Working Paper No. 1085

The Efficacy of Fiscal Deficit–Interest Rate Links on Private Corporate Investment: Analyzing the Post-Pandemic Monetary Policy Stance Using High Frequency Data in India

by

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July 2025

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ISSN 1547-366X

ABSTRACT

Using high-frequency macro data from a financially deregulated regime, this paper examines whether there is any evidence of financial crowding out in India. The macroeconomic channel through which financial crowding out occurs is the link between the fiscal deficit and the interest rate determination. The results revealed that the fiscal deficit does not significantly determine interest rates in the post-pandemic monetary policy stance in India. The long-term interest rates were strongly influenced by the short-term interest rates, a fact which reinforces that the term structure is operating in India. The results further revealed that long-term interest rates were also positively influenced by capital flows and inflation expectations, while inversely impacted by the money supply. These inferences have policy implications on the fiscal and monetary policy coordination in India, where it is crucial to analyze the effect of a high-interest-rate regime on public corporate investment. Our results showed that public infrastructure investment and rate of interest are significant determinants of private corporate investment. Our results counter the popular belief that deficits determine interest rates in the context of emerging economies and “crowd out” private corporate investment.

KEY WORDS: fiscal deficit, interest rate determination, asymmetric vector autoregressive model, financial crowding out

JEL CODES: E62, C32, H6

INTRODUCTION

In the context of emerging economies such as India, persistent fiscal imbalances are often seen as constraining the effectiveness of monetary policy in steering interest rates, owing to the risk of financial crowding out. However, the high interest rates set by central banks can affect public debt management, making debt servicing costlier. Therefore, the setting of both monetary and fiscal policies needs to be reassessed within a comprehensive framework of sound and stable fiscal balances over the medium term for the economic growth recovery process (Auerbach and Kotlikoff 1987; Auerbach 2003; Blanchard 2019). This is especially significant because fiscal policy has remained accommodative in India with a focus on high capital expenditure (CaPex) investment for economic growth recovery.

The return of fiscal dominance is crucial, especially when the impact of monetary policy on growth is constrained, as it primarily focuses on price stability as the single mandate of central banks—as per the new monetary policy framework in India. High deficits and debt in India have created debates regarding fiscal risks from maintaining an accommodative fiscal stance. However, India has followed a fiscal glide path cautiously, linking high deficits to capex formation in the economy. Credit rating agencies are worried about high deficits due to potential macroeconomic consequences, primarily the impact on interest rate management. However, credit rating agencies are becoming increasingly confident in the insignificant link between deficits and interest rates, especially when the Reserve Bank of India (RBI) determines interest rates based on a rules-based, inflation-targeting framework. The timely fiscal deficit in India is articulated in a positive manner, by linking it to capex formation for the growth recovery process. This paper contributes to the empirical evidence from India, further substantiating that the timely fiscal deficit is not the culprit behind rising interest rates, and it is crucial to keep fiscal policy accommodative to the capex and growth recovery process.

Using high-frequency data models, the paper analyzes the second level of crowding out—financial crowding out—in the post-pandemic period. Against the backdrop of a deregulated financial regime in India, we analyze the macroeconomic channels in which the financial crowding out is operated. Until the mid-1990s, the rate of interest was administered in India, and remained non-varying for a long period. The post-pandemic monetary policy stance of interest rate determination, the period of accommodative stance, and the subsequent withdrawal of accommodative stance—will be analyzed in the next paper, using high-frequency data models.

1. THE ANALYTICAL FRAMEWORK

Following Chakraborty (2016), the analytical framework for the study is derived from an extended version of Sargent's (1969) model, which is flexible enough to incorporate the macroeconomic link that may operate in the determination of interest rates (Chakraborty 2016). Sargent (1969) expressed the nominal rate of interest as a combination of three components: the equilibrating rate of interest, the spread between market rate of interest and the equilibrating real rate of interest and the spread between nominal rate of interest and market rate of interest. It can be expressed as follows:

$$r_{n(t)} = r_{e(t)} + [r_{m(t)} - r_{e(t)}] + [r_{n(t)} - r_{m(t)}] \quad (1)$$

In equation (1), $r_{n(t)}$ is the nominal rate of interest, $r_{e(t)}$ is the real rate of interest which equilibrates desired savings and desired investment; $r_{m(t)}$ is the nominal rate of interest adjusted for the expected rate of inflation. Each of the three specific components is determined in turn by specific macroeconomic variables.

The logical next step is to identify the determinants of each of the three terms in equation (1). But, as the objective of our study was not to test the validity of alternative paradigms of connection between deficit and rate of interest across countries but to distinguish between the short- and long-term impacts of deficits on the rate of interest, we have not drawn heavily on the derivations of the determinants of the model. Rather, we improvise the specification according to our purpose to undertake the financial crowding out in the context of India, irrespective of the paradigm-specific details and the dichotomy of transitory and permanent effects of deficits on rate of interest.

One of the significant determinants of the first term, $r_{e(t)}$, which is the real rate of interest that equilibrates desired savings and desired investment, is the deficit of the government. The other determinants of equation (1) in the Gupta-Moazzami model constituted the government consumption expenditure, the national income, private consumption expenditure, private savings, etc.—all of which we omit in our specification due to multicollinearity problems. Moreover, these explanatory variables are not required for our analysis as we have not tested the validity of each of the alternative paradigms of fiscal deficit and rate of interest in the context of India; our prime concern was, instead, to assess the role of the fiscal deficit on the rate of interest to understand the transmission channel of the crowding-out phenomenon (Chakraborty 2016).

Following Chakraborty (2016), the determinant of the second term, [$r_{m(t)} - r_{e(t)}$], is taken as the growth rate of high-powered money. In the open economy model, capital flows also determine the spread between the market rate and the equilibrium real rate of interest, which is beyond the scope of the present paper. The real exchange rate can also be inserted into equation (3) to capture the effect on the interest rate, in an open economy macro model—a scope for future research. In the present model, we confine our analysis to high-powered money (HPM), whose components are inclusive of net-RBI credit to government and net FOREX reserves.

$$r_{e(t)} = \alpha + \beta_1 (def_t) + \mu_t \tag{2}$$

Assuming linearity, we thus have:

$$r_{m(t)} - r_{e(t)} = \lambda + \beta_2 (\Delta M_3)_t + \beta_3 (K_r)_t + \delta_t \tag{3}$$

Where, $(\Delta M_3)_t$ = changes in high powered money.

The last term of equation (1) is assumed to depend linearly and positively on the inflationary expectations.

$$r_{n(t)} - r_{m(t)} = \theta + \beta_4(\pi_t^e) + \upsilon_t \quad (4)$$

Where $\pi_t^e = Expected\ Rate\ of\ Inflation$.

Now by substituting equations (2), (3), and (4) into equation (1), we get equation (5)

$$r_{n(t)} = \varphi + \beta_1(def_t) + \beta_2(\Delta M_3)_t + \beta_3(K_r)_t + \beta_4(\pi_t^e) + \omega_t \quad (5)$$

According to equation (5), the rate of interest is a function of fiscal deficits, changes in high-powered money, capital flows, and expected inflation.

2. INTERPRETING DATA

The new monetary policy framework was introduced in India in February 2016, with an inflation-targeting framework. Since May 2020, the RBI has kept the policy stance "accommodative," for economic firefighting during the pandemic period. Between May 2020 and May 2022, RBI had kept the repo rate constant at 4 percent. Since May 2022, the RBI has increased the repo rate and has increased the rate by 250 basis points (bps) to 6.5 percent by February 2023. Since February 2023, the Monetary Policy Committee (MPC) kept the repo rate unchanged at 6.5 percent in all the policy review meetings. The RBI's decision to transition to a "neutral stance" is a bold one, giving equal importance to growth and inflation.

The central bank has emphasized the success of the "new monetary framework" envisioned for India in February 2016, based on Urjit Patel Committee recommendations. The new monetary policy framework envisages "price stability" as the single mandate of the RBI, through the flexible inflation targeting framework. As per the flexible inflation target (FIT) framework in India, a nominal anchor of 4 percent CPI inflation was decided, within a band of plus or minus 2 percent.

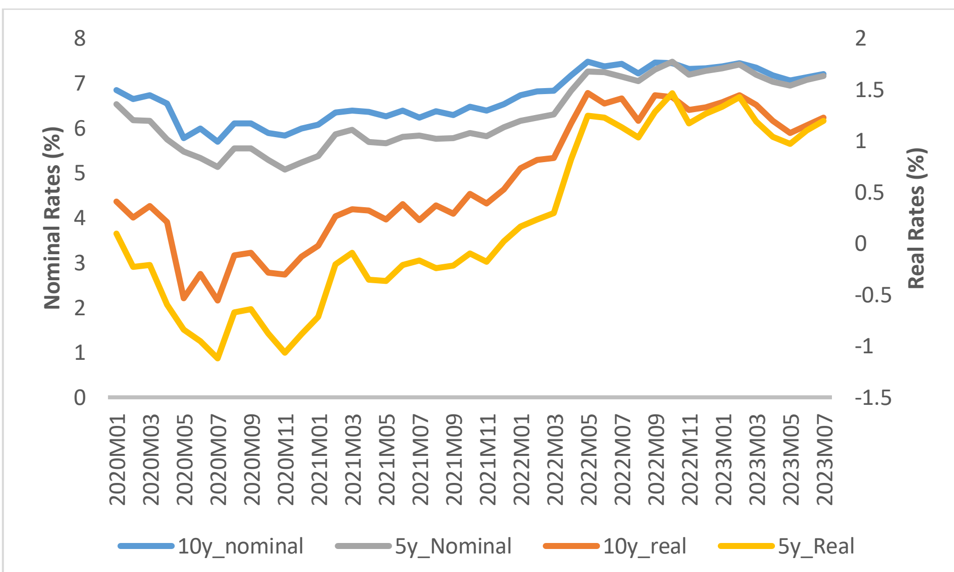
The MPC is mindful of negative interest rates, if the inflationary expectations are higher than the nominal interest rate. Their decision thus reflects the reality that a sudden reduction in the policy rates at this moment is not feasible given the geo-political uncertainties. The RBI Governor has emphasised “central bank independence”—in terms of “operational independence”—recalling the decision in 2016 to constitute the MPC with internal and external members, instead of the RBI Governor singularly making decisions on the policy rates. The “operational independence” allows the MPC members to take an independent stance regarding the policy rates based on their voting powers. In the latest MPC meeting, a unanimous decision for a “neutral” policy stance was taken. A majority of five of six members voted to keep the policy repo rate unchanged at 6.50 percent.

The monetary policy corridor remains “symmetrical,” with lower and upper bounds of the corridor equidistant from the repo rate. The lower bound of the corridor is the Standard Deposit Facility (SDF) rate, the rate (kept at 6.25 percent) at which the RBI absorbs liquidity from banks (by accepting uncollateralized deposits) on an “overnight” basis. The upper bound of the corridor is the Marginal Standing Facility (MSF), which is kept at 6.75 percent. The Marginal Standing Facility (MSF) rate is the rate at which banks can borrow “overnight” from the RBI. These are the Liquidity Adjustment Facility (LAF) mechanism tools of the RBI, through which banks borrow or lend money.

Given the volatility in the global financial markets and the downward risks from the geo-political uncertainties, the real GDP growth for Q1:2025–26 is projected at 7.3 percent. The MPC has projected the real GDP growth for 2024–25 to be at 7.2 percent, with Q2 at 7.0 percent; Q3 at 7.4 percent; and Q4 at 7.4 percent. The CPI inflation for 2024–25 is projected at 4.5 percent, with Q2 at 4.1 percent; Q3 at 4.8 percent; and Q4 at 4.2 percent. CPI inflation for Q1:2025–26 is projected at 4.3 percent. The RBI's growth and inflation outlook highlights global resilience, despite geopolitical risks.[1] Table 1 explains the structure of various interest rates in India and the macro-monetary ratios including CRR and SLR.

The variables included in the study consist of time-series data with a monthly frequency from January 2020 to July 2023. All the data used in the study are sourced from the Reserve Bank of India database. As per the requisite of the theoretical model, the dependent variables selected for the study include the yield of 10-year and 5-year GSecs, which constitute the long-term interest rates, and the yield of 3-year GSecs and 91-day Treasury Bills, which constitute the short-term interest rates. The independent variables include inflation and expected inflation, derived from the Consumer Price Index (CPI), the output gap derived from the Index of Industrial Production (IIP), the capital flows, fiscal deficit, and the money supply captured through broad money. The fall in interest rates of both the long- and short-term government securities (Gsecs) was evident during this period (Figures 1 and 2).

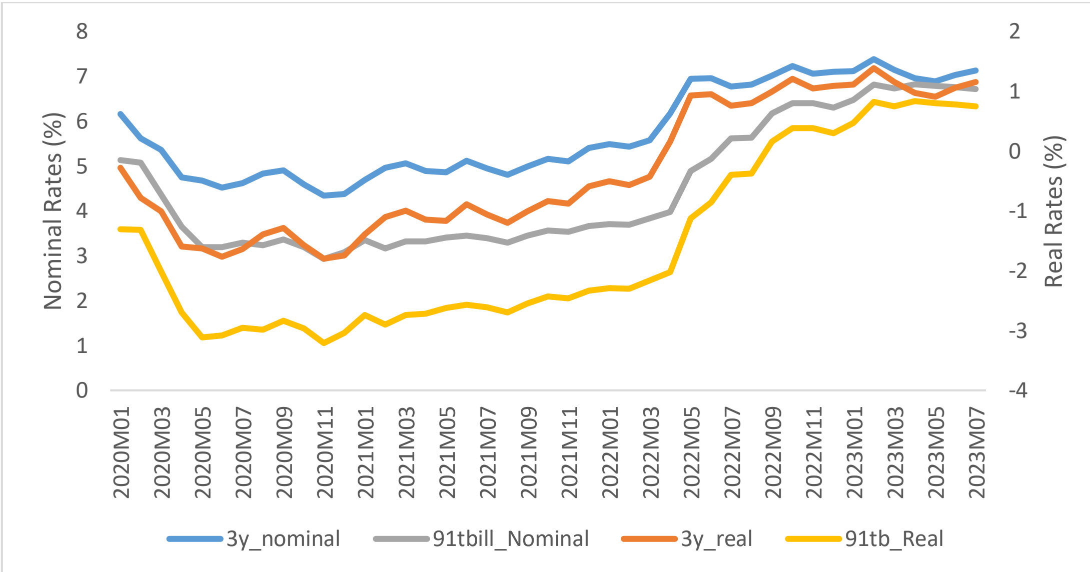
Figure 1: Long-term interest rates (Jan 2020 – July 2023)



Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

[1] Reserve Bank of India - Press Releases (rbi.org.in)

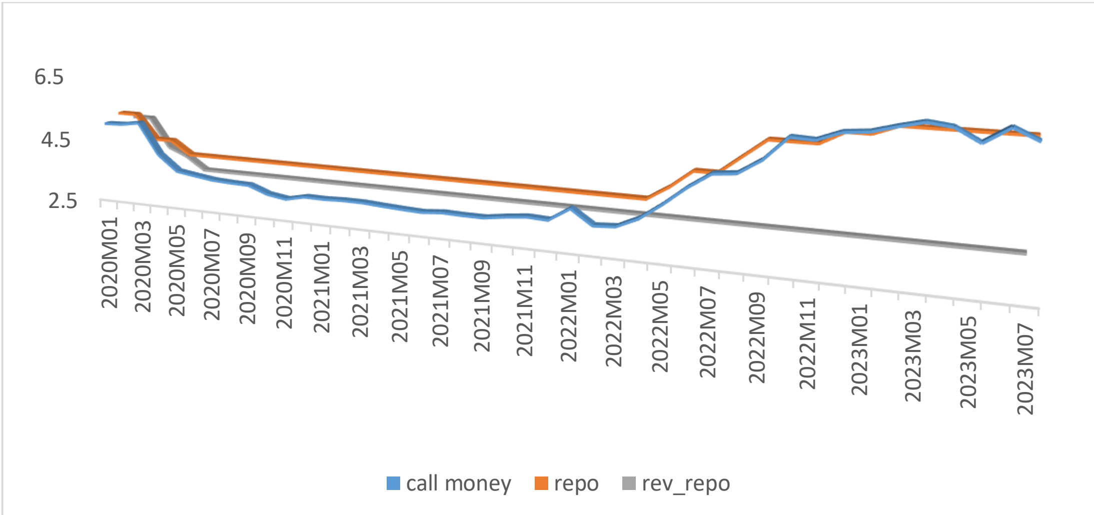
Figure 2: Short-term interest rates (Jan 2020–July 2023)



Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

The Monetary Policy Committee (MPC) unanimously decided to keep the policy repo rates unchanged while it was deemed necessary to revive and sustain the economic growth at that time. All policy rates were kept at moderate levels to facilitate the recovery of the economy (Figure 3). Unlike the advanced economies which reduced the policy rates closer to the zero-bound, the RBI did not lower the policy repo rates below the targeted inflation rate of 4 percent. These rate cuts were complemented by liquidity infusion measures adding to the array of both conventional and unconventional measures aimed at boosting investor confidence and, ultimately, reviving the economy. Variable Rate Reverse Repo (VRRR) was followed to migrate the surplus liquidity from short-term periods to long-term periods. Further modulation of long-term GSec yields was carried out through Operation Twist, involving the simultaneous sale of short- and long-term Gsecs, lowering the interest rates of instruments benchmarked to GSecs (Das 2023).

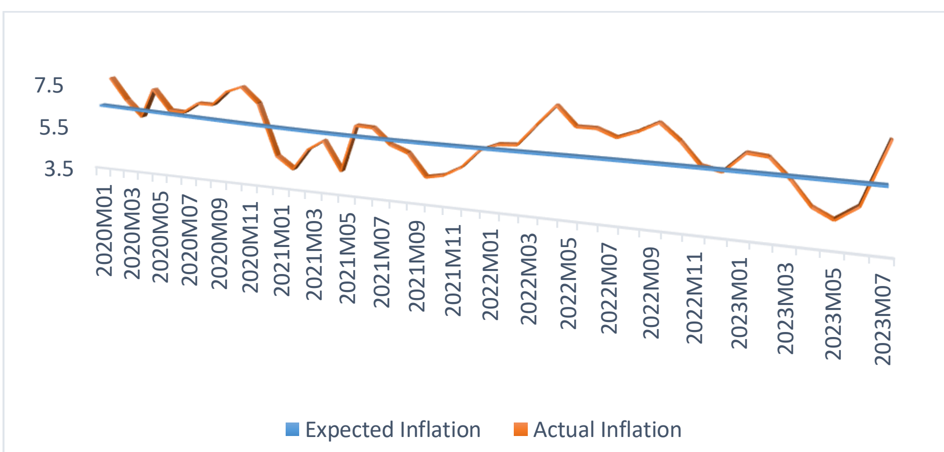
Figure 3: Monetary Policy Rates (January 2020–July 2023)



Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

The data on inflation are taken as the Consumer Price Index (CPI), which is transformed into the ex-ante real rate of interest, following Fischer's equation (see Correia et al. 1995; Chakraborty 2012; Chakraborty 2024), where the expected inflation is computed using the Hodrick-Prescott filter. Inflation in the pre-pandemic period hovered around 7 percent in January 2020 driven by rising food prices, before falling below 6 percent in March 2020. The lockdowns and supply chain disruptions resulted in a spike in inflation to more than 7.5 percent. The inflation levels from January 2020 to July 2023 reflect a period of economic turbulence and recovery as depicted in Figure 4.

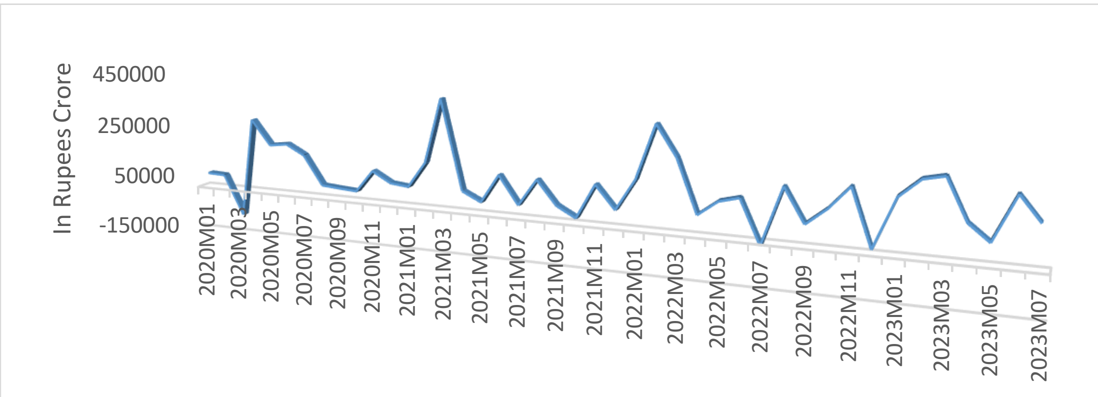
Figure 4: Actual Inflation and Expected Inflation Derived using HP Filter



Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Fiscal deficit—in regards to the broader policy debate about its impact on interest rates—is considered an important variable determining interest rates. Figure 5 captures the monthly progression of fiscal deficit during the pandemic period and through the recovery phase. The pandemic period witnessed a surge in the fiscal deficit due to the disruptive effects of the nationwide lockdown and leading to a severe contraction in economic activity and, at the same time, the allocation of resources toward mounting health expenditures. The pandemic-induced challenges were addressed through well-calibrated fiscal expansion during the recovery period.

Figure 5: Monthly Gross Fiscal Deficit



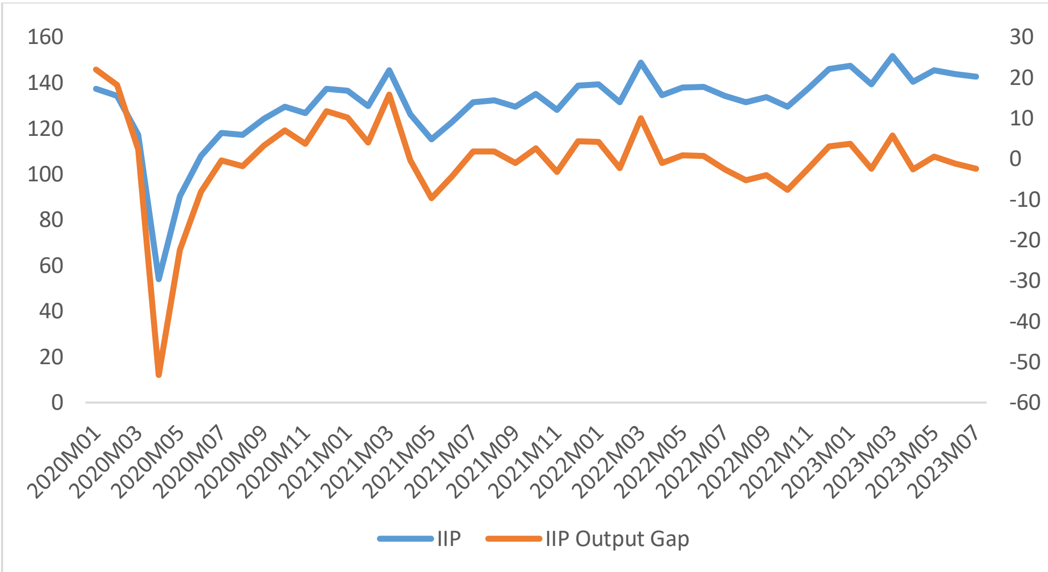
Source: the authors' calculation from Basic data—Reserve Bank of India Handbook of Statistics (2024)

The pace of economic activity is gauged by the output gap, derived from the seasonally adjusted Index of Industrial Production (IIP). Here, the output gap which depicts the transitory deviations from potential output is derived as:

$$[((Acutal\ IIP - Potential\ Output)/Potential\ Output) * 100)]$$

The potential output is derived using the Hodrick-Prescott filter. The major advantage of the Hodrick-Prescott filter is that it allows the output gap to be stationary across a range of smoothing values while accommodating the changes in trend over time (de Brouwer 1998). The plot of monthly IIP and the output gap is depicted in Figure 6.

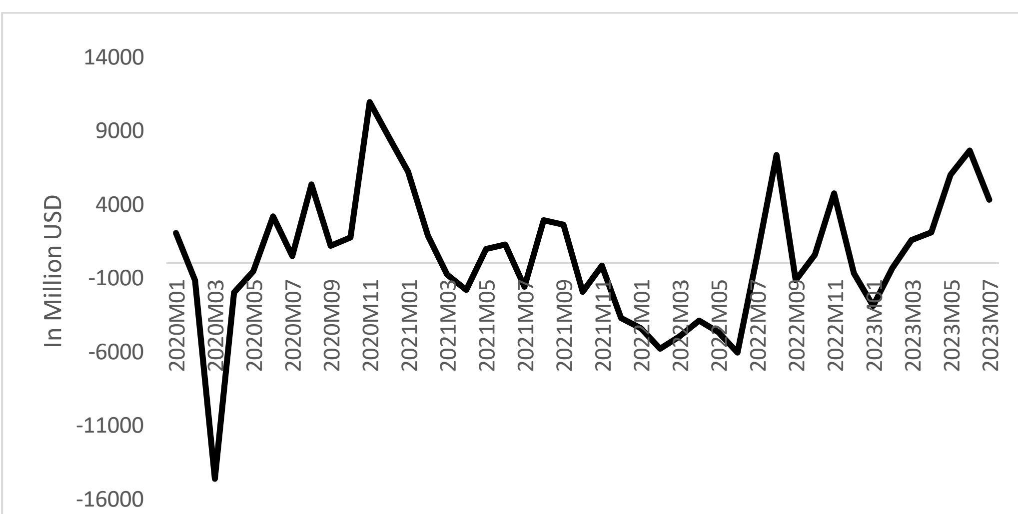
Figure 6: IIP and Output Gap Derived Using HP Filter



Source: By the authors from Basic data—Reserve Bank of India Handbook of Statistics (2024)

The capital flows into the economy are captured by the net foreign portfolio investments. India experienced a substantial outflow of net portfolio investments in the wake of the pandemic (Figure 7) as well as in 2022, driven by a global tightening of financial conditions (Goel and Novikova 2023). Amidst the volatile capital flows during the pandemic, the RBI pursued an accommodative policy of lower interest rates in order to bolster economic recovery.

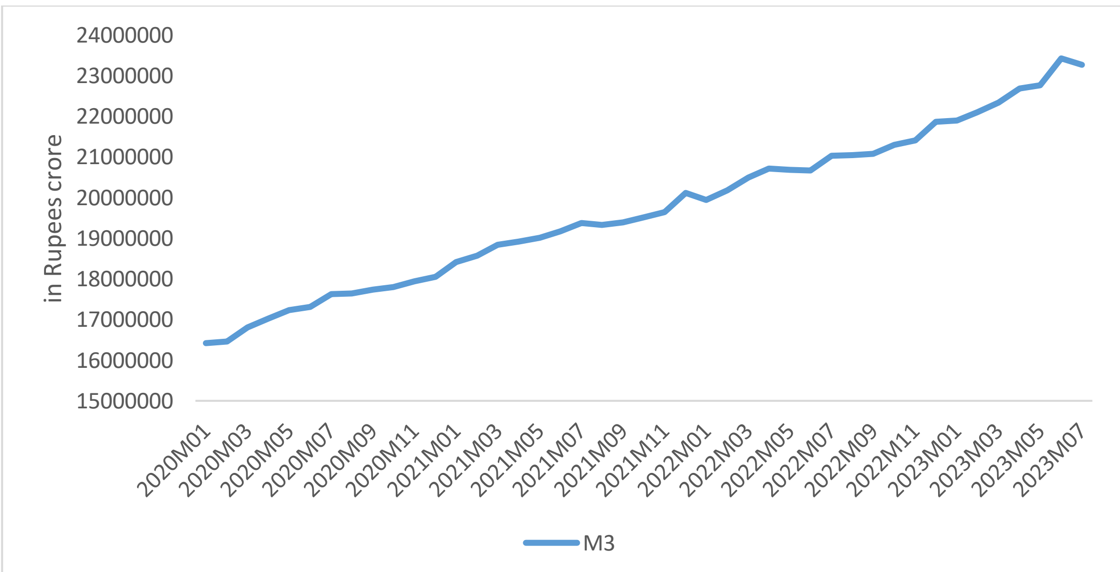
Figure 7: Monthly Net Portfolio Investments



Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

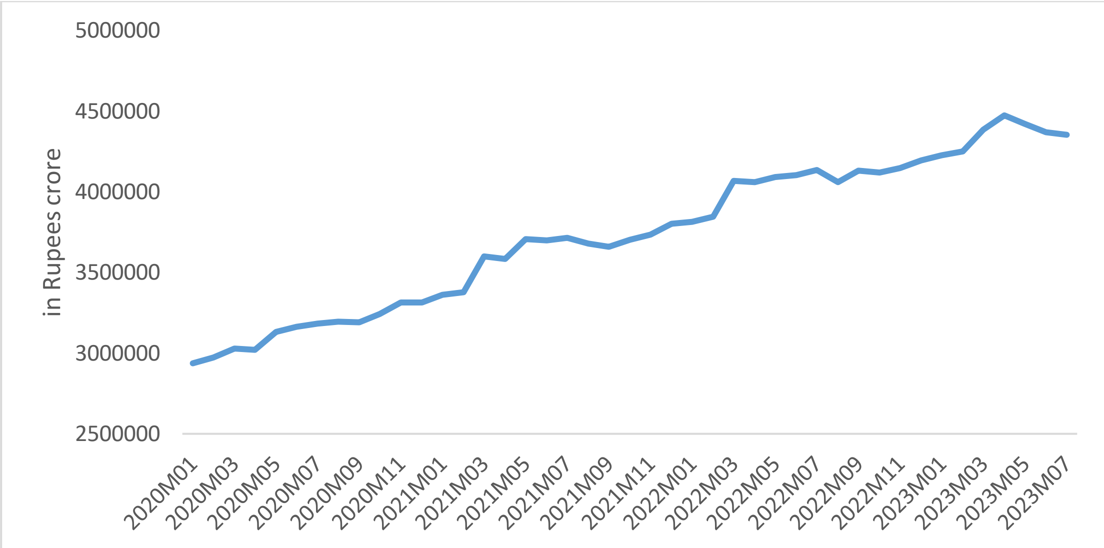
The trends of money supply in India are captured by the broad money (M3) and the high-powered money (M0) in Figure 7. Empirical literature shows that broad money is negatively associated with long-term interest rates, while it exhibits a positive relationship with short-term interest rates (see Vinod, Chakraborty, and Karun 2016). Figures 8 and 9 present the trajectories of M3 and M0 during the reference period of the study. The present analysis considers M3 as one of the determinants of interest rates. Prior to estimating the ARDL models, Figures 10–21 encapsulate the bivariate scatterplots, which visually represent the stylized facts of the plausible direction of relationship between the variables.

Figure 8: Trends in Broad Money (M3)



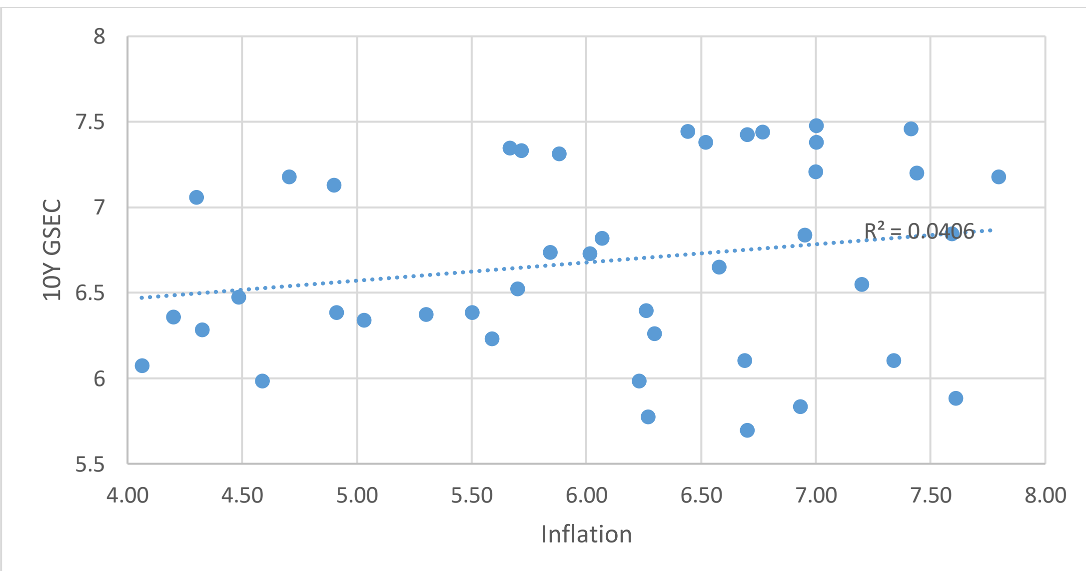
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 9: Trends in High-Powered Money (M0)



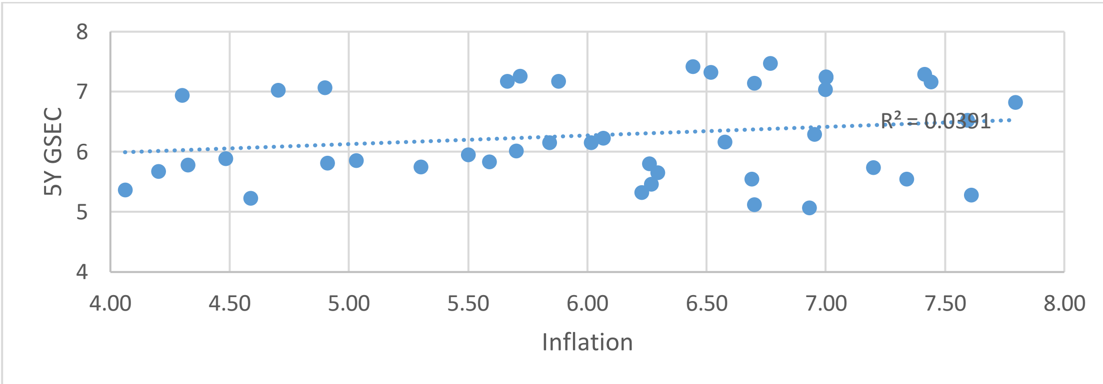
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 10: Scatter Plot of 10YGSEC and Expected Inflation



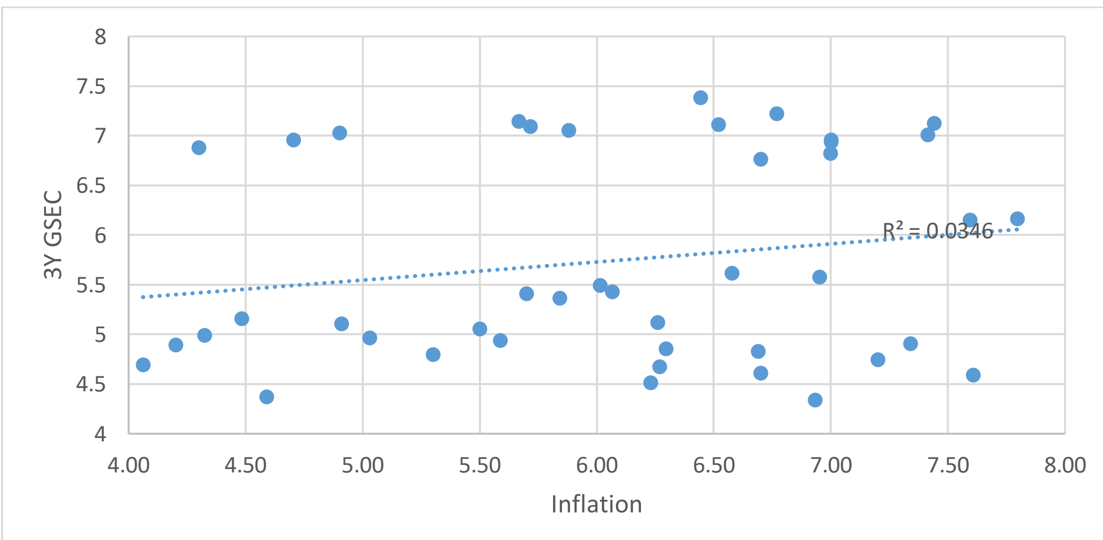
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 11: Scatter Plot of 5YGSEC and Expected Inflation



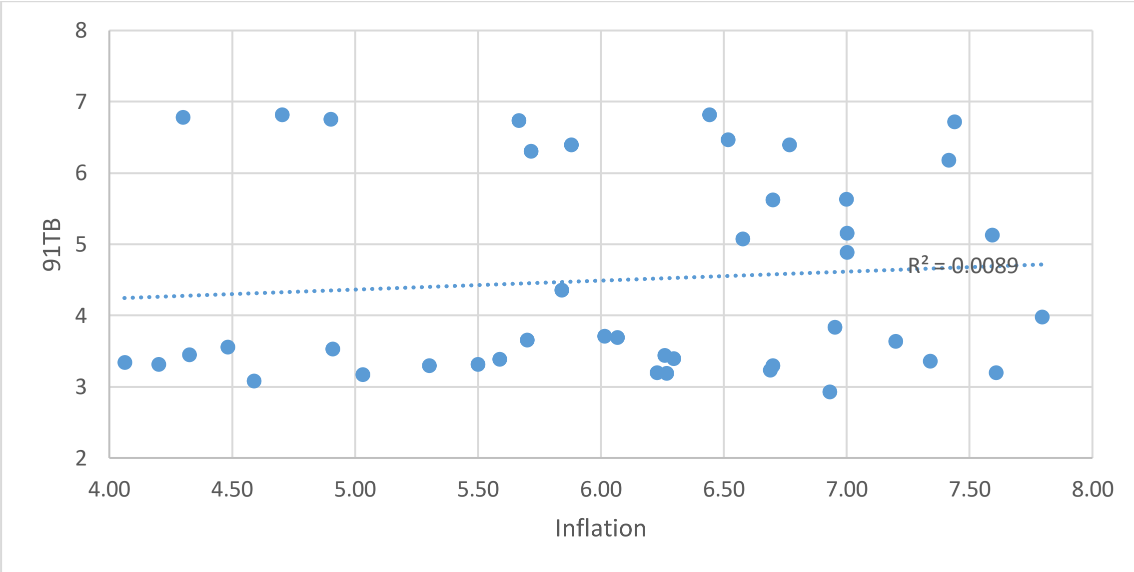
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 12: Scatter Plot of 3YGSEC and Expected Inflation



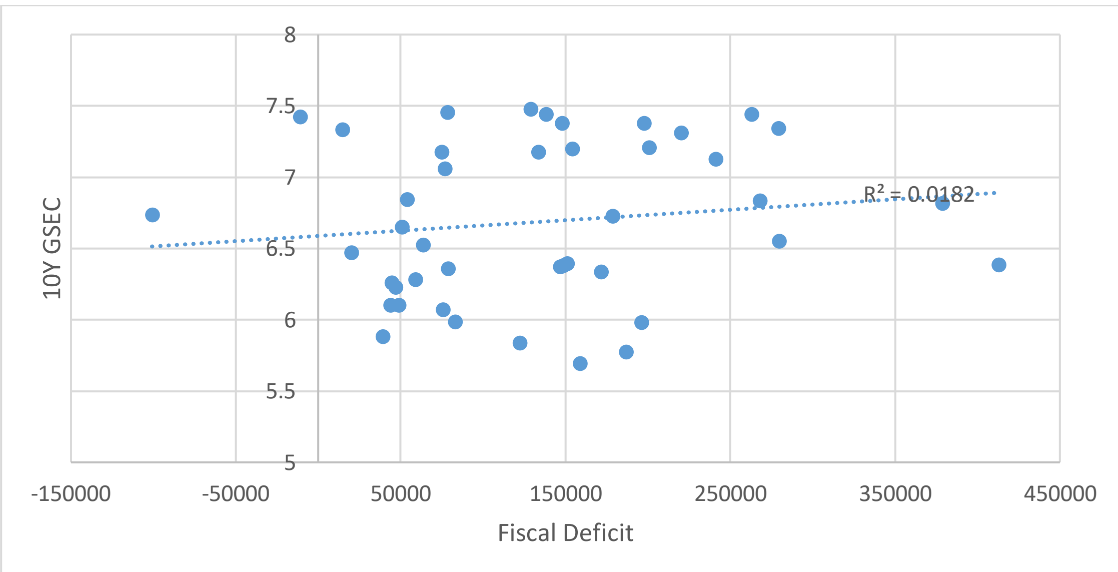
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 13: Scatter Plot of 91 Treasury Bill Rate and Expected Inflation



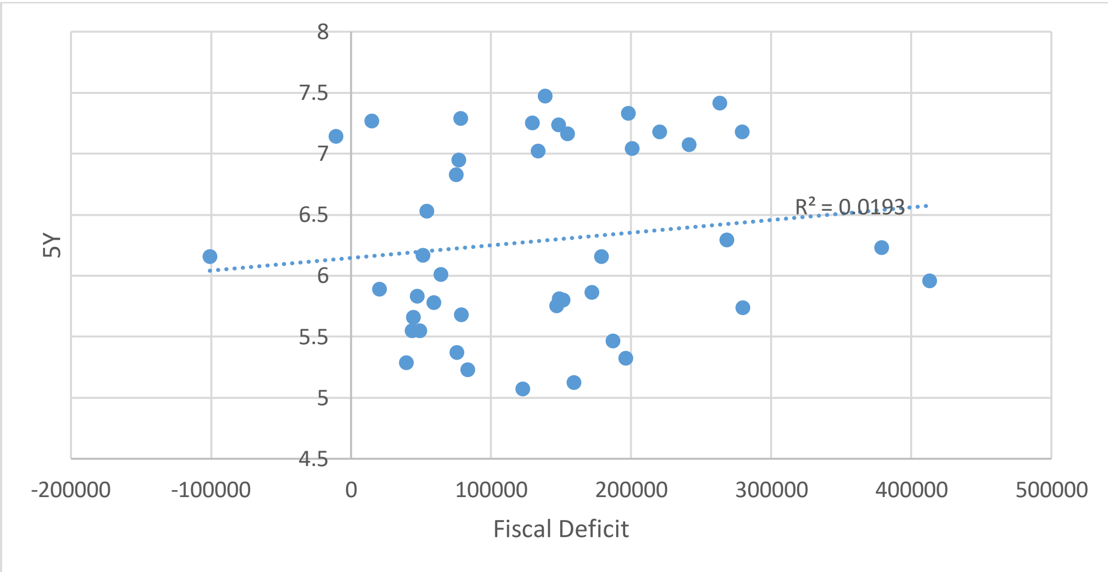
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 14: Scatter Plot of 10YGSEC and Fiscal Deficit



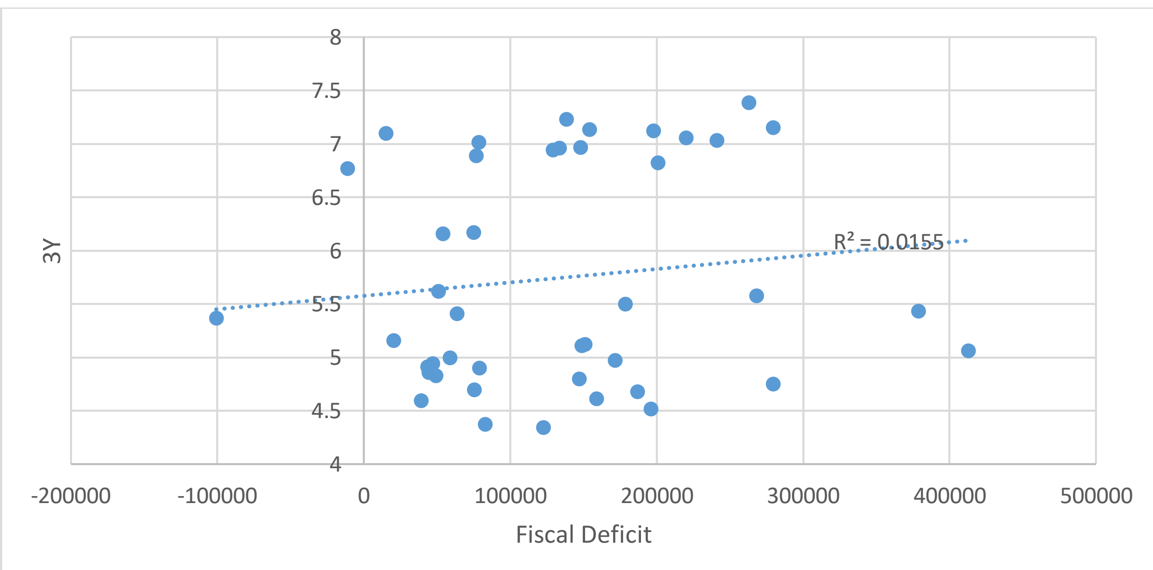
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 15: Scatter Plot of 5YGSEC and Fiscal Deficit



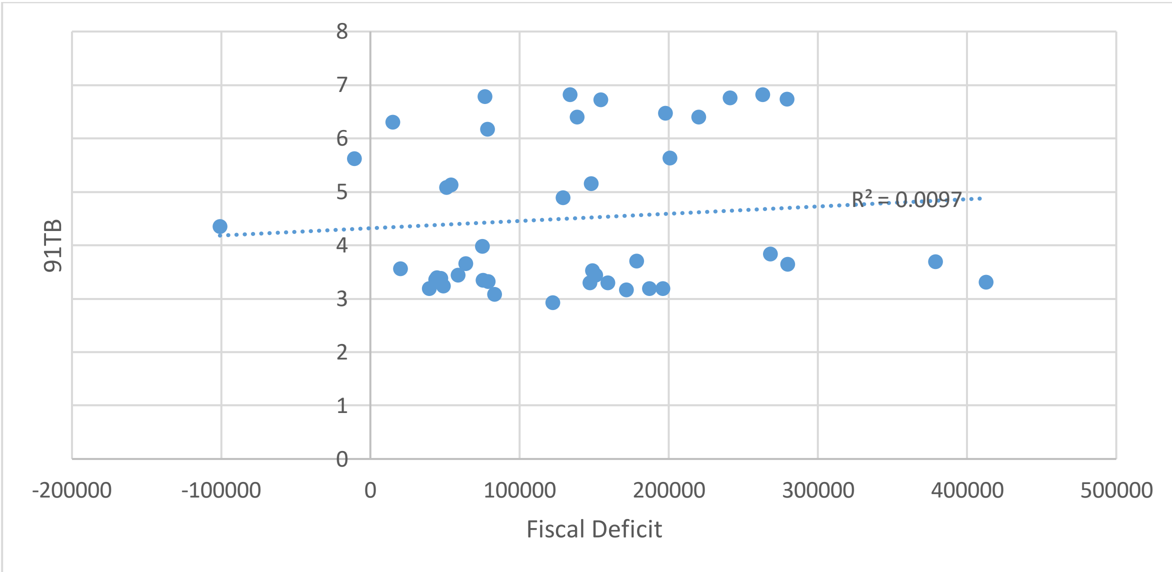
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 16: Scatter Plot of 3YGSEC and Fiscal Deficit



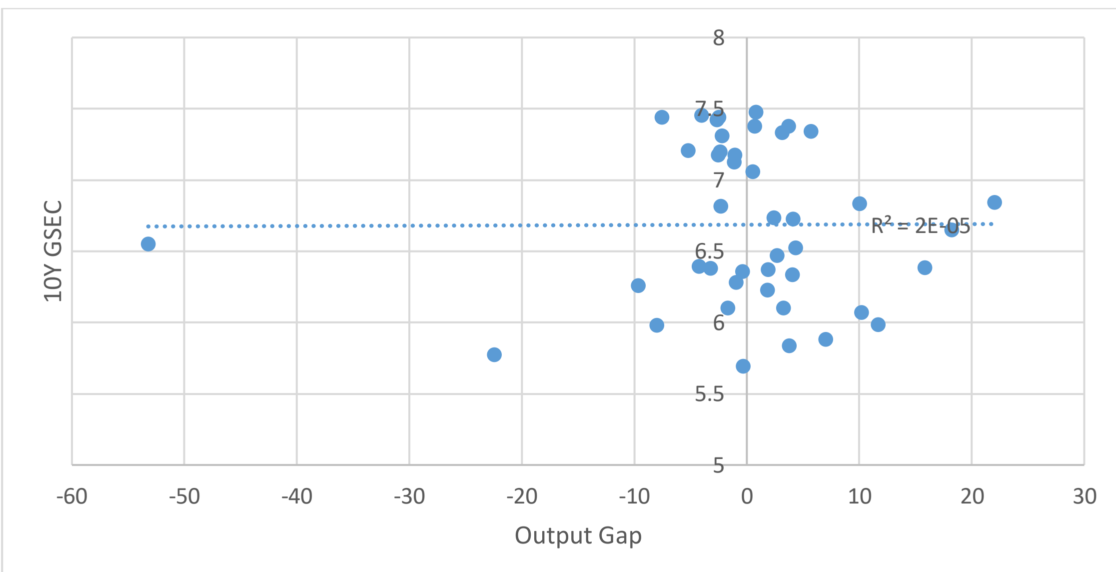
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 17: Scatter Plot of 91 Treasury Bill Rate and Fiscal Deficit



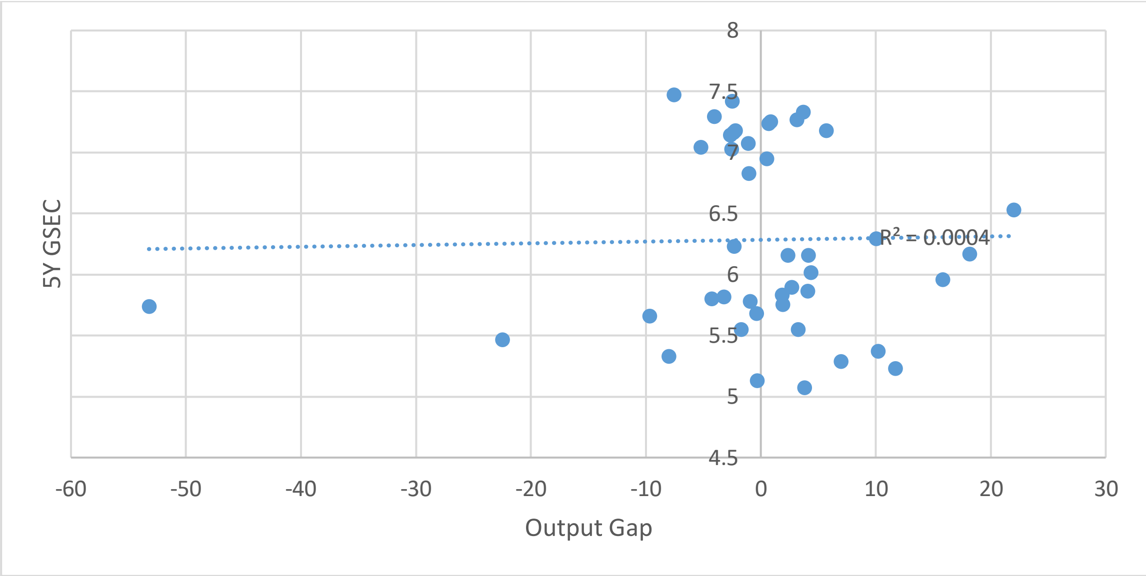
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 18: Scatter Plot of 10YGSEC and Output Gap



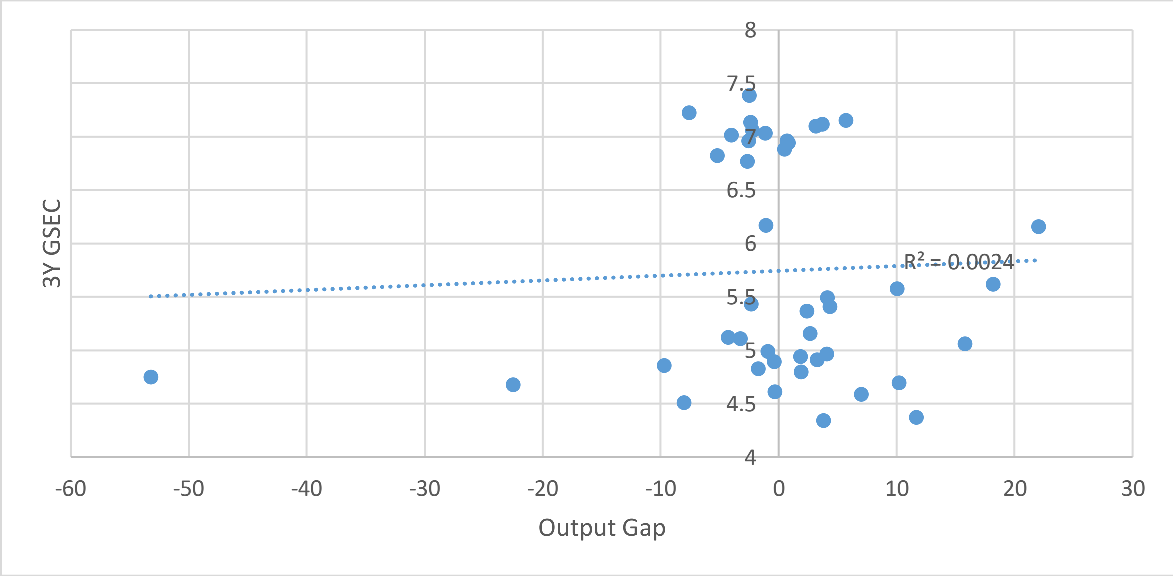
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 19: Scatter Plot of 5YGSEC and Output Gap



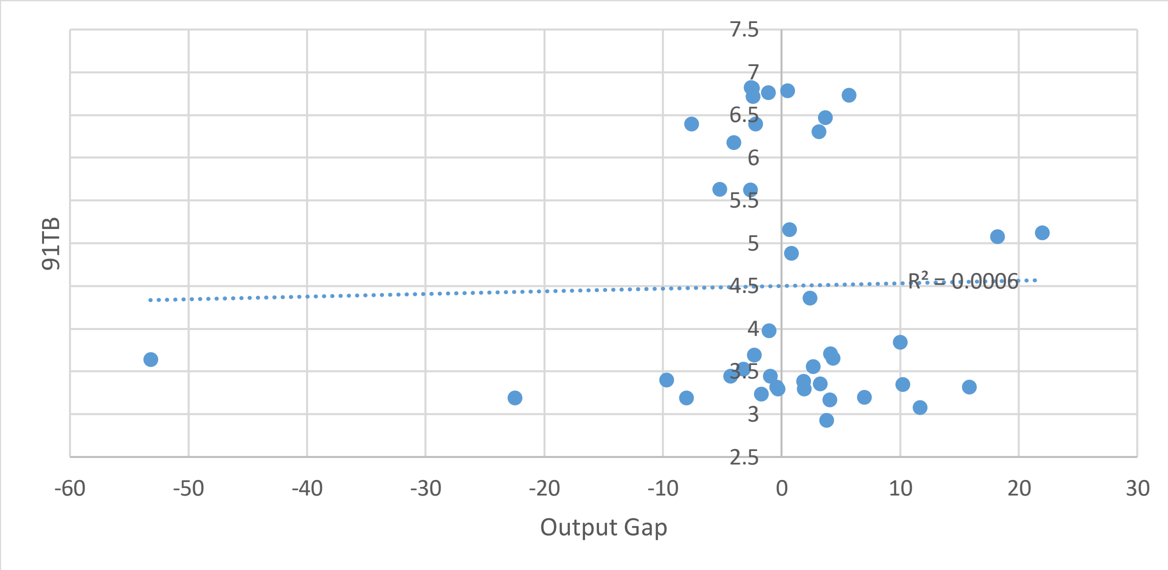
Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 20: Scatter Plot of 3YGSEC and Output Gap



Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

Figure 21: Scatter Plot of 91 Treasury Bill Rate and Output Gap



Source: Basic data—Reserve Bank of India Handbook of Statistics (2024)

3. THE EMPIRICAL APPROACH

We employ an ARDL model for studying the term structure of interest rates in India. In the long-run rate of interest models, the results of the bounds test revealed for all estimated equations that the null hypothesis of no cointegration is rejected at the 1 percent level of significance since the value of the F statistic lies above the bound I(1) implying the existence of a long-run relationship among the variables (Table 1). Estimating the results of the long-term interest rates of GSecs 10Y and 5Y, Table 2 displays the long-run coefficients of the specified ARDL models with their lags. Both long-term interest variables deny the existence of any significant long-run relationship between fiscal deficit and interest rates in accordance with the reviewed empirical literature (Chakraborty 2002; Das 2004; Goyal 2004; Chakraborty 2012; Vinod, Chakraborty, and Karun 2014; and Chakraborty 2024). The results show that the coefficient of the short-term interest rate is positive for both long-term interest rates and is significant at a 1 percent level, indicating the strong influence of short-term interest rates on long-term interest rates in adherence with the theoretical perception (Akram and

Das 2019). Further supporting the theoretical conjectures, the expected inflation rates have a strong positive influence on the interest rate in the long run. While the capital flows exhibited a positive influence, the money supply given by broad money showed a significant negative relationship with long-term interest rates. Interestingly, the output gap did not exhibit any significant influence on long-term interest rates.

Table 1: ARDL Estimation of GSEC 10Y Yield Rate

Variable	Estimate	t-stat
$\Delta lnfd_t$	0.0041	0.9550
$\Delta ln91tb_t$	0.5564	3.7410***
$\Delta lnkflows_t$	0.0086	3.8729***
$\Delta lnkflows_{t-1}$	–0.0029	–1.4708
$\Delta lnkflows_{t-2}$	0.0015	0.6622
$\Delta lnopg_t$	0.0208	1.7732*
$\Delta lnopg_{t-1}$	0.0190	1.7962*
$\Delta lnopg_{t-2}$	0.0273	2.6647**
$\Delta lnopg_{t-3}$	0.0219	2.3102**
$\Delta lnm3_t$	4.9135	2.2725**
$\Delta lnm3_{t-1}$	13.8785	6.5699***
$\Delta lnm3_{t-2}$	9.6992	3.6721***
EC_{t-1}	–1.5197	–10.1868***

*, **, *** denote significance at 10%, 5%, and 1% respectively.

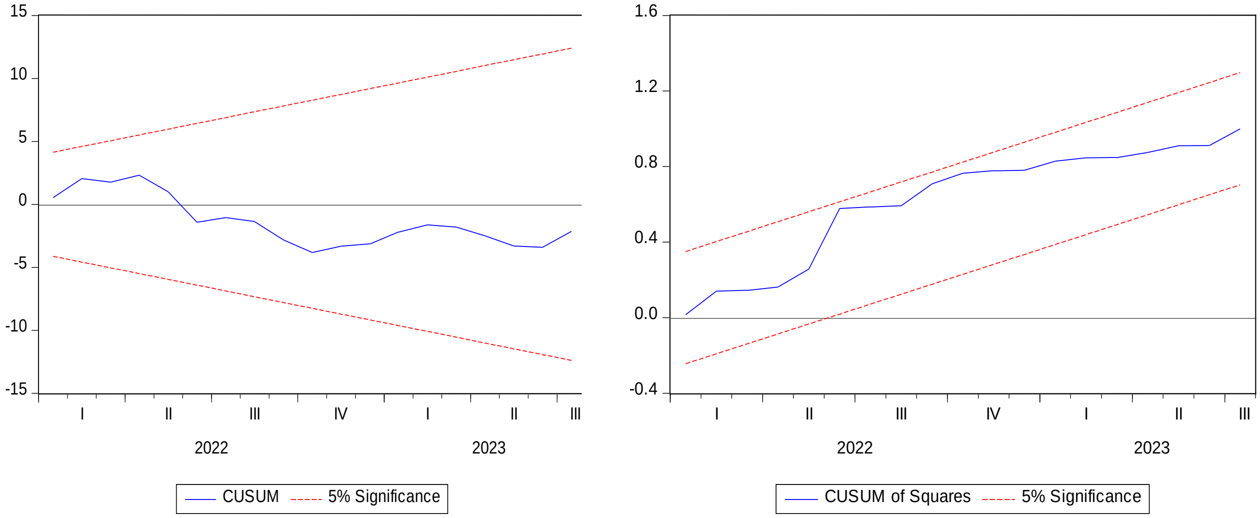
Table 2: ARDL Estimation of GSEC 5Y Yield Rate

Variable	Estimate	t-stat
$\Delta lnfd_t$	0.0013	0.4715
$\Delta ln91tb_t$	0.4542	3.2275***
$\Delta ln91tb_{t-1}$	0.2132	1.7269*
$\Delta lnkflows_t$	0.0033	2.0514**
$\Delta lnm3_t$	6.2237	3.6229***
$\Delta lnm3_{t-1}$	13.1092	6.5620***
$\Delta lnm3_{t-2}$	7.4861	3.3811***
EC_{t-1}	–1.0010	–8.9139***

As revealed by the ECM representation in Tables 2 and 3, Gsec10Y and Gsec5Y are determined by the short-term interest rate (91-day Treasury bill rate), the inflation expectations, capital flows, and broad money. Consistent with the long-run relationship, the results negate the influence of fiscal deficit on long-term interest rates. The error correction (EC) representation of the estimated ARDL equation shows that, as expected, the coefficient of EC is negative. However, the speed of adjustment at more than 1 indicates an over adjustment, where 151 percent of any disequilibrium in the previous period is corrected to equilibrium in the current period in the case of GSEC 10Y. In the case of long-term interest rate given by the 5Y yield rate, 100 percent of the disequilibrium in the previous period is corrected in the current period. Therefore, the dependent variable converges to the long-run equilibrium rapidly in both the long-term interest rate models.

The next step is to check for any potential bias or mis-specification in the executed model. For checking the stability of the model, the plot of Cumulative Sum of Recursive Residuals (CUSUM) and CUSUM of squares (CUSUMSQ) is observed. The CUSUM and CUSUMSQ tests, which are based on the cumulative sum of recursive residuals, plot the cumulative sum along with standard error bands indicating limitations on level of significance. If the cumulative sum falls outside the level of significance limits, it indicates instability of parameters. In Figure 22, the plot of the CUSUM and CUSUMQ statistics of the estimated model lies within the critical bounds at 5 percent level of significance showing that the estimated parameters of the model are stable over the sample period.

Figure 22: CUSUM and CUSUM of Squares of the GSEC10Y yield rate model



The stability tests of the GSEC 5Y yield rate model show that the plots of CUSUM and CUSUMSQ lie within the critical bounds at a 5 percent level of significance indicating the stability of estimated parameters of the model over the sample period as depicted in Figure 23.

Figure 23: CUSUM and CUSUM of Squares of the GSEC 5Y yield rate model

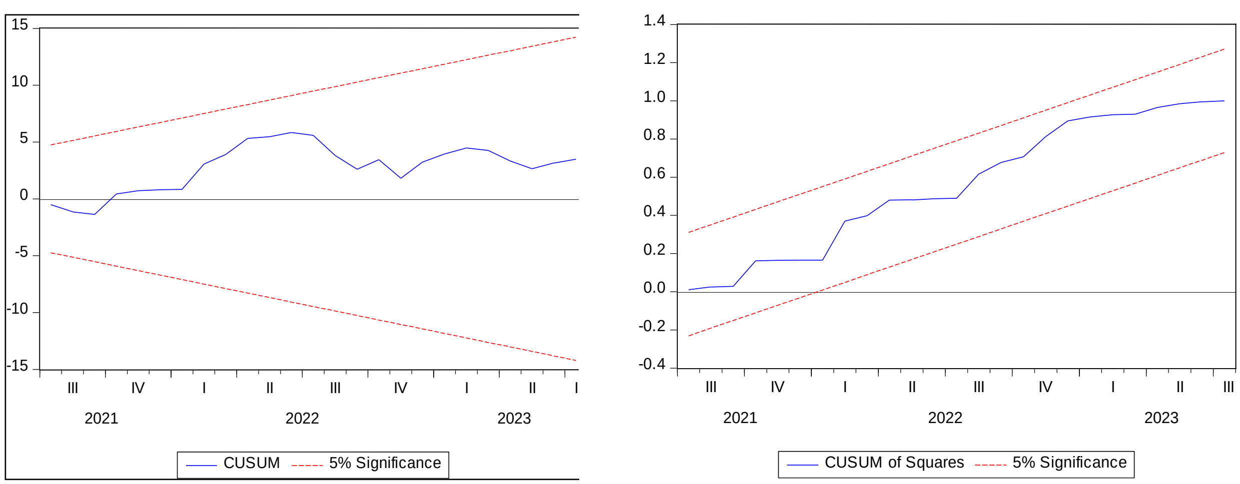
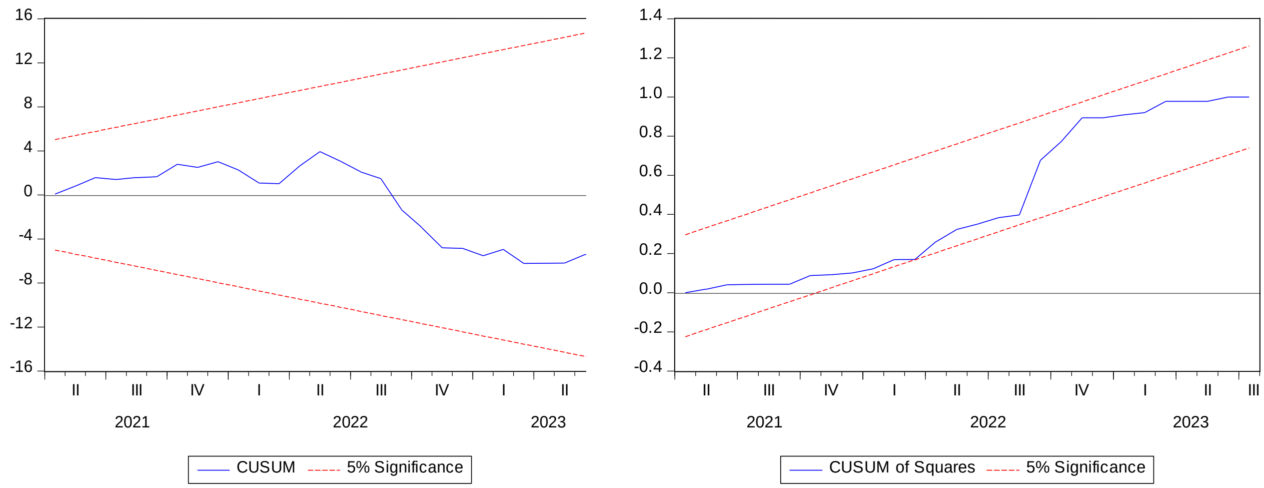


Figure 24: CUSUM and CUSUM of Squares of the GSEC 3Y yield rate model



The stability tests of the GSEC 3Y yield rate model show that the plots of CUSUM and CUSUMSQ lie within the critical bounds at 5 percent level of significance indicating the stability of the estimated parameters of the model over the sample period (Figure 24).

As we have refuted the plausibility of financial crowding-out in India through interest rate-deficit linkages, the next logical question is about "direct crowding-out" links of public infrastructure and private corporate investment. As high deficits are closely tied to capex formation in India in the infrastructure sectors, we now turn to analyze the effects of public infrastructure investment on private corporate investment in India.

4. THE INFERENCES FOR PRIVATE CORPORATE INVESTMENT AND CROWDING OUT

Taking the logarithmic form, the determinants of private investment included in the models are public investment, real interest rate (here, we use short- or long-term rate), credit to the private sector, foreign investment capital flows, and output gap. All variables are taken in their respective logarithmic form. The results of the Augmented Dickey-Fuller Test for stationarity (Table 3) show stationary at levels, I(0) and at first difference, I(1). As the variables are stationary at either

I(0) or I(1), and no variables are stationary at I(2), following Pesaran et al. (2001), the ARDL Bounds test would be appropriate for the test of cointegration among the variables.

Table 3: Stationarity Test (ADF)

Variable Name	***Variable Notation***	***t-stat***	***Lags***	***Decision***
Private Investment	lnIPvt	*–5.8724**	*2*	*I(1), No trend, no intercept*
Public Investment	lnIPub	*–6.1212****	*2*	*I(1), No trend, no intercept*
Real T-Bill yield rate	lntb	*–5.7931****	*0*	*I(1), No trend, no intercept*
Real Long Term yield rate	lnltr	*–1.7920**	*3*	*I(0), No trend, no intercept*
Expected inflation	lneinf	*–2.0353****	*3*	*I(1), No trend, no intercept*
Non - Food Credit	lnnfc	*–10.201****	*0*	*I(1), with trend and intercept*
GDP Output Gap	lnopg	*–3.6099***	*3*	*I(1), No trend, no intercept*
Foreign Investment	lnforinv	*–4.9243****	*3*	*I(0), with trend and intercept*
Public Infrastructure Investment	lnpinfr	*–6.9275****	*2*	*I(1), with trend and intercept*
Public Non-infrastructure Investment	lnpninfr	*–6.1948****	*2*	*I(1), with trend and intercept*

*, **, *** denote significance at 10%, 5% and 1% respectively.

The lag length for the ARDL models was identified based on the VAR lag selection criteria, using the sequential modified LR test statistic (LR), Akaike information criterion (AIC), Schwarz information criterion (SC), and Hannan-Quinn information criterion (HQ).

The results of the bounds test for all estimated equations are given in Table 4. Here, it is revealed that, for all estimated equations, the null hypothesis of no cointegration is rejected at the 1 percent level of significance since the value of the F statistic lies above the bound I(1) implying the existence of a long-run relationship among the variables.

Table 4: Bounds Test of Interest Rate Determination Models

F-Bounds Test					Null Hypothesis: No levels relationship		
Private Investment Model	Short term Interest Rate		Long term Interest Rate		Signif.	I(0)	I(1)
	F-statistic	k	F-statistic	k			
Model 1	46.06	5	101.11	5	10%	2.08	3
Model 2	35.37	5	27.62	5	5%	2.39	3.38
Model 3	10.69	5	105.02	5	2.5%	2.7	3.73

Following Chakraborty (2007) and Karun, Vinod, and Chakraborty (2020), the present study attempts to explore the determinants of private investment. Both monetary and fiscal policy instruments, which encourage private investment are considered given in the model specification equation (1). Three individual models of fiscal policy instruments, viz., total public investment, public investment in infrastructure and non-infrastructure are considered, with separate versions of monetary policy variable real interest rates based on the short and long-term interest rates. Tables 5 and 6 present the results of the ARDL model when we consider the short- and long-term interest rates, respectively.

Table 5: ARDL Estimation of Short-term Interest Rates

Dependent variable: Private Investment						
	Model 1		Model 2		Model 3	
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Long-run Coefficients:						
$\boldsymbol{lntb_t}$	0.1211	0.6846	–0.2920**	–2.6081	0.1974	1.4088
$\boldsymbol{lnforinv_t}$	–0.0040*	–2.0100	–0.0095***	–3.2882	–0.0013	–0.8551
$\boldsymbol{lnnfc_t}$	–2.5138**	–2.2558	–2.2213**	–2.2424	–2.5358***	–2.9367
$\boldsymbol{lnIPub_t}$	0.8938***	7.1054	–	–	–	–
$\boldsymbol{lnopg_t}$	–0.0075	–0.5017	–0.0203	–1.2552	0.0348*	2.0112
$\boldsymbol{lninfr_t}$	–	–	0.6587***	6.4392	–	–
$\boldsymbol{lnnoninfr_t}$	–	–	–	–	0.9142***	9.7075
$\boldsymbol{C}$	0.0753**	2.4423	0.0850***	2.9857	0.0656**	2.7987
Error Correction Representation:						
Variable	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
$\Delta\boldsymbol{lnIPvt_{t-1}}$	–0.2060***	–4.8444	–0.1262**	–2.4188	–	–

$\Delta lntb_t$	–0.1104*	–1.8709	–	–	–0.1502**	–2.2953
$\Delta lntb_{t-1}$	–0.2364***	–4.1315	–	–	–0.3695***	–6.1865
$\Delta lnopg_t$	0.0065*	1.9947	0.0049	1.2070	0.0169***	5.2888
$\Delta lnopg_{t-1}$	0.0097***	3.5700	0.0145***	4.3663	–0.0139***	–3.7960
$\Delta lnforinv_t$	–0.0008	–1.0523	–0.0037***	–3.3325	0.0006	0.7482
$\Delta lnforinv_{t-1}$	–	–	0.0028***	2.6080	–	–
$\Delta lnnfc_t$	–0.3398	–1.4845	0.2437	0.8004	–0.7542***	–2.9551
$\Delta lnnfc_{t-1}$	0.7133***	3.3847	1.3108***	4.5639	0.7793***	2.8979
$lninfr_t$	–	–	–	–		
$lnnoninfr_t$	–	–	–	–	0.7143***	19.0646
$lnnoninfr_{t-1}$	–	–	–	–	–0.2155***	–5.6548
EC_{t-1}	–0.8152***	–19.9193	–0.9576***	–17.3962	–1.1214***	–9.7132
R^2	0.9786		0.9590		0.9800	
$Adjusted\ R^2$	0.9733		0.9503		0.9731	
Lags of ARDL	(2, 2, 2, 1, 2, 0)		(2, 0, 2, 2, 2, 0)		(1, 2, 3, 1, 2, 2)	

From the results of Model 1 given in Table 3 and Table 4, it is evident that a positive relationship exists between public and private investment, which signifies a crowding-in effect of public investment on private investment. Similarly, in Models 2 and 3, we find that both the infrastructure and non-infrastructure public investment have significant positive relationships with private investment, once again indicating a crowding-in effect. Considering the effect of short-term interest rates in Model 2, a significantly negative coefficient indicates that higher short-term interest rates reduce private investment. However, there is a dominant positive effect of public investment.

Table 6: ARDL Estimation of Long-term Interest Rates

Dependent variable: Private Investment						
	Model 1		**Model 2**		**Model 3**	
Variable	**Estimate**	**t-stat**	**Estimate**	**t-stat**	**Estimate**	**t-stat**
Long-run Coefficients:						
$lngsec_t$	–0.0050	–0.7610	–0.0052	–0.5452	–0.0034	–0.4823
$lnforinv_t$	–0.0042**	–2.1542	–0.0057**	–2.3376	–0.0007	–0.2531
$lnnfc_t$	–2.0247***	–2.8577	–2.7678**	–2.5680	–1.3761*	–1.8565
$lnIPub_t$	0.8269***	9.5365	–	–	–	–

$lnopg_t$	0.0035	0.7904	–0.0301	–1.6465	0.0080	1.1619
$lninfr_t$	–	–	0.7422***	6.2634	–	–
$lnnoninfr_t$	–	–	–	–	0.8649***	13.7690
C	0.0646***	2.9240	0.0938***	2.9256	–	–
Error Correction Representation:						
Variable	**Estimate**	**t-stat**	**Estimate**	**t-stat**	**Estimate**	**t-stat**
$\Delta lnIPvt_{t-1}$	–0.0717**	–2.1933	–0.1092*	–1.8369	–0.1037***	–2.9118
$\Delta lngsec_t$	0.0014	0.1543	–	–	0.0047	0.4648
$\Delta lngsec_{t-1}$	0.0288***	3.1381	–	–	0.0437***	4.2158
$\Delta lnopg_t$	–	–	–0.0031	–0.6463	–	–
$\Delta lnopg_{t-1}$	–	–	0.0145***	3.9864	–	–
$\Delta lnforinv_t$	–0.0010	–1.2151	–0.0028**	–2.3986	0.0005	0.5946
$\Delta lnforinv_{t-1}$	0.0016**	2.1304			0.0003	0.2707
$\Delta lnnfc_t$	–0.4967***	–2.8891	0.0087	0.0256	–0.4705***	–3.5422
$\Delta lnnfc_{t-1}$	0.4106**	2.2873	1.3815***	4.2891		
EC_{t-1}	–0.9671***	–29.4119	–0.9489***	–15.3233	–0.9047***	–27.3279
R^2	0.9773		0.9470		0.9735	
$Adjusted\ R^2$	0.9724		0.9377		0.9669	
Lags of ARDL	(2, 2, 0, 2, 2, 0)		(2, 0, 2, 1, 2, 0)		(2, 2, 0, 3, 1, 0)	

Furthermore, the significant negative signs of the non-food credit might be indicative of credit constraints which limit private investment opportunities. The negative coefficient of foreign investment could be associated with the negative bearing on the scale of private investment posed by uncertainty in the stability of funds inflow (see Karun, Vinod, and Chakraborty 2020). The significantly positive output gap indicates that, when the economy operates above its potential, it fosters private investment as economic expansion creates avenues for new opportunities. The error correction coefficients in all three models are negative and indicate higher speeds of adjustment toward equilibrium. The R-squared and adjusted R-squared values suggest that most of the variation in private investment is explained by the models.

5. CONCLUSION

Against the backdrop of the new Monetary Policy Committee (MPC) decisions to maintain status quo policy rates, we analyze the post-pandemic monetary policy stance in India. Using high-frequency data, the term structure of interest rate is analyzed incorporating fiscal deficit and other open economy macroeconomic variables. The results revealed that the fiscal deficit does not significantly determine interest rates in the post-pandemic monetary policy stance in India. The long-term interest rates were strongly influenced by the short-term interest rates, reinforcing that term structure is operating in India. The results further revealed that long-term interest rates were positively influenced by capital flows and inflation expectations, while being inversely impacted by money supply. These inferences have policy implications on the fiscal and monetary policy coordination in India, where it is not the deficits that increase interest rates in India. Our results showed that public infrastructure investment and rate of interest are significant determinants of private corporate investment. Our results counter the popular belief that deficits determine interest rates in the context of emerging economies and "crowd out" private corporate investment. On the contrary, it is crucial to analyze the efficacy of a high-interest-rate regime on public debt management.

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