basis of monthly data. There is a high degree of negative correlation for 2010 at -0.814 and low degree correlation for three years, which is -0.245 for 2005, -0.439 for 2007, and -0.682 for 2009. There is a positive correlation only for three years, which is 0.234 for 2004, 0.782 for 2006, and 0.852 for 2008. From the Table 1, it can be inferred that even though a mixed trend is observed in case of the relationship between inflation and IBAR, for most of the years, it is negatively correlated. To be precise, in case of

exactly five out of eight years, inflation and IBAR are negatively correlated. There is a positive correlation only for three years: 2004, 2006, and 2008. Among these 3 years, 2006 and 2008 have a high degree of positive correlation.

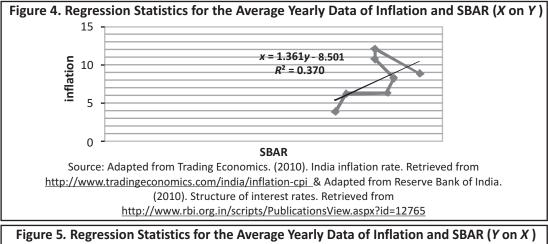
Basically, the rate of inflation can be controlled by increasing the interest rates which will lead to the contraction of money supply in the economy. But here, for most of the years, IBAR has decreased without considering the increase in the inflation rate. This showed the way to more money supply in the economy and thereby, increased the rate of inflation in the year 2009 to 2011. Thus, IBAR was of no assistance in curtailing inflation. This negative correlation between inflation and IBAR might have resulted in an increase in the rate of inflation.

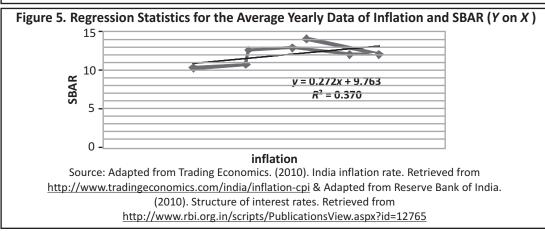
 $\$ Regression Analysis of Inflation Rate and SBAR: The Figure 4 shows the regression equation of x on y: -X=1.361Y- 8.501. Regression equation X on Y gives the most probable values of X-inflation for the given values of Y - SBAR. Slope of the curve is 1.361, which shows the change in X for per unit change in Y. This implies that whenever there is a change in the SBAR, it will lead to a per unit change of 1.361 in the inflation rate.

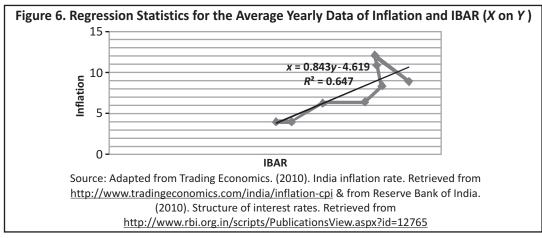
The Figure 5 shows the regression equation of y on x: - Y = 0.272X + 9.763. Regression equation Y on X gives the most probable values of Y-SBAR for the given values of X-inflation. Slope of the curve is 0.272, which shows that one-unit change in the inflation rate will lead to 0.272 unit of change in the SBAR.

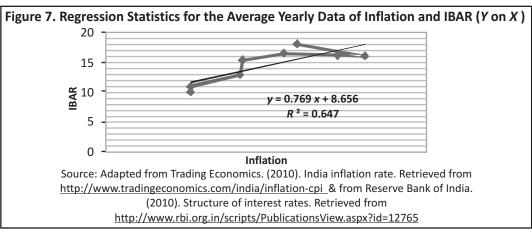
-X = 0.843Y - 4.619. Regression equation X on Y gives the most probable values of X-inflation for the given values of Y-IBAR. From the equation, slope of the curve is 0.843, which shows the change in X for per unit change in Y. It shows that whenever there is a change in the IBAR, it will lead to a per unit change of 0.843 in the inflation rate.

The Figure 7 depicts the regression equation of y on x: -Y = 0.769 X + 8.656. Regression equation Y on X gives the most probable values of Y-IBAR for the given values of X-inflation. As per the equation, slope of the curve is 0.769, which shows the change in Y for per unit change in X. From this, it is clear that one unit change in the inflation rate will lead to 0.769 unit of change in the IBAR.









Testing the Significance of the Relationship Using ANOVA

For analyzing the relationship between two variables, the best way is to assume that a linear relationship exists between them and to make a linear regression based upon the regression equation. In this way, two regression equations are formed in between PLR and inflation. Therefore, the next step is to measure the fit of these regression lines. The test focuses on the slope of the regression line. $Y = B_0 + B_1 X$

(i) Testing the Significance of the Relationship Between Inflation and SBAR

H_0 : β_1 =0 (There is no significant linear relationship existing between inflation and SBAR.)

From the Table 2 (ANOVA table), the test statistics is calculated as 3.47. Compare it with the table value of 5.99, which is calculated on the basis of degrees of freedom 1 as 1 and degrees of freedom 2 as 6 @ 5% level of significance. Since the calculated value is lower than the table value, H₀ is to be accepted.

 $\$ Decision - Accept H₀: β_1 = 0: There is no significant linear relationship existing between inflation and SBAR.

(ii) Testing the Significance of the Relationship Between Inflation and IBAR

H_a: $\beta_1 = 0$ (There is no significant linear relationship existing between inflation and IBAR.)

From the Table 3 (ANOVA table), the test statistics is calculated as 11.05. Compare it with the table value of 5.99, which is calculated on the basis of degrees of freedom 1 as 1 and degrees of freedom 2 as 6 @ 5% level of significance. Since the calculated value is greater than the table value, H_a is to be rejected and H_a is to be accepted.

Table 2. ANOVA Table

	Sum of Squares	Degrees of Freedom	Mean of Squares	F Statistics
Regression	SSR = 4.57	k = 1	MSR=4.57	MSR/MSE
Residual	SSE =7.90	n- k -1 = 16	MSE=1.317	3.47
Total	SST =12.47	7		

Source: Adapted from Trading Economics. (2010). India inflation rate. Retrieved from

http://www.tradingeconomics.com/india/inflation-cpi & from Reserve Bank of India. (2010). Structure of interest rates. Retrieved from http://www.rbi.org.in/scripts/PublicationsView.aspx?id=12765

Table 3. ANOVA Table

	Sum of Squares	Degrees of Freedom	Mean of Squares	F Statistics
Regression	SSR=37.08	<i>k</i> =1	MSR=37.08	MSR/MSE
Residual	SSE=20.14	n-k-1=6	MSE=3.357	11.05
Total	57.22	7		

Source: Adapted from Trading Economics. (2010). India inflation rate. Retrieved from

http://www.tradingeconomics.com/india/inflation-cpi & from Reserve Bank of India. (2010). Structure of interest rates. Retrieved from http://www.rbi.org.in/scripts/PublicationsView.aspx?id=12765

becision - Accept H₁: β₁ 0: There is a significant linear relationship existing between inflation and IBAR.

Findings

- 1) The average inflation and the average IBAR per year showed an increasing trend for eight years, while the average SBAR per year showed a fluctuating trend.
- 2) For most of the years, inflation and SBAR are negatively correlated. Since inflation and SBAR were moving in the opposite direction, SBAR has not been of much help in controlling inflation in the economy.
- 3) Inflation and IBAR are negatively correlated in 5 out of 8 years, and hence, IBAR was also not of much assistance to curtail inflation.
- 4) From the regression analysis of the yearly average inflation rate and SBAR, two regression equations are formed.
- (i) Regression equation of X on Y: X = 1.361Y 8.501, and (ii) Y on X: Y = 0.272X + 9.763
- 5) From the regression analysis of the yearly average inflation rate and IBAR, two regression equations are formed.
- (i) Regression equation of x on y: -X = 0.843 Y 4.619, and (ii) Regression equation of y on x: -Y = 0.769 X + 8.656
- 6) A change in the SBAR will lead to a per unit change of 1.361 in the inflation rate.
- 7) One unit change in the inflation rate will lead to 0.272 unit change in the SBAR.
- 8) A change in the IBAR will lead to a per unit change of 0.843 in the inflation rate.
- 9) One unit change in the inflation rate will lead to 0.769 unit change in the IBAR.
- **10)** There is no significant linear relationship existing between inflation rate and SBAR.
- 11) There is a significant linear relationship existing between inflation rate and IBAR.

Suggestions

The management of inflation cannot be reduced to a scientific problem which can be solved by a predetermined formula. Inflation control needs different measures depending upon its nature and causes.

- The inflation target policy of the government would only be feasible if interest rate is fixed earlier. There should be a regular check/control of the domestic interest rates that would put inflation under control.
- If the government depends only on increasing the CRR and other interest rates, it becomes difficult for the farmers and small scale sectors to get loans. Therefore, the government should make proper arrangements to access the required finances for these groups of people, notwithstanding the high interest rates. Otherwise, it will hamper these productive areas of the economy.
- Banks may also choose to raise the interest on deposit accounts. With higher deposit interest rates, people might think twice about spending and simply decide to save money. By saving, the supply of money in the market becomes limited.
- \$\text{\$\text{\$\text{\$}}\$ The government would also have to play an important role in controlling inflation without harming economic growth. The governments at the Centre and the States should ensure that the prime lending rates of all the banks are in tune with the inflation in the economy. Also, they should take urgent action to make adequate credit available at competitive interest rates and offer other incentives to the primary sectors.
- \$\text{\text{The banks should try to make their prime lending rates more flexible according to the changes in the inflation rates, especially the public sector banks. Then only they can act as an effective tool for controlling the inflation in the economy.

Conclusion

Inflation is a rise in the general price level of goods and services in an economy over a period of time. However, the changes in interest rate policy were found to be effective in stabilizing the inflation rate. In other words, an increase in the inflation rate has prompted the monetary authorities and financial institutions to raise interest rates on loan and it becomes more expensive to borrow money and savings become attractive. This will reduce the money supply, and in turn, this reduces inflation. If the interest rates are lowered, banks are able to lend more, it will lead to excessive supply of money in the economy, which will in turn lead to inflation. Therefore, both the inflation rate and interest rate affect each other.

It is concluded from the present study that the efforts by the Indian government in curtailing and stabilizing prices in the economy would fail if interest rates are not put under control. Definitely, the government should try to check inflation in the country, and at the same time, the banks should try to make their lending rates more flexible. This would go a long way in achieving price stability in the country.

Research Implications

The adoption of inflation-targeting has placed an increased importance on developing accurate expected inflation forecasts. This has prompted an increase in the number of inflation expectation time series available for use in future empirical econometric studies. The results of the study have important policy implications for both domestic policy makers and development partners, implying that controlling interest rates is a necessary condition for monitoring inflation and thereby promoting economic growth. This study is useful for banks as well as for the investors. It will help the banks to frame strategies to manage, plan, and monitor their interest rates for getting maximum returns. This will help the depositors as they can realize the relation between inflation and interest rates, and thereby, they can plan their investments properly. Also, it is helpful to the borrowers as it helps them to forecast the decline in the lending rates and they can take advantage of this opportunity. Due to the crucial role played by expectations of future inflation in all policy decisions, further insight into the dynamics of inflationary expectations will provide valuable information for monetary authorities.

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