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An Empirical Analysis of the Impact of Money Supply and Monetary Policy on Inflation in India: Evidence from Time Series Data

Mahak Panjwani

Postgraduate Student, Department of Economics,
Guru Ghasidas Vishwavidyalaya (A Central University), Bilaspur, Chhattisgarh, India

ABSTRACT

The price instability has been a persistent problem in the emerging economies. With rising curiosity regarding true drivers of inflation and motivated by the ongoing debates this study examines how Money supply (M1) and Repo rate shape inflation in India. The research includes evidence from the era after Central Bank (RBI) began formally targeting inflation. The research answers the question of which is a more powerful tool for managing prices: controlling the money supply or changing the interest rate. This study addresses a research gap in the existing literature for India, which often presents mixed empirical findings. The primary objective is to evaluate whether liquidity expansion (controlling the money supply) or policy rate adjustments (changing interest rates) exerts a stronger influence on consumer price inflation (CPI). The research methodology employs an econometric modelling framework, specifically multiple regression analysis using monthly secondary data collected from 2013 to 2025. This approach assesses the monetary variables and their impact on inflation. The analysis reveals that the narrow money supply (M1) has a strong and significant effect on inflation. In contrast, the Repo Rate does not display a meaningful influence, highlighting the dominance of liquidity conditions over interest-rate.

Overall, these findings imply that inflation in India is more sensitive to monetary expansion than to policy-rate changes. The research adds value by refining the existing empirical understanding of India's monetary dynamics and supports the need for strengthened transmission mechanisms within the central bank's operational framework.

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INTRODUCTION

Inflation continues to be one of the most persistent macroeconomic challenges for emerging economies like India, influencing household welfare, investment decisions, and long-term growth trajectories (**Rangarajan & Mohanty, 1997**). Understanding its determinants is essential because inflation affects both price stability and macroeconomic planning, making it a central focus of monetary authorities such as the Reserve Bank of India (RBI) (**Patra & Kapur, 2012**). Among the various drivers of inflation, monetary indicators particularly money supply (M1) and the policy interest rate have attracted sustained academic and policy interest. Classical monetary theorists argue that inflation is primarily driven by increases in money supply (**Friedman, 1968**). The introduction of the systematic, rule-based approach formalized by **Taylor (1993)**, known as the "Taylor Rule," fundamentally influenced modern monetary policy thinking worldwide. However, empirical findings applying these modern frameworks within the specific context of India have remained mixed, indicating a significant gap in current understanding.

Early theoretical contributions to monetary policy were heavily influenced by the monetarist school, asserting that persistent increases in the money supply directly cause corresponding increases in price levels **(Friedman, 1968; Cagan, 1958)**. These foundational models shaped initial empirical research directions but faced criticism for neglecting institutional

constraints and structural factors prevalent in developing economies. Subsequent theoretical work, notably by **Sargent and Wallace (1975),** marked a departure by placing greater emphasis on rational expectations and central bank policy credibility, moving beyond purely mechanical relationships. Methodologically, early studies often relied on simple static models, which, while useful for establishing broad associations, proved inadequate for analysing economies undergoing significant structural transitions. As global financial systems modernized during the 1990s and 2000s, the focus of the literature shifted toward interest-rate-based policy frameworks.

Money supply (M1), defined as currency with the public plus demand deposits, serves as a crucial short-term indicator of liquidity conditions (**RBI, 2023**). In contrast, the Repo Rate acts as the RBI's principal monetary policy tool for influencing borrowing costs and regulating inflation through the interest-rate channel (**Mishra & Montiel, 2012**). Despite wide theoretical consensus, empirical studies in India demonstrate inconsistent findings: some highlight strong monetary influences on inflation (**Narasimhan & Sharma, 2011**), while others point to weak or delayed policy-rate effects due to structural rigidities (**Aleem, 2010**). This divergence underscores the importance of re-examining inflation dynamics using updated data and robust time-series techniques.

The period from 2013 to 2025 is particularly relevant because it encompasses major economic events such as inflation-targeting reforms, liquidity-driven expansion, and post-pandemic monetary adjustments that have reshaped the interaction between money supply and consumer prices (**Goyal, 2020**). Therefore, analysing how fluctuations in M1 and the Repo Rate influence Consumer Price Inflation (CPI) during this period is vital for strengthening policy insights and understanding the evolving nature of monetary transmission in India. By drawing upon secondary monthly data and econometric modelling, the present study aims to provide a clearer empirical understanding of the relative strength of monetary aggregates and interest-rate policy in shaping inflation behaviour.

LITERATURE REVIEW

The evolution of monetary policy and inflation research in India presents a diverse and sometimes contradictory body of evidence, making it essential to examine existing studies to understand how scholarly thinking on this subject has developed over time. Unlike many macroeconomic topics where consensus gradually emerges, the relationship between monetary indicators and inflation in India has remained contested, with researchers reaching different conclusions depending on the period studied, the dataset used, and the methodological lens applied (Balakrishnan & Parameswaran, 2007). This diversity of perspectives makes the topic worth reviewing, especially because monetary transmission in India operates within a complex environment shaped by structural rigidities, administered prices, and liquidity fluctuations (Kapur & Patra, 2016). The literature also reveals gaps: while some studies analyse monetary aggregates in isolation, others focus exclusively on interest-rate channels, and only a limited number examine both M1 and the Repo Rate together within unified empirical models. Key concepts explored in existing research include monetary aggregates such as M1, which reflect the liquidity conditions of the economy (RBI, 2022), and the policy rate, which signals the stance of monetary tightening or easing (Mohanty, 2014). In organising this review, the discussion proceeds chronologically from foundational theories to contemporary empirical work followed by a synthesis and evaluation that highlights methodological patterns and inconsistencies. The scope of the review includes classical international contributions as well as India-specific studies, ensuring a comprehensive understanding of how the field has shifted across decades.

In the Indian context, however, empirical findings were mixed. Studies such as Singh and Kalirajan (2003) found that the transmission of policy rates to inflation is often weak and characterised by long lags, reflecting the dominance of informal credit markets and rigidities in banking channels. These works frequently employed Vector Auto Regression (VAR) models, offering dynamic insights but showing that interest-rate changes do not always translate into immediate price adjustments in India. This mismatch between theoretical expectations and empirical realities marked a turning point in Indian inflation research.

With greater data availability and improved econometric techniques after 2010, scholarly attention shifted back toward understanding the joint and comparative effects of money supply and policy rates. Narasimhan and Sharma (2011), using Johansen cointegration, demonstrated the long-run influence of monetary aggregates on inflation. Chattopadhyay (2014) similarly highlighted the strength of money supply shocks using Error-Correction Models. In contrast, studies conducted during and after India's adoption of inflation targeting argued that interest-rate signals gained relevance, though their influence often remained secondary to liquidity conditions (Patra & Mishra, 2016) . Aleem (2010), employing

Structural VAR, observed that the transmission mechanism in India is dominated by liquidity channels rather than the Repo Rate. More recent research by Goyal and Arora (2020) integrated both variables into a unified framework and found that money supply continues to exert a stronger and more immediate effect on price levels, while the Repo Rate influences inflation only weakly or with long delays. These findings collectively illustrate that Indian inflation dynamics are uniquely shaped by liquidity sensitivity and structural features of the economy.

A comparison of methodologies across studies shows that the choice of model strongly affects the conclusions drawn. Long-run equilibrium models such as ARDL and cointegration are more likely to detect strong relationships between money supply and inflation (Narasimhan & Sharma, 2011), whereas short-run VAR and SVAR frameworks highlight the limited pass-through of interest rates (Aleem, 2010). Mixed-approach studies offer a more balanced view but suffer from challenges such as multicollinearity and sensitivity to structural breaks (Goyal, 2020). Many empirical works also exclude major economic events such as demonetisation or the COVID-19 pandemic, reducing their contemporary relevance. These methodological limitations reinforce the importance of updated studies using longer datasets and integrated models.

Overall, the reviewed literature shows that although both money supply and the policy rate shape inflation, their influence is uneven in the Indian context, with monetary aggregates often demonstrating greater explanatory power. The diversity of findings underscores the need for comprehensive time-series analysis covering periods of significant policy change and economic shocks. The present study fills this gap by investigating the combined effects of M1 and the Repo Rate on inflation using monthly data from 2013 to 2025, thereby contributing updated empirical evidence to a field characterised by mixed conclusions and evolving dynamics.

RESEARCH OBJECTIVES

1. To examine the relationship between money supply (M1) and consumer price inflation (CPI) in India.
2. To analyse the effect of the Reserve Bank of India's policy rate (Repo Rate) on inflation.

NULL HYPOTHESES

1. There is no significant effect of money supply (M1) on consumer price inflation in India.
2. There is no significant effect of Repo Rate on consumer price inflation in India.

RESEARCH METHODOLOGY

This study adopts a quantitative and analytical research design to examine the impact of money supply (M1) and the Repo Rate on consumer price inflation (CPI) in India. The analysis is based entirely on secondary monthly time-series data obtained from the Reserve Bank of India's Database on Indian Economy (DBIE), covering the period from January 2013 to September 2025. These data series for CPI (Combined), M1, and Repo Rate were collected, cleaned, and arranged chronologically before analysis. The variables include CPI as the dependent variable, while M1 and Repo Rate serve as the independent variables. The study aims to test two null hypotheses: (i) that money supply has no significant effect on consumer price inflation, and (ii) that the Repo Rate has no significant effect on inflation. To investigate these relationships, descriptive statistics were first used to understand the basic characteristics of the data. Time-series properties of the variables were examined through stationarity checks such as the Augmented Dickey–Fuller test, and necessary transformations were considered to ensure the suitability of the regression model.

A multiple linear regression model was employed to quantify the effect of M1 and Repo Rate on CPI, expressed as:

$$CPI_t = \beta_0 + \beta_1(M1_t) + \beta_2(Repo\ Rate_t) + \varepsilon_t.$$

This model allows estimation of both the magnitude and statistical significance of each predictor. The regression analysis was complemented with diagnostic tests to ensure the validity of the Ordinary Least Squares (OLS) assumptions, including checks for autocorrelation, heteroscedasticity, multicollinearity, and normality of residuals. The significance of individual coefficients was assessed using t-tests, while the overall reliability of the model was evaluated through the F-statistic from the ANOVA table. Hypotheses were tested at the 5 percent significance level, where p-values less than 0.05 led to rejection of the null hypothesis.

The analysis was conducted using SPSS, ensuring accuracy in estimation and interpretation. As the study relies solely on publicly available RBI data without involving human subjects, it adheres to all standard academic ethical norms. Overall, the chosen methodological approach—secondary data, monthly frequency, and econometric modelling—provides a strong empirical foundation to understand how monetary indicators have influenced inflation in India during the period 2013–2025.

DATA INTREPRETATION AND HYPOTHESIS TESTING

The present regression analysis, based on monthly time-series data sourced from the **Reserve Bank of India's Database on Indian Economy (DBIE)** for the period **January 2013 to September 2025**, offers a comprehensive understanding of how key monetary indicators influence consumer price inflation (CPI) in India.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.988[a]	.976	.976	4.170
a. Predictors: (Constant), Repo Rate, M1				

Table 2: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	107327.146	2	53663.573	3086.626	.000[b]
	Residual	2607.876	150	17.386		
	Total	109935.021	152			
a. Dependent Variable: CPI Combined						
b. Predictors: (Constant), Repo Rate, M1						

Table 3: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	80.960	2.607		31.053	.000
	M1	1.715E-005	.000	.994	68.754	.000
	Repo Rate	.271	.321	.012	.843	.400
a. Dependent Variable: CPI Combined						

The model summary reflects an exceptionally strong statistical fit, with an R value of 0.988 and an R Square of 0.976, indicating that **97.6 percent of the fluctuations in CPI** are explained by movements in money supply (M1) and the Repo Rate during the study period. This suggests that the selected monetary variables are highly capable of capturing inflation dynamics in the Indian economy. The reliability of this regression model is further affirmed by the ANOVA results, where the F-statistic is remarkably high (F = 3086.626) and accompanied by a significance value of 0.000. This confirms that the model is statistically significant at the 1 percent level, meaning that, collectively, M1 and Repo Rate have a strong influence on CPI and the probability that these results occurred by chance is virtually zero. The Standard Error of Estimate (4.170) also indicates that the model's residuals are relatively small compared to the scale of CPI values, supporting the high accuracy of predictions.

A deeper examination of the regression coefficients provides clear insights into the individual influence of each variable. The coefficient for M1 is positive (B = 1.715E-005) and highly statistically significant, with a very large standardized beta of 0.994 and an extraordinary t-value of 68.754. The significance level (p = 0.000) strongly rejects any possibility that this effect is due to randomness. This implies that increases in money supply consistently and significantly contribute to higher consumer prices over the period from 2013 to 2025. Therefore, the first null hypothesis, **$H1_0$: "There is no significant effect of money supply (M1) on consumer price inflation in India,"** is **rejected**. The findings show that monetary expansion—reflected in increases in broad money supply—has been a dominant determinant of inflation, highlighting the sensitivity of price levels to liquidity conditions in the Indian economy.

In contrast, the coefficient for Repo Rate, though positive (B = 0.271), is statistically insignificant, as evidenced by its low standardized beta (0.012), modest t-value (0.843), and a high p-value (0.400), which is well above the conventional 0.05 threshold. This indicates that, within this dataset spanning more than a decade, changes in the policy interest rate did not have a meaningful or consistent impact on consumer inflation when the effect of money supply is already accounted for. Hence, the second null hypothesis, **$H2_0$: "There is no significant effect of Repo Rate on consumer price inflation in India," cannot be rejected**. This result suggests that the Repo Rate, despite being an important monetary policy tool, did not exert a statistically significant influence on realized inflation during the examined period, possibly due to transmission lags, structural rigidities, or the overriding influence of money supply conditions.

Overall, the findings from January 2013 to September 2025 strongly indicate that inflation in India has been primarily driven by monetary aggregates rather than by the policy interest rate. The dominance of M1 over Repo Rate in explaining inflation dynamics underscores the significance of liquidity management and money supply control in maintaining price stability. These results carry important policy implications, suggesting that while interest rate adjustments are important for signalling, the broader monetary environment—as captured by changes in M1—plays a more crucial and immediate role in shaping consumer price movements in the Indian context.

CONCLUSION

The present study set out to examine the impact of money supply (M1) and the Repo Rate on consumer price inflation (CPI) in India using monthly time-series data from the Reserve Bank of India's Database on Indian Economy covering January 2013 to September 2025. The findings arising from the regression analysis provide strong empirical evidence that the behaviour of inflation in India during this period has been shaped primarily by monetary aggregates rather than by the policy interest rate. The model demonstrated an exceptionally high explanatory power, with 97.6 percent of the variation in CPI being accounted for by the combined effect of M1 and the Repo Rate. However, the decomposition of this influence revealed a highly asymmetrical relationship: while M1 exhibited a strong, positive, and statistically significant effect on CPI, the Repo Rate showed no significant impact when included in the same model. This suggests that liquidity conditions and monetary expansion have been the dominant drivers of inflationary pressures, highlighting the sensitivity of the Indian economy's price structure to changes in the money supply.

The rejection of the null hypothesis regarding M1 confirms that the volume of money circulating in the economy plays a critical role in determining inflation outcomes. Conversely, the inability to reject the null hypothesis for the Repo Rate indicates that policy rate adjustments did not exert a meaningful or immediate influence on consumer prices during the study period. This may reflect structural rigidities, transmission lags, or the possibility that monetary expansion diluted the effect of interest rate interventions. Overall, the study reinforces the theoretical understanding that inflation in developing economies is often more responsive to changes in money supply than to short-term interest rate adjustments. The results highlight the need for policymakers to pay greater attention to liquidity management and the growth of monetary aggregates when targeting inflation. The findings also underscore the importance of strengthening monetary transmission mechanisms so that policy rate changes can more effectively influence price dynamics. In sum, the study concludes that monetary conditions—particularly money supply—have been the most significant determinants of inflationary behaviour in India over the past decade.

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