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Assessing Central Bank Commitment to Inflation Targeting: Evidence from Financial Market Expectations in India

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Abstract:
We propose a novel framework to gauge the credibility of central banks' commitment to an inflation-targeting regime. Our framework combines survey data on macroeconomic forecasts with high-frequency financial market data to understand how inflation targeting makes economic agents change their perception about central bank decisions. Specifically, using the Reserve Bank of India's adoption of inflation targeting in 2015 as a laboratory, we apply two different approaches to estimate a market-perceived monetary policy rule and analyze how it changed with the implementation of inflation targeting. Both approaches indicate that the market perceived a larger response to inflation in the monetary policy reaction function following the adoption of inflation targeting. This evidence suggests that the market viewed the shift to inflation targeting as a credible commitment by the Reserve Bank of India.

JEL Classifications: E44, E47, E52, E58
Keywords: macroeconomic forecasts, financial markets, credibility, inflation targeting, inflation expectations

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1 Introduction

Over the last few decades, the central banks of several countries have adopted an inflation-targeting framework. An important channel through which inflation targeting affects macroeconomic outcomes is the "anchoring" of inflation expectations. Therefore, testing the extent to which inflation expectations became anchored is commonly used as a metric to gauge the success of inflation targeting. However, focusing on the level of realized inflation expectations can be problematic for two reasons. First, it is difficult to separate the effect of central banks' commitment to inflation targeting from the effect of exogenous macroeconomic shocks on inflation expectations. Second, emerging-market economies often lack data on inflation expectations at longer horizons, making it difficult to directly assess the extent of anchoring.

In this paper, we propose an alternative approach for evaluating whether central banks' commitment to inflation targeting is considered credible by economic agents. Our approach is motivated by the theoretical mechanism underlying the benefits of inflation targeting—the central bank uses its policy instrument to stabilize inflation, which then feeds into more stable long-term inflation expectations if the commitment to inflation targeting is perceived as credible. Instead of focusing on realized inflation expectations in isolation, we study how agents' expectations about central bank actions are affected by the adoption of inflation targeting. We use two different estimation frameworks to examine this issue. In both frameworks we combine information from surveys of professional forecasters with high-frequency financial market data.

Our first approach relies on estimating agents' beliefs about central bank responses to macroeconomic variables and studies whether and how these beliefs changed with the adoption of inflation targeting. Specifically, we posit that macroeconomic forecasts by professional forecasters are linked to their expectations of interest rates through a simple monetary policy rule. We then study the changes in the parameters of this market-perceived rule once inflation targeting is implemented. Our hypothesis is that if the inflation targeting regime is credible, then the market-perceived coefficient of the inflation measure should increase relative to the pre-inflation targeting period.

Our second approach estimates the degree to which the financial market revises its forecasts for interest rates in response to macroeconomic news releases and how the degree of revision changed with inflation targeting. The idea here is that the surprise component of macroeconomic news releases should affect the market's expectations for future interest rates and, importantly, that the extent of this effect should depend on the market's beliefs regarding the central bank's commitment to inflation targeting. For example, if a data release announces that inflation is higher than what the market was expecting, then the market may revise up-

ward its expected path of interest rates; that is, the market may anticipate that the central bank will raise interest rates to fight the higher-than-expected inflation. The key insight is that the degree to which market participants revise their interest rate forecasts is linked to their perception about the central bank's resolve to fight inflation.

Using a novel data set, we apply our approach to India, a large emerging-market economy that adopted inflation targeting in 2015. Motivated by the success of previous central banks and also due to a phase of high and volatile inflation in the aftermath of the Global Financial Crisis, the Reserve Bank of India (RBI) rolled out a flexible inflation targeting (FIT) framework in March 2015 and formally adopted it in October 2016.[1] The RBI announced a Consumer Price Index (CPI)–based inflation target of 4 percent with a band of 2 percent around the target. We study the period from January 2010 through February 2020, which we divide into pre-FIT (January 2010 through February 2015) and post-FIT (March 2015 through February 2020) periods, and then estimate agents' expectations of the RBI's actions separately for both periods.

For our first empirical approach, we use data from Consensus Economics and Bloomberg Economic Forecasts, both of which survey a panel of professional forecasters every month and collect their forecasts for key Indian macroeconomic variables, including inflation (measured using India's Consumer Price Index and Wholesale Price Index), output (measured using GDP and the Index of Industrial Production), and nominal INR/USD (rupee/dollar) exchange rates. The monthly frequency of this data is crucial for our estimation. We confirm that the broad patterns in these forecasts are similar to those in the RBI's own survey of professional forecasters, which is conducted at a lower frequency and hence is relatively less useful for our purpose. We combine this survey data with financial market data on overnight index swap (OIS) rates, which are available at a daily frequency and provide a real-time gauge of market expectations about future monetary policy decisions.

Using a monetary policy rule that includes inflation and output growth, we find that the market-perceived response by the RBI to inflation doubles in the post-FIT period. The larger coefficient of inflation in the post-FIT period indicates that the market perceives FIT as a credible commitment on the part of the RBI. We then augment the baseline rule to include exchange rate and interest rate persistence, both of which have been shown to be important in the context of Indian monetary policy. We continue to find a larger market-perceived response by the RBI to inflation in the post-FIT period. Our finding is also robust to using alternative

[1] According to the Monetary Policy Framework Agreement signed on February 20, 2015, the RBI adopted a flexible inflation targeting (FIT) framework that defines the objective of monetary policy as maintaining price stability while keeping in mind the objective of growth. It is called "flexible" because at any point in time, the RBI has three quarters to achieve the inflation target. Failure to achieve the target is defined as Consumer Price Index (CPI) inflation exceeding 6 percent or remaining below 2 percent for three consecutive quarters.

sources of forecasts for all the relevant variables.

As a placebo test, we estimate our specification on forecast data from China for the same "pre-FIT" and "post-FIT" samples. We find that the market-perceived response to inflation does not change meaningfully for China, providing more evidence that the adoption of inflation targeting rather than the effect of macroeconomic factors on emerging economies is driving our result.

For our second approach, we use an alternative data set from Bloomberg that surveys forecasters leading right up to the dates of data releases of prominent macroeconomic indicators. We construct a macroeconomic news surprise measure as the difference between the values announced in the news release and the median expected values prior to the release. Focusing on the macroeconomic news release days, we regress the change in interest rate expectations (proxied by OIS rates) on our news surprise measures. We find that interest rate expectations respond markedly more to macroeconomic news surprises in the post-FIT period. In the pre-FIT period, market participants did not appear to systematically revise their expectations of interest rates in response to news surprises—the coefficients from our regressions are all insignificant. However, there is a noticeable change in the post-FIT period. The size of the coefficients is larger for both CPI and GDP news releases, and they are strongly statistically significant. Moreover, the proportion of the variation in interest rate forecast revisions explained on news release days increases in the post-FIT period; the R^2 from each regression is much higher than in the pre-FIT period. The estimates from this second approach are broadly consistent with the result from the first approach: In the post-FIT period, the market expects the RBI to respond more strongly to inflation.

In addition to our empirical analysis, we show that the reduced-form trends in the data support the estimation results from our two more structural approaches. We find that FIT adoption in India coincided with a reduction in the mean of inflation (CPI) forecasts, from a high of 8.6 percent in the pre-FIT period to 4.5 percent in the post-FIT period, which is close to the RBI's inflation target of 4 percent. We also find a reduction in the variance in the forecasts of inflation and output growth in the time series as well as in the cross section of forecasters. These trends suggests that inflation expectations—at least in the short term—have stabilized since the adoption of FIT.

Our work is similar to the literature attempting to estimate market-perceived monetary policy rules in different settings. In the United States, Hamilton et al. (2011) estimate market-perceived rules using federal funds futures and macroeconomic news surprises, and Bauer et al. (2022) use panel data of survey forecasters to explore time variation. Fendel et al. (2011) estimate "ex-ante" Taylor rules for G7 countries using survey forecasts. Our work is the first

to explore, using two different approaches, this idea in the context of understanding the effects of inflation-targeting adoption.

Our approach that involves analyzing the credibility of inflation targeting is especially suited to emerging economies where financial markets are not well developed. Related work evaluating the adoption of inflation targeting in developed countries relies on measuring long-run inflation expectations using inflation-linked bonds; see, for example Gürkaynak et al. (2007) and Gürkaynak et al. (2010). However, this type of market does not exist in emerging economies such as India. Our approach bypasses this data limitation by using surveys of professional forecasters that are available for a broader set of countries.[2]

In the Indian context, our paper is related to the nascent literature that attempts to evaluate the performance of the country's FIT framework.[3] However, none of these studies examines changes in the market's perception of the RBI's monetary policy reaction function or tests the extent to which the RBI's commitment to inflation targeting has been credible by using professional forecasters' data.

The rest of the paper proceeds as follows. In section 2 we provide a brief background of India's monetary policy framework. In section 3 we discuss the data sources and present some trends in macroeconomic forecasts. In section 4 we describe our first empirical approach and discuss its results. In section 5 we present our second empirical approach and its results. We conclude in section 6.

2 Background of Monetary Policy Framework in India

India's monetary policy framework has gone through a few structural changes over the years in response to evolving macroeconomic and financial conditions. In the aftermath of the financial liberalization reforms of the early 1990s, the RBI adopted a "multiple indicator approach" (MIA) in April 1998. Under this approach, the RBI tracked and analyzed several quantity variables—money supply, credit growth, output growth, trade, capital flows, and fiscal balance—and price variables–rates of return in different financial markets, inflation rates, and exchange rates– to arrive at monetary policy decisions (Dua, 2020). Monetary policy was not governed by any explicit or well-defined objective per se.

After the Global Financial Crisis (GFC), India witnessed persistently high and rising inflation along with declining growth. From 2009 to 2013, Wholesale Price Index (WPI) inflation

[2]Both Consensus Economics and Bloomberg have these data available for a large list of emerging economies.

[3]See, for example, Goyal and Parab (2020), Goyal and Parab (2021b), Goyal and Parab (2021a), RBI (2021), Blagrave and Lian (2020), (Patnaik and Pandey, 2020b), Eichengreen and Choudhary (2021), and Das et al. (2020) among others.

rose to 7 percent, and CPI inflation increased sharply to more than 10 percent. Inflation in India was the highest among all G20 countries. Household inflation expectations became unhinged from the low and stable inflation experience of the 2000–2007 period and increased dramatically (RBI, 2014). Consequently, the credibility of the MIA approach was repeatedly called into question during this period of heightened macroeconomic volatility.

The Expert Committee to Revise and Strengthen the Monetary Policy Framework was established on September 12, 2013, to develop a recommendation for a revised monetary policy framework that would be more transparent and predictable. The committee was better known as the Urjit Patel Committee (UPC), named for the RBI deputy governor (and later governor) who was appointed to head the committee by then-Governor Raghuram Rajan. Echoing the criticism meted out against the MIA framework by all stakeholders, the UPC's report (RBI (2014)) noted that the MIA approach left policy analysts uncertain about what the RBI looked at when making policy decisions, and this uncertainty in turn hampered the anchoring of expectations. The report explicitly recognized the adverse impact of high and volatile inflation on the Indian economy and mentioned that *"given the initial conditions facing India at the current juncture, bringing down inflation must be accorded primacy. Anchored inflation expectations will then provide the latitude to address other objectives without compromising on price stability."*

The committee highlighted the importance of having a transparent and predictable rule-based policy framework centered on a well-defined nominal anchor. The objective was to tie down the goal of monetary policy and its path in the medium to long term so that the expectations of economic agents could adjust accordingly. The committee recommended that inflation become the nominal anchor of the revised monetary policy framework in India and that the RBI adopt flexible inflation targeting (FIT) that would recognize the short-run trade-offs between growth and inflation. The RBI accepted the committee's recommendations.

This led to the signing of the Monetary Policy Framework Agreement (MPFA) between the government of India and the RBI on February 20, 2015, and with this, FIT was formally adopted in India. In May 2016, the Reserve Bank of India Act of 1934 was amended to provide a statutory basis for the implementation of the FIT framework. The amended RBI act provided that the government shall, in consultation with the RBI, determine the inflation target once every five years.

Under the MIA approach, the RBI often used the the WPI rather than the CPI as its preferred measure of inflation, because the WPI was available at high frequency and at a more disaggregated level (Patnaik and Pandey, 2020a). However, in keeping with the recommendations of the Urjit Patel Committee Report, the target under FIT was redefined in terms of the

year-on-year change in headline CPI inflation (including food and fuel prices), which closely reflects the cost of living of an average Indian household. In August 2016, the government established 4 percent CPI inflation as the target for the period from August 5, 2016 through March 31, 2021, with an upper tolerance limit of 6 percent and a lower tolerance limit of 2 percent. After a scheduled review in 2020, this target was renewed for the next five-year period.

One of the main objectives behind adoption of FIT was to establish in a visible and transparent manner that the goal of monetary policy was to ensure that deviations from the target level of inflation on a persistent basis would not be tolerated. This was considered important for stabilizing and anchoring inflation expectations of all economic agents, which in turn would influence their behavior and hence aggregate demand (RBI, 2014). Accordingly, the law outlining the FIT framework contains various provisions to ensure accountability, transparency, and predictability of the monetary policy operating procedure.

The amended RBI Act of 1934 provides that the RBI shall be seen to have failed to meet the target if inflation remains above 6 percent or below 2 percent for three consecutive quarters. In such circumstances, the RBI is required to inform the government about the reasons for the failure and propose remedial measures and the expected time it will take to return inflation to the target.

In most inflation-targeting countries, monetary policy decisions are made by a committee. Accordingly, the amended RBI Act, 1934 provided for the formation of a six-member Monetary Policy Committee (MPC), which is entrusted with the task of determining the policy repo rate required to achieve the inflation target (Patnaik and Pandey, 2020a). The MPC is constituted by the government for a period of four years. It consists of three internal RBI members including the RBI governor, who is the chairperson of the committee, and three external members. The first MPC was constituted in September 2016 and held its first meeting in October 2016.[4] The current MPC was appointed in October 2020.

In every MPC meeting, the repo rate is decided by a majority of votes by the members present at the meeting. Each MPC member has one vote, and in the event of a tie, the governor has a casting vote. Further, according to the act, the RBI must organize at least four meetings of the MPC every year and the meeting schedule for the year must be published on the RBI website at least one week before the year's first meeting. This imparts greater predictability to monetary policy decisions.

Credibility of the FIT framework is crucially contingent on an efficient and transparent communication strategy (Patnaik and Pandey, 2020a). The act requires that resolutions

[4]Therefore, technically October 2016 can also be considered the date of implementation of FIT, in addition to February 2015.

adopted by the MPC must be published on the RBI website after each monetary policy meeting. The RBI must also publish the minutes of the MPC meetings 14 days after every meeting as well as a detailed monetary policy report twice a year, outlining the sources of inflation and the forecasts for inflation.

The implementation of these provisions implies that there has been a marked change in the manner in which monetary policy is conducted in the FIT regime compared with the MIA period. The conduct of monetary policy has become significantly more transparent and communication has become more streamlined and focused (Mathur and Sengupta, 2019).

3 Data

3.1 Surveys of Professional Forecasters

We obtain data on macroeconomic forecasts from two main sources: Consensus Economics and Bloomberg Economic Forecasts.[5]

Consensus Economics Consensus Economics is an international economic survey organization that polls a panel of private-sector economists each month and obtains their latest forecasts for various macroeconomic indicators for multiple horizons. We use the following variables in our regression analysis: GDP growth (YoY,%), growth in the Index of Industrial Production (YoY,%), CPI inflation (YoY,%)[6], WPI inflation (YoY,%), interest rate (level), and INR/USD exchange rate (level). We use the "consensus" estimates available from the survey, but it also contains individual forecasts of the respondents for every macroeconomic indicator. The survey is conducted on a monthly basis, and precise survey dates are available for all the indicators over our sample period (January 2010 through February 2020).[7]

For the variables reported in year-on-year (YoY %) terms, estimates are available for the current fiscal year (which in India runs from April to March) as well as the next fiscal year, relative to the survey date.[8] For the variables reported in levels, 3 months ahead, 12 months

[5]In Appendix A.3, we provide a comparison of forecasts from these sources against the RBI's Survey of Professional Forecasters (SPF) and show that they track each other relatively well. We do not use the RBI's SPF in our main analysis for two reasons: (1) the survey frequency is bimonthly, which means we obtain only half as many data points, and (2) annual inflation forecasts (of both CPI and WPI) are available only from 2017 onward. We provide a complete description of the data available from the SPF in Appendix A.1.5.

[6]In the survey, CPI-Industrial Workers was replaced with CPI-All India Combined (rural plus urban) starting in February 2015.

[7]We chose February 2020 as the end point of our sample to avoid the COVID-19 period. We then chose January 2010 as the starting point of our sample period so that we have a balanced number of observations across the pre- and post-FIT periods.

[8]Consensus Economics names a fiscal year based on the calendar year in which it begins. For example,

ahead, and sometimes 24 months ahead forecasts are available relative to the survey date. We convert the exchange rate forecasts from levels to percentages relative to the survey date before incorporating them in our analysis. For a complete description of the variables that we use from Consensus Economics as well as their forecast horizons, see Appendix A.1.1.

Bloomberg Economic Forecasts Similar to Consensus Economics, Bloomberg polls a panel of private-sector economists to obtain their forecasts of various macroeconomic indicators over multiple time horizons. Forecasters submit their estimates monthly, but they may do so on different days within a calendar month (typically in its last week), so there is no precise survey date for the aggregate estimates. We compute the monthly forecast as the mean of the estimates across forecasters.[9] Of the variables for which forecast estimates are available for India, we use the same four in our regression analysis as we do with Consensus Economics: GDP growth rate, IIP growth rate, CPI, WPI, INR/USD exchange rate change, and interest rate.[10]

The Bloomberg survey has an advantage over Consensus Economics in that it contains estimates over multiple quarterly and annual horizons. But monthly survey values are not available over our entire sample period for some of the macroeconomic indicators. Therefore, we use the Consensus Economics data for our baseline results but confirm our results with Bloomberg Economic forecasts. For a complete description of the variables that we use from Bloomberg Economic Forecasts as well as their forecast horizons, see Appendix A.1.2.

3.2 Overnight Index Swaps

While both Consensus Economics and Bloomberg Economic forecasts provide estimates of interest rate forecasts, the forecast horizons are different from those of the other macroeconomic indicators. Hence, it is difficult to use these forecasts in our regression analysis in a straightforward manner. To overcome this issue, we use data on OIS rates. OIS is a form of interest rate swap where one party is paid a fixed payment while the other party is paid a floating payment tied to the overnight index. As expectations of future interest rates over a given horizon change, so does the OIS rate over that horizon. Therefore, we use OIS rates as a proxy for the private sector's expectations of future interest rates. Recent work by Lak-

FY2020 refers to the fiscal year starting in April 2020 and ending in March 2021. We use this definition throughout our analysis and adjust other data sets accordingly wherever needed.

[9]These data can be accessed on the Bloomberg Terminal using the command "ECFC" or through the various Bloomberg data APIs and navigating to the forecast value as of the last date of the calendar month.

[10]Bloomberg data name a fiscal year based on the calendar year in which it ends. For example, FY2020 refers to the fiscal year starting in April 2019 and ending in March 2020. We reformat the data to match the definition of fiscal years used in Consensus Economics.

dawala and Sengupta (2021) shows that OIS rates are a useful indicator for gauging market expectations about RBI decisions.[11]

3.3 Bloomberg Macroeconomic News Releases

We use data from an additional Bloomberg source that surveys economists about upcoming news releases of major macroeconomic variables. This survey is conducted leading up to the actual news release dates. Typically most economists submit their forecast one to four days before a news release. We take the median estimate from this survey to reflect the consensus market expectations. Then the news surprise is defined as the difference between the variable value reported in the release and the consensus expectation. We focus on CPI and GDP news releases.

3.4 Assessing Trends in the Data

In this subsection, we present summary statistics of the forecast data and highlight some patterns in the pre- versus post-FIT samples. We begin by analyzing the time series of the "consensus" (cross-sectional mean) macroeconomic forecasts. This will help to assess a) how sensible the consensus forecasts are when compared with the realized values, and b) how they might have changed in the post-FIT period. One of the primary objectives of FIT is to stabilize inflation expectations. Therefore, it is useful to check whether any significant changes in the forecasts occurred around the FIT adoption period.

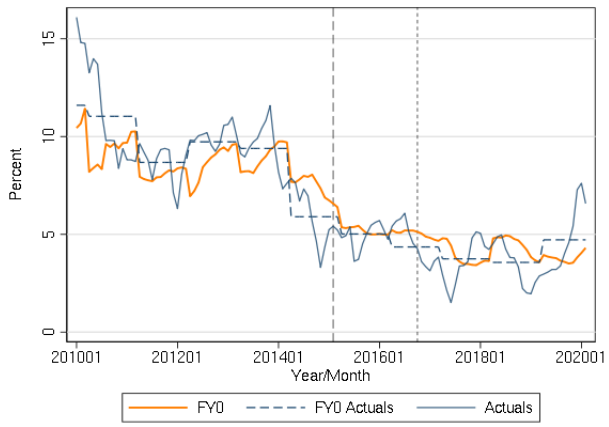
Figure 1 shows the Consensus Economics forecasts for inflation and output growth along with their actual (realized) time series values (in solid blue). We consider two inflation measures—CPI in panel (a), WPI in panel (c)—and two output measures—GDP in panel (b) and IIP in panel (d). For all these variables, we show the forecasts for the current fiscal year and overlay two vertical lines to represent February 2015 and October 2016, which correspond respectively to the two FIT adoption dates discussed above.[12] We find that across all

[11] There might still be a concern that while the macroeconomic forecasts reflect the expectations of the economists and firms that were polled in the surveys, the OIS rates reflect the expectations of the financial market more generally, which is a different entity. To ameliorate these concerns, we do two things. One, we verify that the horizons for which interest rate forecasts are available within Consensus Economics or Bloomberg Economic forecasts line up well with the forecasts for that horizon computed based on the OIS rates. This comparison is shown in Figures A.1 and A.2 in Appendix A.2. Two, we follow Fendel et al. (2011) in constructing 3-month and 12-month ahead forecasts of output growth and inflation from their fiscal year forecast values, which we then use in the regressions along with interest rate and exchange rate forecasts for the same horizons.

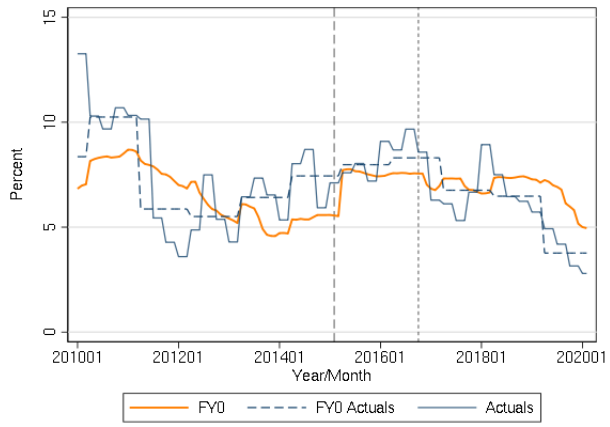
[12] There is a discrepancy in the horizon over which the forecasts are made in Consensus Economics relative to the horizon for which the actual value is computed. To overcome this discrepancy, we compute the actual counterparts of the variables for which the forecasts are made, labeling these "FY0 Actuals" (in dashed blue)

the panels, the forecasts track the trends in the actual data reasonably well.

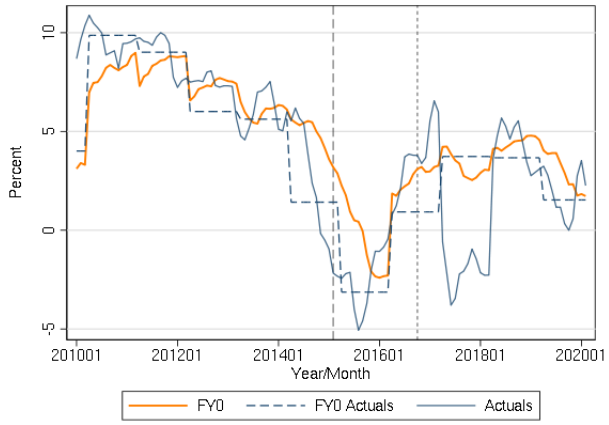
Figure 1: Time Series of Forecasts vs. Actual Values



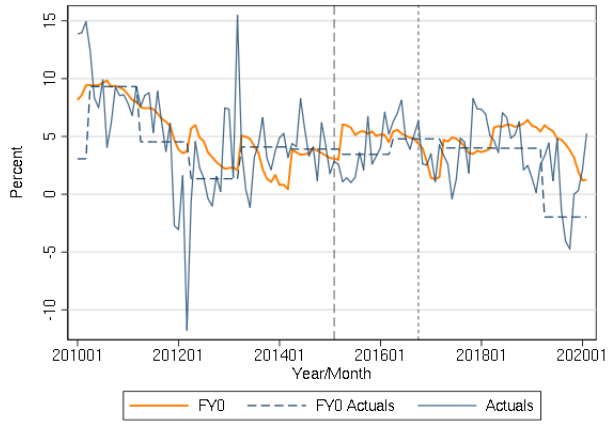
(a) CPI inflation



(b) GDP growth



(c) WPI inflation



(d) IIP growth

Notes: The long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date. *Source:* The forecasts are from Consensus Economics. The time series of the actual values of CPI, WPI, and IIP are obtained from the Centre for Monitoring Indian Economy (CMIE). The time series of the actual values of GDP are from the FRED database.

Next, we analyze how trends in the forecast data changed around the implementation of the FIT regime. We present summary statistics of the forecasts in Table 1. A few main patterns emerge, which can be gauged from Figure 1 as well as Table 1. First, there has been a significant reduction in the mean of the inflation forecasts in the post-FIT period, while the mean of the output growth forecasts has remained roughly unchanged relative to the pre-FIT

in figure 1. We explain this computation in detail in Appendix A.1.3.

period. Particularly noticeable is the decline in the mean of the forecast of CPI inflation, which has fallen from 8.6 percent in the pre-FIT period to 4.5 percent in the post-FIT period. This is close to the RBI's inflation target of 4 percent. Second, there has been a significant reduction in the variance of the current FY forecasts of both inflation (based on CPI) and output growth (based on GDP as well as IIP) in the post-FIT period. This is reassuring, because with a clear inflation target, inflation forecasts should move closer to the inflation target, and that should, through general equilibrium channels, reduce the variation in the forecasts of the other macroeconomic indicators as well.

Table 1: Summary Statistics of the Forecasts

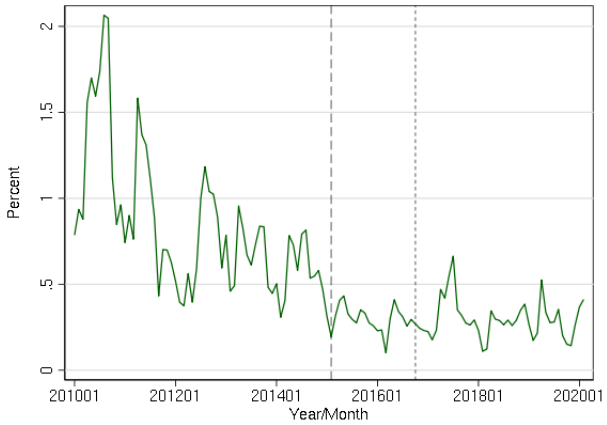
	Mean			Standard Deviation		
	Pre-FIT	Post-FIT	p-value	Pre-FIT	Post-FIT	p-value
GDP growth	6.560	7.074	0.007	1.306	0.666	0.000
CPI inflation	8.621	4.504	0.000	1.019	0.713	0.007
WPI inflation	6.792	2.531	0.000	1.603	1.922	0.163
IIP growth	5.142	4.612	0.185	2.767	1.373	0.000
Observations	62	60		62	60	

Notes: The table reports the mean and standard deviation (SD) of forecasts of various macroeconomic aggregates for the current fiscal year in the pre- and post-FIT periods. It also reports the p-value of the difference between the statistics in the pre- and post-FIT periods. The pre-FIT period runs from January 2010 through February 2015, while the post-FIT period runs from March 2015 through February 2020. *Source:* Forecast values are from Consensus Economics.

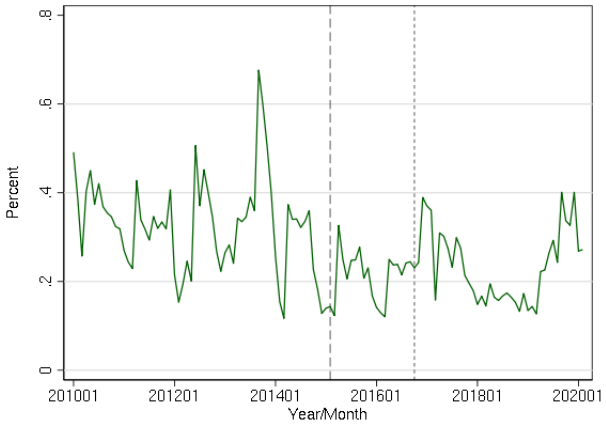
Using the forecasts of the individual survey participants, we also study how disagreement across forecasters has changed since the adoption of FIT. Specifically, for each month we plot the cross-sectional standard deviation of the current fiscal year forecasts across the forecasters. If the FIT mandate was credible, we would expect the forecasts from individual respondents, especially for CPI inflation, to converge. In other words, we would expect the cross-sectional standard deviation of the forecasts to be lower in the post-FIT period.

Panel (a) in Figure 2 shows that there is a clear decline in the standard deviation of CPI inflation forecasts in the post-FIT period. This pattern of decline in disagreement across forecasters is not apparent in GDP and IIP forecasts.

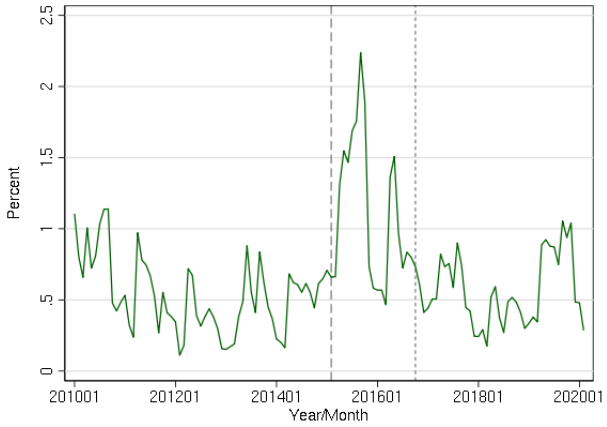
Figure 2: Standard Deviation of Estimates from Individual Forecasters



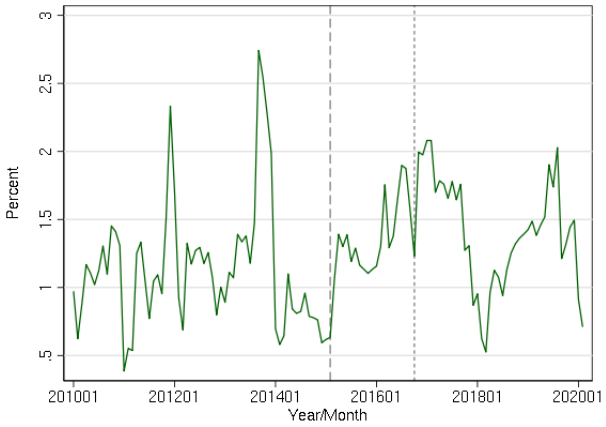
(a) CPI inflation



(b) GDP growth



(c) WPI inflation



(d) IIP growth

Notes: The long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date. *Source*: All forecast values are from Consensus Economics.

Overall, the analysis in this section suggests that the forecast data are reliable and that there has been a decline in the mean, time-series variance, and cross-sectional variance of inflation forecasts coinciding with the adoption of FIT. It is, of course, possible that these patterns have been driven by macroeconomic factors other than the adoption of FIT. Therefore, we next employ two structural approaches to isolate the effects of the FIT adoption from other changes in macroeconomic conditions.

4 Estimation Using Survey Forecasts

In this section, we present our first empirical approach, which estimates the market's perception of the RBI's reaction function. The idea is that when central banks implement inflation targeting, they assign a greater weight to inflation (relative to other macroeconomic indicators such as output growth) in their objective function (Eichengreen and Choudhary (2021). Therefore, to the extent that the commitment to FIT is perceived as credible by economic agents in India, it should correspondingly be reflected in their perception of the monetary policy reaction function through a greater (relative) weight of inflation in the post-FIT period than in the pre-FIT period.

To estimate the market-perceived reaction function, we need to take a stance on its functional form. There is general consensus in the literature as well as in the RBI's statements that the RBI pays attention to inflation, output growth, and occasionally exchange rate changes in formulating its policy rate. Therefore, for our baseline results, we assume a simple functional form for the monetary policy rule that is linear in inflation and output growth, as represented by the following equation:

$$i_t = i^* + \beta\left(\pi_t - \pi^*\right) + \delta y_t + u_t, \tag{1}$$

where i_t is the RBI's policy rate, i^* is the long-run or "neutral" nominal interest rate, π_t is the inflation rate, π^* is the inflation target, y_t is the (real) output growth rate, and u_t is an independently and identically distributed monetary policy shock with mean zero.

To estimate the market perception of the RBI's baseline reaction function, that is, what the market believes are the coefficients β and δ in equation 1, we link the forecasts of interest rates with forecasts of macroeconomic indicators. Leading equation 1 by h periods and taking expectations on both sides we get:

$$E_t i_{t+h} = i^* + \beta E_t\left(\pi_{t+h} - \pi^*\right) + \delta E_t y_{t+h} + E_t u_{t+h}, \tag{2}$$

where E_t denotes expectations conditional on the information set available at time t and $E_t u_{t+h} = 0$. Combining the time-invariant terms into a constant, we end up with the following equation:

$$E_t i_{t+h} = \alpha + \beta E_t \pi_{t+h} + \delta E_t y_{t+h}. \tag{3}$$

We estimate this equation using forecasts for interest rates, inflation, and output growth using ordinary least squares (OLS). In principle, OLS estimation of monetary policy rules and thus the above market-perceived monetary policy rule suffers from endogeneity concerns. However,

recent work by Carvalho et al. (2021) argues that in practice the bias introduced by OLS is small and that OLS and instrumental variable estimates are very similar. We also consider an augmented reaction function where we include the nominal exchange rate change as an additional target of monetary policy. This gives rise to the following estimating equation:

$$E_t i_{t+h} = \alpha + \beta E_t \pi_{t+h} + \delta E_t y_{t+h} + \gamma E_t e_{t+h}, \tag{4}$$

where e_t is the percentage change in the nominal exchange rate.

We estimate equations 3 and 4 adding an error term to reflect the measurement error in the forecast data. The split-sample estimates of these equations for the pre-FIT and post-FIT samples will allow us to draw inference about the market's beliefs regarding how FIT changed the RBI's resolve to fight inflation. If the RBI succeeded in signaling its credible commitment to FIT, then we would expect the coefficient β to be higher in the post-FIT period than in the pre-FIT period across both regression specifications.

For the forecasts of macroeconomic variables in our baseline results, we use the monthly panel of annual forecasts from Consensus Economics. We then verify that the results are robust to using annual Bloomberg Economic Forecasts data as well. We use GDP as the measure of output in both the pre-FIT and post-FIT periods. For inflation, the RBI focused on two different measures in our 2010–2020 sample: WPI and CPI. Before Raghuram Rajan's tenure as governor of the RBI (which started in September 2013), the bank primarily considered WPI inflation when setting interest rates. Since Rajan's tenure, which ended in 2016, the RBI has focused on CPI inflation. This potentially complicates our approach that involves comparing the coefficient on inflation in pre- versus post-FIT samples. Fortunately, Consensus Economics has survey forecasts for both CPI and WPI inflation. This enables us to account for the change in the inflation measure used by the RBI in answering our main question about the market-perceived responsiveness to inflation since FIT adoption.

We do this by combining the two measures into one single measure that we call "combined inflation"—we set this measure equal to the WPI inflation forecast in the pre-September-2013 period and the CPI inflation forecast in the post-September-2013 period, in keeping with the change in the RBI's policy. We also conduct the estimation separately using CPI and WPI inflation in both samples. This helps us investigate whether the market indeed believed that the RBI considered WPI its preferred inflation measure in the pre-Rajan-tenure period and CPI inflation in the post-Rajan-tenure period, that is, since 2013.

For interest rate forecasts, we use expectations measured using OIS rates from Bloomberg. This choice is motivated by the lack of ideal interest rate forecast data in the two surveys. As explained in Section 3 above, in the Consensus Economics data, the interest rate forecast

horizons do not match the macroeconomic forecast horizons. Thus we rely on OIS rates. We use daily data on OIS contracts of maturities of one, two, three, six, and nine months and of one, two, and three years in our analysis, aggregating to monthly frequency by averaging over the days in a month. The OIS analysis requires that the horizon of the forecast for the interest rate on the left-hand side of the monetary policy reaction function is the same as the horizon for the forecasts of the macroeconomic indicators on its the right-hand side. Since reliable OIS rates are available only for limited monthly maturities, we reformat the data so that the interest rate forecasts are over the same horizon as the forecasts of macroeconomic indicators. The details of this reformatting are provided in Appendix A.1.5.

Table 2: Estimates of the Market-Perceived Monetary Policy Reaction Function

	Dependent Variable: Interest Rate							
	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Combined Inflation	0.354***	0.659***					0.396***	0.674***
	(3.51)	(4.19)					(3.89)	(4.34)
GDP Growth	-0.483***	0.238	-0.586***	0.238	-0.679***	0.653***	-0.547***	0.272
	(-7.24)	(1.53)	(-8.84)	(1.53)	(-9.03)	(4.29)	(-7.49)	(1.80)
CPI Inflation			-0.231	0.659***				
			(-1.90)	(4.19)				
WPI Inflation					0.328***	-0.115***		
					(3.47)	(-5.34)		
Exchange Rate Change							-0.0553*	-0.0926***
							(-2.45)	(-5.42)
Constant	8.407***	1.651**	13.40***	1.651**	10.12***	2.082	8.426***	1.433*
	(8.75)	(2.70)	(11.49)	(2.70)	(19.81)	(1.84)	(9.40)	(2.46)
Observations	124	120	124	120	124	120	124	120
R^2	0.468	0.535	0.380	0.535	0.450	0.362	0.490	0.588
Adjusted R^2	0.459	0.527	0.369	0.527	0.441	0.351	0.477	0.578

Notes: The pre-FIT period runs from January 2010 through February 2015, while the post-FIT period runs from March 2015 through February 2020. T-statistics are in parentheses. "Combined inflation" refers to WPI inflation forecast in the pre-Rajan period and CPI inflation forecast in the post-Rajan period. *Source:* CPI inflation, GDP growth, WPI inflation, and exchange rate forecasts are from Consensus Economics. OIS rates are from Bloomberg.

In the first two columns of Table 2, we present our main result from estimating equation 3 using our combined inflation measure separately for the pre- and post-FIT samples. The market-perceived response to inflation doubles in the post-FIT period. Specifically, the market

perceived that a 1 percentage point (p.p.) rise in inflation led to a contemporaneous 0.35 p.p. increase in the policy rate in the pre-FIT period compared with a 0.66 p.p. increase in the policy rate in the post-FIT period. The coefficients are also strongly statistically significant. The GDP growth coefficient was negative in the pre-FIT period but is small and insignificant in the post-FIT period, suggesting that in the post-FIT sample, forecasters expect the RBI to respond robustly to inflation but not to output growth.

The literature on Indian monetary policy suggests that the exchange rate is also an important determinant of the central bank's policy decisions; see for example, Hutchison et al. (2010), Hutchison and Singh (2013). While Consensus Economics contains exchange rate forecast data, these are available only for 3 months, 12 months, and 24 months ahead of the survey date, and therefore they may not align with the fiscal-year-based forecasts of inflation and output growth. We address this issue by considering $E_t e_{t+h}$ as the exchange rate forecast that is closest to the forecast horizon being used (either the end of the current fiscal year or the next fiscal year).[13] Columns (7) and (8) show results from estimating equation 4, which includes the exchange rate change in the market-perceived reaction function. We find that the baseline coefficients of inflation in both the pre-FIT and post-FIT periods remain essentially unchanged when the forecasts of exchange rate change are included.

We also investigate whether the market's perception about the importance of CPI versus WPI inflation in the monetary policy framework has been consistent with the RBI's announced changes. To do this, we rerun our estimation of equation 3 using CPI and WPI inflation, respectively, and report these results in columns (3) through (6). We find that the market perceived that CPI inflation was not a significant determinant of the RBI's policy rate in the pre-FIT period but that WPI inflation was. However, in the post-FIT period, CPI inflation is perceived to be a significant driver of the RBI's policy, while WPI inflation has a small negative impact on the policy rate. Thus, the RBI's switch to CPI from WPI as its preferred inflation measure seems to have been internalized by the private forecasters.

4.1 Interest Rate Persistence

Interest rate persistence has been shown to be an important determinant of the RBI's monetary policy.[14] Accounting for persistence in the market-perceived reaction function is straightforward in theory, but the resulting function is difficult to estimate given the limitations of our forecast data. To see this clearly, suppose the market perceives a monetary policy reaction

[13] We find that the results are also robust to using quarterly data from Bloomberg Economic Forecasts, for which such a manual alignment of the horizons is not required.

[14] See for example, Hutchison et al. (2010) and Hutchison and Singh (2013).

function of the following form:

$$i_t = i^* + \varrho i_{t-1} + (1-\varrho)\left[\beta\left(\pi_t - \pi^*\right) + \delta y_t\right] + u_t, \tag{5}$$

where i_{t-1} is the lagged interest rate, and ϱ is the importance of interest rate inertia in the monetary policy reaction function. If we iterate this equation forward by h periods, take expectations on both sides, and combine the constant into a common term as we did before, we get:

$$E_t i_{t+h} = \alpha + \varrho E_t i_{t+h-1} + \beta E_t \pi_{t+h} + \delta E_t y_{t+h}, \tag{6}$$

which we could, in theory, simply estimate using OLS. However, this requires data on lagged interest rate forecasts, $E_t i_{t+h-1}$, which we do not have because the OIS rates are reliable only for limited maturities.[15] We work around this issue by noting that the monetary policy rule with inertia can be written as a function of lagged macroeconomic forecasts:

$$i_t = \tilde{i^*} + \sum_{j=0}^{\infty} \beta_j \left(\pi_{t-j} - \pi^*\right) + \sum_{j=0}^{\infty} \delta_j y_{t-j} + u_t, \tag{7}$$

We then make the assumption that three quarters' worth of lags is enough to empirically capture the RBI's interest rate smoothing. Iterating forward, taking expectations at time t and combining constant gives us the following estimating equation:

$$E_t i_{t+h} = \alpha + \sum_{j=0}^{3} \beta_j E_t \pi_{t+h-j} + \sum_{j=0}^{3} \delta_j E_t y_{t+h-j}. \tag{8}$$

We still cannot estimate the above equation using the Consensus Economics data. However, we can use the quarterly Bloomberg Economic Forecasts data for this purpose. Because WPI forecasts from Bloomberg are not available prior to 2014, we cannot use the combined inflation measure as in Table 2. So, instead we use the CPI inflation measure both for the pre- and post-FIT periods.

The cumulative coefficients from equation 7 are reported in Table 3.[16] Interest rate per-

[15] For the OIS rate, there is only enough liquidity in the market for one-, two-, three-, six-, nine-, and twelve-month maturities. Therefore, on the LHS, we can consider $h = 1, 2, 3, 6, 9, 12$ months. This implies that on the RHS, $E_t i_{t+h-1}$ will require interest rate forecasts (OIS rates) data for $h-1 = 0, 1, 2, 5, 8, 11$ months ahead from the perspective of month t. Since we do not have reliable data for all these maturities, we would need to substitute them with the closest available maturity that does not exceed the corresponding h. Therefore, for $h = 2, 3, 6, 9, 12$ we would consider $h - 1 = 1, 2, 3, 6, 9$ months. However, approximation using the closest maturity on the LHS as well as RHS is problematic and can lead to approximated lags of interest rate forecasts that are quite different from the lags that we really need.

[16] We ignore the exchange rate terms here to prevent the table from becoming unwieldy, but including them

sistence is clearly an important component in the market-perceived reaction function, as indicated by the increase in R^2 when it is included in the estimation (compared with columns 3 and 4 in Table 2). Even with this augmented reaction function, the main result remains the same: The coefficient of CPI inflation is significantly higher in the post-FIT sample across all the specifications. The market perceived that a 1 p.p. higher CPI inflation leads to a 0.6 p.p. higher interest rate response in the post-FIT period relative to the pre-FIT period.

Table 3: Estimates of the Market-Perceived Monetary Policy Reaction Function with Interest Rate Persistence

	Dependent Variable: Interest Rate	
	Pre-FIT	Post-FIT
	(1)	(2)
CPI Inflation	-0.163***	0.427***
	(-2.01)	(9.95)
GDP Growth	-0.346***	0.629***
	(-3.40)	(14.17)
Constant	11.62***	-0.0565
	(23.81)	(-0.17)
Observations	210	240
R^2	0.536	0.641
Adjusted R^2	0.518	0.629

Notes: The pre-FIT period runs from January 2010 through February 2015, while the post-FIT period runs from March 2015 through February 2020. The lagged interest rate coefficient is given by the sum of the coefficients on lags of CPI inflation and GDP growth over the previous three quarters relative to the survey date. T-statistics are in parentheses. *Source:* CPI and GDP forecast values are from Bloomberg Economic Forecasts. OIS rates are from Bloomberg.

4.2 Using Interest Rate Forecasts from Consensus Economics

One concern with our analysis so far could be that while the inflation and output forecasts capture the perceptions of the professional forecasters who participate in the Consensus Economics and Bloomberg surveys, the OIS rates capture the perceptions of the financial market more generally. Therefore, there could be some inconsistency between the forecasts on the left- and right-hand sides of our market-perceived reaction function. To get around this issue, we try an alternative estimation using the forecasts of all our macroeconomic variables

leaves the inflation and output growth coefficients at all lags unchanged.

of interest—inflation, output growth, interest rate, and exchange rate—from Consensus Economics.

As discussed above, the interest rate and exchange rate forecasts in the Consensus Economics data are available for three months and twelve months ahead of the survey date. However, the inflation and GDP growth forecasts are available for the current and next fiscal years. Therefore, to align the forecast horizons of inflation and GDP growth with those of the interest rate and exchange rate forecasts, we make some algebraic adjustments following Fendel et al. (2011). We compute the three-month-ahead forecast for inflation/output growth using the following formula:

$$f_{3m} = \frac{f_t * m + f_{t+1} * (3 - m)}{3}, \tag{9}$$

where f_t is the forecast for the current fiscal year, f_{t+1} is the forecast for the next fiscal year, and $m = 3$ if the number of months left in the current fiscal year is greater than 2, otherwise m equals the number of months left in the current fiscal year.

Similarly, we compute the 12-month-ahead forecast for inflation/output growth using the following formula:

$$f_{12m} = \frac{f_t * m + f_{t+1} * (12 - m)}{12}, \tag{10}$$

where f_t is the forecast for the current fiscal year, f_{t+1} is the forecast for the next fiscal year, and m is the number of months left in the current fiscal year.

We then run four different regression specifications. In the "short-term" regressions, we regress the three-month-ahead interest rate forecast on the three-month-ahead inflation and output growth forecasts. In the "medium-term" regressions, we regress the twelve-month-ahead interest rate forecast on the twelve-month-ahead inflation and output growth forecasts. In the "forward" regressions, we regress the twelve-month- ahead interest rate forecast on the three-month-ahead inflation and output growth forecasts. In the "pooled" regression, we pool together the three-month and twelve-month forecasts and regress the interest rate forecasts for three or twelve months ahead on the inflation and output growth forecasts over the corresponding horizons. We run each of these specifications separately for the pre-FIT and post-FIT periods. The results of this exercise are shown in Table 4. We find that across all the specifications, the coefficients of inflation are positive and significant in both the pre- and post-FIT period, but they are larger in the post-FIT sample. On the other hand, coefficients of GDP growth were negative and significant in the pre-FIT period, while they are positive and significant in the post-FIT period.

Table 4: Estimates of the Market-Perceived Reaction Function with CE Interest Rate Forecasts

	Dependent Variable: 3-Month Interest Rate							
	Pre-FIT Short	Post-FIT Short	Pre-FIT Medium	Post-FIT Medium	Pre-FIT Forward	Post-FIT Forward	Pre-FIT Pooled	Post-FIT Pooled
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Combined Inflation	0.378**	0.482**	0.351*	0.560*	0.298**	0.360*	0.335**	0.511***
	(2.77)	(2.87)	(2.60)	(2.43)	(3.23)	(2.14)	(3.19)	(3.83)
GDP Growth	-0.642***	0.463**	-0.466***	0.547*	-0.400***	0.533**	-0.555***	0.483***
	(-6.09)	(2.81)	(-5.56)	(2.01)	(-5.13)	(3.28)	(-8.09)	(3.42)
Constant	8.750***	1.296*	8.055***	0.218	7.746***	1.396*	8.629***	0.964
	(8.41)	(2.06)	(7.72)	(0.21)	(10.72)	(2.10)	(10.29)	(1.73)
Observations	62	60	62	60	62	60	124	120
R^2	0.484	0.670	0.428	0.648	0.443	0.610	0.442	0.649
Adjusted R^2	0.466	0.659	0.408	0.636	0.424	0.597	0.432	0.643

Notes: The pre-FIT period runs from January 2010 through February 2015, while the post-FIT period runs from March 2015 through February 2020. T-statistics are in parentheses. *Source:* CPI inflation, WPI inflation, GDP growth, and interest rate forecasts are from Consensus Economics.

We also confirm that our results do not change when we augment the market-perceived reaction function with the exchange rate change as a determinant of the central bank's policy rate, that is, when we estimate a reaction function including the forecasts of the INR/USD exchange rate change on the right-hand side. The results of this exercise are shown in Table A.9 in the Appendix.

We conduct robustness checks that are not presented due to space constraints. Our preferred source of survey forecasts for the main results is Consensus Economics. In Appendix A.4.1, we rerun our results using the survey data from Bloomberg Economic forecasts and again find that the results are very similar.

We conclude this section by performing a placebo test of sorts. We collect forecast data from Consensus Economics for China and estimate the specifications reported in Table 4. In our sample period, China did not adopt inflation targeting or make any major changes to its monetary policy framework. Thus, if the adoption of inflation targeting is driving our results for the RBI, then we should not expect to see similar changes in the estimated coefficients for China. On the other hand, if global macroeconomic factors are affecting both India and China, then we may expect to see similar changes in the coefficients for China. The results for China are presented in Table A.10. The market-perceived response to inflation in China does not change meaningfully in the two samples. This provides some reassuring support for our main hypothesis that adoption of FIT is changing the market's perception about how

monetary policy is conducted in India.

5 Estimation Using Macroeconomic News Surprises

In this section, we explore an alternative way to gauge changes in the market's perception of the RBI's monetary policy reaction function following the implementation of FIT. The idea is to study how the market revises its expectations of interest rates in response to macroeconomic news releases and whether this may have changed with FIT. If, for example, an inflation data release indicates that prices are rising faster than was expected by economic agents, then any corresponding change in the market's expectations of the interest rate path followed by the RBI should be informative about the market-perceived monetary policy rule.

To construct news surprises, we use median consensus expectations of macroeconomic variables, namely GDP and CPI, from Bloomberg's survey of economists (as described in Section 3).

We define the news surprise as the difference between the actual data release and this consensus expectation. To measure the change in the market's expectations about the path of the policy interest rate we use OIS rates. Specifically, we look at a two-day change in the OIS rate around the macroeconomic data release date. For a given release on day t, ΔOIS_t^h is defined as $OIS_{t+1} - OIS_t$.

We run OLS regressions of the change in OIS rate of horizon h on the news surprise ($surp_t = actual_t - median_t$) as follows:

$$\Delta OIS_t^h = \alpha + \beta surp_t + \varepsilon_t. \tag{11}$$

We present the results from estimating equation 11 in Table 5. The top rows show the estimates for the pre-FIT sample, and the bottom rows show the estimates for the post-FIT sample.

There is a certain amount of overlap between news release dates. To account for this overlap issue, we control for all the news surprises that happen on a given day while estimating equation 11.[17] For example, if the CPI and IIP data come out on the same day, then we regress the OIS rate changes on both the CPI and IIP news surprises but only report the coefficient on the CPI news surprise.

A striking pattern emerges from the table. The pre-FIT coefficients were small and sta-

[17]There are 12 days when the CPI news release coincides with the WPI news release. Moreover, for most of the sample, the IIP news also is released on the same day as the CPI news is released (52 overlap days in our sample).

tistically insignificant for both GDP and CPI. This implies that there was no systematic relationship between news surprises and revisions of interest rate expectations in the pre-FIT sample. In the post-FIT sample, however, this pattern changes drastically, with OIS rates responding substantially and strongly statistically. The coefficients are all positive. This is consistent with a positive coefficient in the market-perceived monetary policy rule in the post-FIT period for both inflation and output. In other words, when news about the economy is more "positive" than expected (for example, if the release reports that inflation is higher than the market's expectations), then the market expects the RBI to respond by raising rates. Moreover, the R^2 from the post-FIT regressions are much higher compared with the pre-FIT regressions. Finally, we note that this result is not driven by changes in the nature of news surprises themselves in the post-FIT sample. In fact, the standard deviation of both GDP and CPI news surprises is higher in the pre-FIT sample, suggesting that the pre-FIT results are not driven by a lack of variation in the regressor (that is, news surprises).

Overall, these results suggest that in the post-FIT period, an important component of movement in market expectations about future interest rates is systematically tied to surprise news about inflation and output, whereas this pattern was not present in the pre-FIT period.

Table 5: Interest Rate Forecast Response to Macroeconomic News Surprises

	Dependent Variable: Interest Rate Change							
	3m		6m		9m		1y	
	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT
GDP Growth	0.04	0.02	0.06	0.03	0.05	0.04**	0.06	0.04**
Surprise	(0.51)	(1.11)	(0.80)	(1.59)	(0.64)	(2.33)	(0.78)	(2.61)
Observations	20	18	20	18	20	18	20	18
R^2	0.02	0.06	0.05	0.12	0.04	0.21	0.06	0.19
	3m		6m		9m		1y	
	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT
CPI Inflation	0.01	0.05**	-0.05	0.08***	-0.01	0.10***	0.01	0.11***
Surprise	(0.19)	(3.81)	(-0.77)	(4.36)	(-0.26)	(4.61)	(0.12)	(5.32)
Observations	22	58	22	58	22	58	22	58
R^2	0.15	0.14	0.19	0.26	0.21	0.28	0.22	0.33

Notes: The table reports results from regressions of OIS-rate changes of different horizons on the surprise

component of macroeconomic news releases. T-statistics calculated using heteroskedasticity-robust standard errors are in parentheses. The pre-FIT period runs from January 2010 through Jan 2015, while the post-FIT period runs from February 2015 through December 2019. The CPI sample starts in January 2013. *Source:* CPI inflation and GDP growth surprises are computed using authors' calculations based on Bloomberg data, and interest rate forecasts are from Bloomberg.

6 Conclusion

In this paper, we formulate a new approach to assess the credibility of central banks' commitment to inflation targeting. We combine a variety of survey forecasts with high-frequency financial market data to study how economic agents change their beliefs about central bank actions after the adoption of inflation targeting. We apply our methodology to study the case of India, where the Reserve Bank of India (RBI) adopted a flexible inflation targeting regime in 2015. Our main result is that since the adoption of inflation targeting, markets believe that the RBI has been more responsive to inflation. This is consistent with an important goal of inflation targeting: making the central bank more transparent and credible in its fight against inflation.

In recent decades, some countries have evolved their monetary policy framework from inflation targeting to inflation forecast targeting; see, for example, Clinton et al. (2015) for a comprehensive survey. This inflation-forecast-targeting approach involves making the inflation forecast of the central bank itself an intermediate target, with more sophisticated approaches involving publication of a conditional forecast path, different scenarios, and uncertainty around the forecast path. Our framework can be easily adapted to evaluate the credibility of such a regime change as well.

References

Bauer, Michael D, C PFlueger, and A Sundaram (2022) "Perceptions about Monetary Policy," *unpublished manuscript, University of Chicago*.

Blagrave, Patrick and Weicheng Lian (2020) "India's Inflation Process Before and After Flexible Inflation Targeting," *International Monetary Fund, Working Paper*, 20/251.

Carvalho, Carlos, Fernanda Nechio, and Tiago Tristao (2021) "Taylor Rule Estimation by OLS," *Journal of Monetary Economics*, 124, 140–154.

Clinton, Kevin, Charles Freedman, Michel Juillard, Mr Ondrej Kamenik, Mr Douglas Laxton, and Hou Wang (2015) *Inflation-Forecast Targeting: Applying the Principle of Transparency*: International Monetary Fund.

Das, Satadru, Jay Surti, and Shekhar Tomar (2020) "Does Inflation Targeting Help Information Transmission?"Technical report, SSRN.

Dua, Pami (2020) "Monetary Policy Framework in India," *Indian Economic Review*, 55 (1), 117–154.

Eichengreen, Gupta Poonam, Barry and Rishabh Choudhary (2021) "Inflation Targeting in India: An Interim Assessment," India Policy Forum 1, National Council of Applied Economic Research.

Fendel, Ralf, Michael Frenkel, and Jan-Christoph Rülke (2011) "'Ex-ante'Taylor rules–Newly Discovered Evidence from the G7 Countries," *Journal of Macroeconomics*, 33 (2), 224–232.

Goyal, Ashima and Prashant Parab (2020) "Inflation Convergence and Anchoring of Expectations in India," *Economic and Political Weekly*, 55 (47).

——— (2021a) "What Influences Aggregate Inflation Expectations of Households in India?" *Journal of Asian Economics*, 72.

——— (2021b) "Central Bank Communications and Professional Forecasts: Evidence from India," *Journal of Emerging Market Finance*, 20 (3).

Gürkaynak, Refet, Andrew Levin, and Eric Swanson (2010) "Does Inflation Targeting Anchor Long-run Inflation Expectations? Evidence from the US, UK, and Sweden," *Journal of the European Economic Association*, 8 (6), 1208–1242.

Gürkaynak, Refet, Andrew T Levin, Andrew N Marder, and Eric T Swanson (2007) "Inflation Targeting and the Anchoring of Inflation Expectations in the Western Hemisphere," *Series on Central Banking, Analysis, and Economic Policies, no. 11*.

Hamilton, James D, Seth Pruitt, and Scott Borger (2011) "Estimating the Market-perceived Monetary Policy Rule," *American Economic Journal: Macroeconomics*, 3 (3), 1–28.

Hutchison, Michael, Rajeswari Sengupta, and Nirvikar Singh (2010) "Estimating a Monetary Policy Rule for India," *Economic and Political Weekly* (38), 67–69.

Hutchison, Sengupta Rajeswari, Michael M. and Nirvikar Singh (2013) "Dove or Hawk? Characterizing Monetary Policy Regime Switches in India," *Emerging Markets Review* (16), 183–202.

Lakdawala, Aeimit and Rajeswari Sengupta (2021) "Measuring Monetary Policy Shocks in India," *Available at SSRN 3905642*.

Mathur, Aakriti and Rajeswari Sengupta (2019) "Analysing Monetary Policy Statements of the Reserve Bank of India," IHEID Working Papers 08-2019, Economics Section, the Graduate Institute of International Studies.

Patnaik, Ila and Radhika Pandey (2020a) "Moving to Inflation Targeting," Working Papers 20/316, National Institute of Public Finance and Policy.

——— (2020b) "Four Years of the Inflation Targeting Framework," Working Papers 20/325, National Institute of Public Finance and Policy.

RBI (2014) "Report of the Expert Committee to Revise and Strengthen the Monetary Policy Framework,"Technical report, Reserve Bank of India.

——— (2021) "Report on Currency and Finance,"Technical report, Reserve Bank of India.

A.1 Data Description

A.1.1 Consensus Economics

Table A.1: Consensus Economics: Overview

Macro Aggregate	Forecast Horizon	Survey Frequency
Gross Domestic Product (real, YoY % change)	FY0, FY1	Monthly
Industrial Production (real, YoY % change)	FY0, FY1	Monthly
Consumer Price Index (YoY % change)	FY0, FY1	Monthly
Wholesale Prices (YoY %)	FY0, FY1	Monthly
Exchange Rate (INR/USD)	3m, 12m, 24m	Monthly
91-day Treasury Bill Rate (%)	3m, 12m	Monthly
10-year Bond Yield (%)	3m, 12m	Monthly

Notes: The forecast value for the macro aggregate is the *mean* across survey participants (private-sector firms including banks) as of the reported survey date. For the Consumer Price Index, CPI-Industrial Workers was replaced by CPI-All India Combined (rural plus urban) starting in February 2015. FY0 indicates current fiscal year (April through March), and FY1 indicates the next fiscal year from the perspective of the survey date. 3m represents three months from the survey date, and 12m represents 12 months from the survey date. All these variables are available starting in January 1995 except Wholesale Prices, which start in April 1997, and the 10-year bond yield, which starts in December 2005. Consensus Economics names a fiscal year based on the calendar year in which it begins. For example, FY2020 refers to the fiscal year starting in April 2020 and ending in March 2021. To easily compare INR/USD exchange rate forecasts with inflation and output growth forecasts, we calculate the percentage change in the exchange rate according to the following formula:

$$\frac{(ER_{t+h} - ER_t)}{ER_t} * 100, \tag{12}$$

where ER_t is the exchange rate on the day of the Consensus survey (included in the Consensus data set), and ER_{t+h} is the exchange rate forecast that is closest to the forecast horizon being used (either the end of the current fiscal year, or the next fiscal year). The way the ER is defined, a higher value indicates a depreciation of the INR relative to the USD.

A.1.2 Bloomberg Economic Forecasts

Table A.2: Bloomberg Economic Forecasts: Overview

Macro Aggregate	Forecast Horizon	Survey Frequency
Gross Domestic Product (real, YoY % change)	FY0, FY1, FY2, CQ0, CQ1, CQ2, CQ3	Monthly
Industrial Production (real, YoY % change)	FY0, FY1, FY2, CQ0, CQ1, CQ2, CQ3	Monthly
Consumer Price Index (YoY % change)	FY0, FY1, FY2, CQ0, CQ1, CQ2, CQ3	Monthly
Wholesale Prices (YoY% change)	FY0, FY1, FY2, CQ0, CQ1, CQ2, CQ3	Monthly
Exchange Rate End Q3, (INR/USD)	FY0, FY1, FY2	Monthly
Exchange Rate, End of Quarter (INR/USD)	CQ0, CQ1, CQ2, CQ3	Monthly
Central Bank Interest Rate, End of Quarter (%)	CQ0, CQ1, CQ2, CQ3	Monthly
10-year Government Bond Yield, End of Quarter (%)	CQ0, CQ1, CQ2, CQ3	Monthly

Notes: The forecast value for the macro aggregate is the *mean* across survey participants (private-sector economists) as of the last day of the month. FY0 indicates the current fiscal year (April through March in India), FY1 indicates the next fiscal year from the perspective of the survey date, and FY2 indicates two fiscal years from the survey date. Correspondingly, FQ0 indicates the current fiscal quarter, FQ1 indicates the next fiscal quarter, FQ2 indicates two fiscal quarters from the survey date, and FQ3 indicates three fiscal quarters from the survey date. Note that Bloomberg defines FY differently from CE—FY2020, for example, refers to the fiscal year starting in Aprril 2019 and ending in March 2020. Finally, CQ0 indicates the current calendar quarter, CQ1 indicates the next calendar quarter, CQ2 indicates two calendar quarters from the survey date, and CQ3 indicates three calendar quarters from the survey date. The GDP and CPI forecasts are available starting in October 2007, but the WPI and IIP forecasts are available only since July 2014. These data can be accessed on a Bloomberg terminal using the command "ECFC" or through the various Bloomberg APIs. Annual forecasts are unavailable for the central bank interest rate, 10-year government bond yield, and INR/USD exchange rate. To create an "annual" exchange rate forecast, we use quarterly exchange rate forecasts for fiscal quarter 3 (calendar quarter 4), for the current fiscal year, next fiscal year, and in two fiscal years. We do this because calendar quarter 4 is the only quarterly forecast available for these expanded time horizons. Quarterly forecasts are originally relative to the calendar year (Q1 is January throgh March, Q2 is April through June, Q3 is July through September, and Q4 is October through December). We then adjust quarterly forecasts so they are relative to the quarters of the fiscal year (where Q1 is April through June, Q2 is July through September, Q3 is October through December, and Q4 is January through March). As with Consensus Economics, to easily compare exchange rate forecasts with inflation and output growth forecasts, we calculate the percentage change in exchange rate according to equation 12. Because Bloomberg Forecasts do not include a value for ER_t, we use the end-of-day exchange rate value available from FRED for the last day of the survey month.

A.1.3 Comparing Consensus Economics Forecasts with Actual Data

There is a difference in the horizon over which the forecasts are made in Consensus Economics relative to the horizon for which the actual value is computed. Actual values in any given year/month (or year/quarter in the case of GDP) simply represent the YoY growth of the concerned variable in that month (or quarter). The consensus estimates, however, are made for a given fiscal year—either FY0 or FY1—and they represent the change in the average value of the variable in the given fiscal year relative to its average in the previous fiscal year. For example, in March 2018, actual CPI inflation represents the YoY CPI percentage change for March 2018 relative to March 2017, while the consensus estimates for FY0 in March 2018 represent forecasters' expectation regarding the average of the YoY CPI change from April 2017 to March 2018 relative to the average of the YoY CPI change from April 2016 to March 2017. Therefore, we cannot expect the forecast values to line up with the actual values.

We believe that a better comparison for testing the reliability of the forecasts would be to compute the actual counterpart of the variable for which the forecasts are made and then test whether the forecasts become closer to these alternative actual values as the end of the fiscal year nears. This alternative measure of actual values is shown as "FY0 Actuals" (in dashed blue) in figure 1.

A.1.4 RBI's Survey of Professional Forecasters

The Survey of Professional Forecasters (SPF) is a bimonthly (conducted once every two months) survey conducted by the Reserve Bank of India (RBI) that polls a panel of private-sector economists about their forecasts for macroeconomics indicators over different time horizons. Both quarterly and annual forecasts are available in the SPF. Annual forecasts are available for the current year as well as the next fiscal year relative to the survey date. Quarterly forecasts are available for the current quarter as well as the next three quarters ahead relative to the survey date. For a complete description of the variables that we use from the SPF as well as their forecast horizons, see Tables A.3, A.4, and A.5 in Appendix A.1.4.

There are two main disadvantages to using RBI's SPF relative to the Consensus Economics forecasts. One, there is limited availability of forecasts for some macroeconomic variables. Among our variables of interest, quarterly forecasts for CPI, WPI, and GDP growth, and annual forecasts for GDP growth are available over our entire sample period. Annual forecasts for CPI and WPI, however, are available only for 2017 onward. Two, the survey frequency is bimonthly, which means we can obtain only half as many data points. For these reasons, we do not use the SPF in our primary analysis, but we do verify that the forecasts obtained from the various sources are similar to each other. Figures A.3 and A.4 in Appendix A.3 compare the forecasts from different sources. We find that the forecasts published by private organizations such as Consensus Economics and Bloomberg reasonably match those published by the RBI.

Table A.3: RBI Survey of Professional Forecasters: Overview

Macro Aggregate	Forecast Horizon	Survey Frequency
Gross Domestic Product at Factor Cost (real, YoY % change)	FY0, FY1, FQ0, FQ1, FQ2, FQ3	Bi-Monthly
Gross Value Added at Basic Prices (real, YoY % change)	FY0, FY1, FQ0, FQ1, FQ2, FQ3	Bi-Monthly
Gross Domestic Product at Market Prices (real, YoY % change)	FY0, FY1, FQ0, FQ1, FQ2, FQ3	Bi-Monthly
Consumer Price Index Combined (YoY % change)	FY0, FY1, FQ0, FQ1, FQ2, FQ3	Bi-Monthly
Wholesale Price Index (YoY % change)	FY0, FY1, FQ0, FQ1, FQ2, FQ3	Bi-Monthly

Notes: FY0 indicates the current fiscal year (April through March in India), FY1 indicates the next fiscal year from the perspective of the survey date, and FY2 indicates two fiscal years from the survey date. Correspondingly, FQ0 indicates the current fiscal quarter, FQ1 indicates the next fiscal quarter, FQ2 indicates two fiscal quarters from the survey date, and FQ3 indicates three fiscal quarters from the survey date. See Table A.4 and Table A.5 for the availability of each variable.

Table A.4: RBI Survey of Professional Forecasters: Annual Forecast Availability

Survey Date	Variable Added	Replacing
May 2008	Gross Domestic Product at Factor Cost	
April 2015	Gross Value Added at Basic Prices	Gross Domestic Product at Factor Cost
June 2017	Gross Domestic Product at Market Prices Consumer Price Index Combined Wholesale Price Index	Gross Value Added at Basic Prices

Table A.5: RBI Survey of Professional Forecasters: Quarterly Forecast Availability

Survey Date	**Variable Added**	**Replacing**
May 2008	Gross Domestic Product at Factor Cost Consumer Price Index-Industrial Workers Wholesale Price Index	
January 2014	Consumer Price Index Combined	Consumer Price Index-Industrial Workers
April 2015	Gross Value Added at Basic Prices	Gross Domestic Product at Factor Cost
June 2017	Gross Domestic Product at Market Prices	Gross Value Added at Basic Prices

A.1.5 Overnight Index Swaps: Reformatting Details

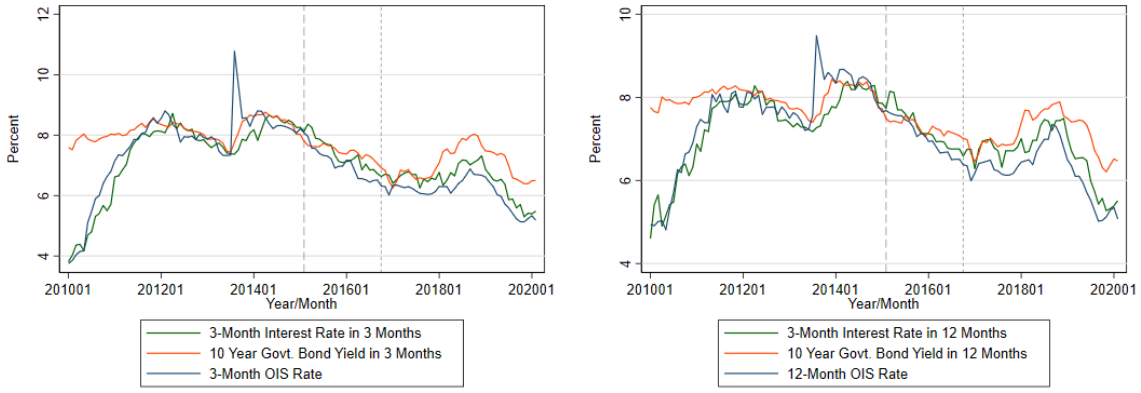
We need the forecasts of the nominal interest rate, which appears on the left-hand side of the monetary policy reaction function, to be over the same horizon as the forecasts of the macroeconomic indicator that appear on the right-hand side of it. However, our data availability for OIS rates is limited due to limited liquidity in the OIS markets for certain maturities. Reliable OIS rates data are available only for maturities of one, two, three, six, and nine months, and one, two, and three years. So, for example, for a consensus estimate from the November of a given fiscal year, the forecasts of macroeconomic indicators will be in reference to the end of that fiscal year, that is, March, which is four months away from the survey date. So, ideally we want to be looking at the OIS rate for a contract expiring in four months as the LHS variable. However, the data on the four-month OIS rates are not reliable. Therefore, we look at the closest available reliable maturity instead, which is six months. We make similar manipulations for other months that corresponding to fiscal-year forecast horizons for which reliable OIS-rates are not available. Table A.6 summarizes how we do this for different months of the fiscal year given the limited maturities available.

Table A.6: OIS Maturities Used at Different Forecast Horizons

Month	FY0	FY1	FY2	FQ0	FQ1	FQ2	FQ3
April	1y	2y	3y	3m	6m	9m	1y
May	1y	2y	3y	2m	6m	9m	1y
June	9m	2y	3y	1m	3m	6m	9m
July	9m	2y	3y	3m	6m	9m	1y
August	9m	2y	3y	2m	6m	9m	1y
September	6m	2y	3y	1m	3m	3m	9m
October	6m	1y	2y	3m	6m	9m	1y
November	6m	1y	2y	2m	6m	9m	1y
December	3m	1y	2y	1m	3m	6m	9m
January	3m	1y	2y	3m	6m	9m	1y
February	2m	1y	2y	2m	6m	9m	1y
March	1m	1y	2y	1m	3m	6m	9m

A.2 Interest Rate Expectations: Survey of Professional Forecasters vs. OIS rates

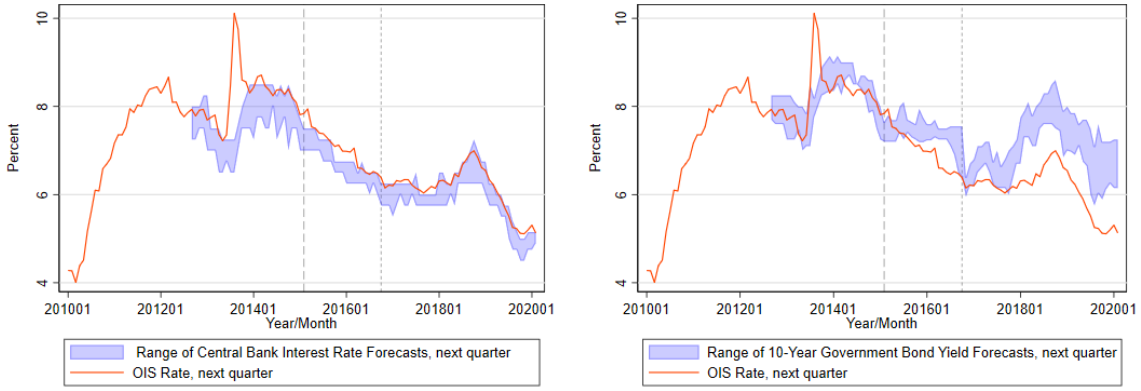
Figure A.1: Interest Rate Forecasts Based on OIS Rates vs. from Consensus Economics



(a) 3-Month OIS Rate (b) 12-Month OIS Rate

Notes: The long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date. *Source:* Interest rate forecasts are from Consensus Economics. OIS rates are from Bloomberg. Long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date.

Figure A.2: Interest Rate Forecasts Based on OIS Rates vs. from Bloomberg Economic Forecasts

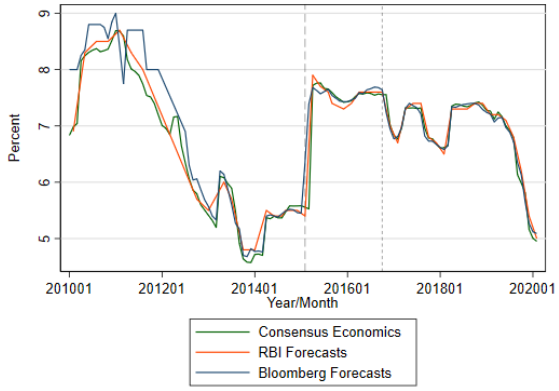


(a) Central Bank Rate (b) 10-Year Government Bond Yield

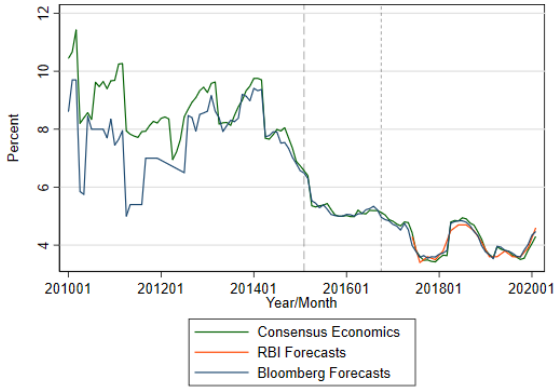
Notes: The long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date. *Source:* Interest rate forecasts are from Bloomberg Forecasts. OIS rates are from Bloomberg. Long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date.

A.3 Comparing Forecasts from Different Sources

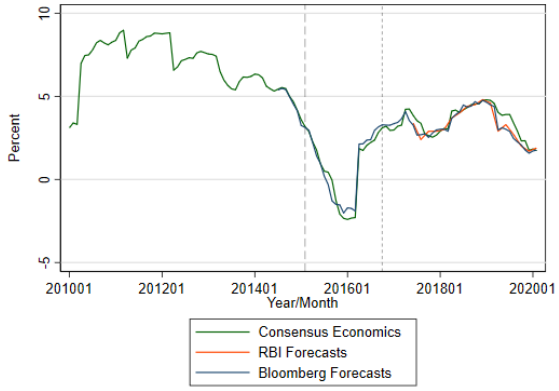
Figure A.3: RBI's SPF vs. Consensus Economics vs. Bloomberg Economic Forecasts: Annual



(a) GDP: Current fiscal year



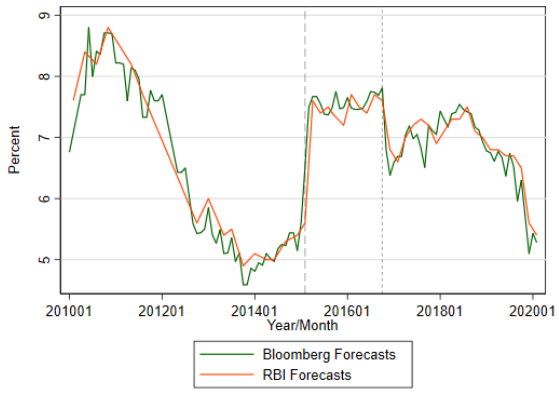
(b) CPI: Current fiscal year



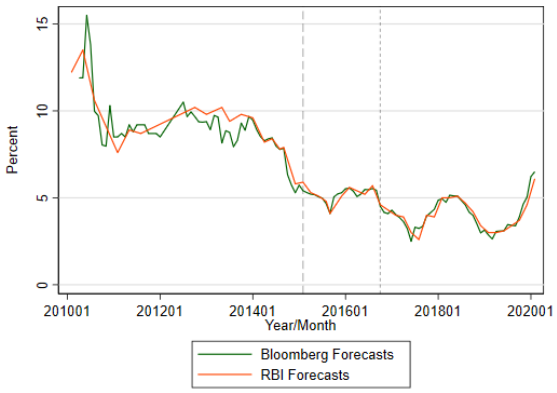
(c) WPI: Current fiscal year

Notes: The long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date. *Source:* Forecast values are from Consensus Economics, RBI Survey of Professional Forecasters, and Bloomberg Forecasts. Long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date.

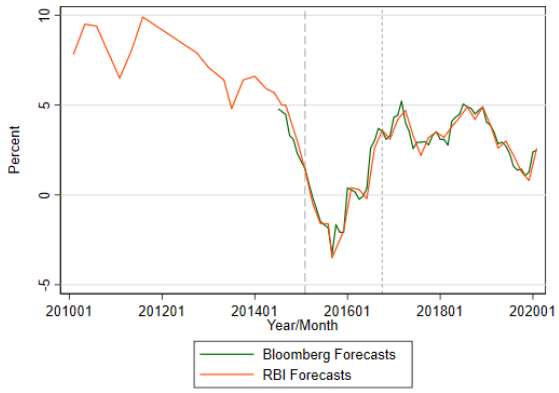
Figure A.4: RBI's SPF vs. Bloomberg Economic Forecasts: Quarterly



(a) GDP: Current Quarter



(b) CPI: Current Quarter



(c) WPI: Current Quarter

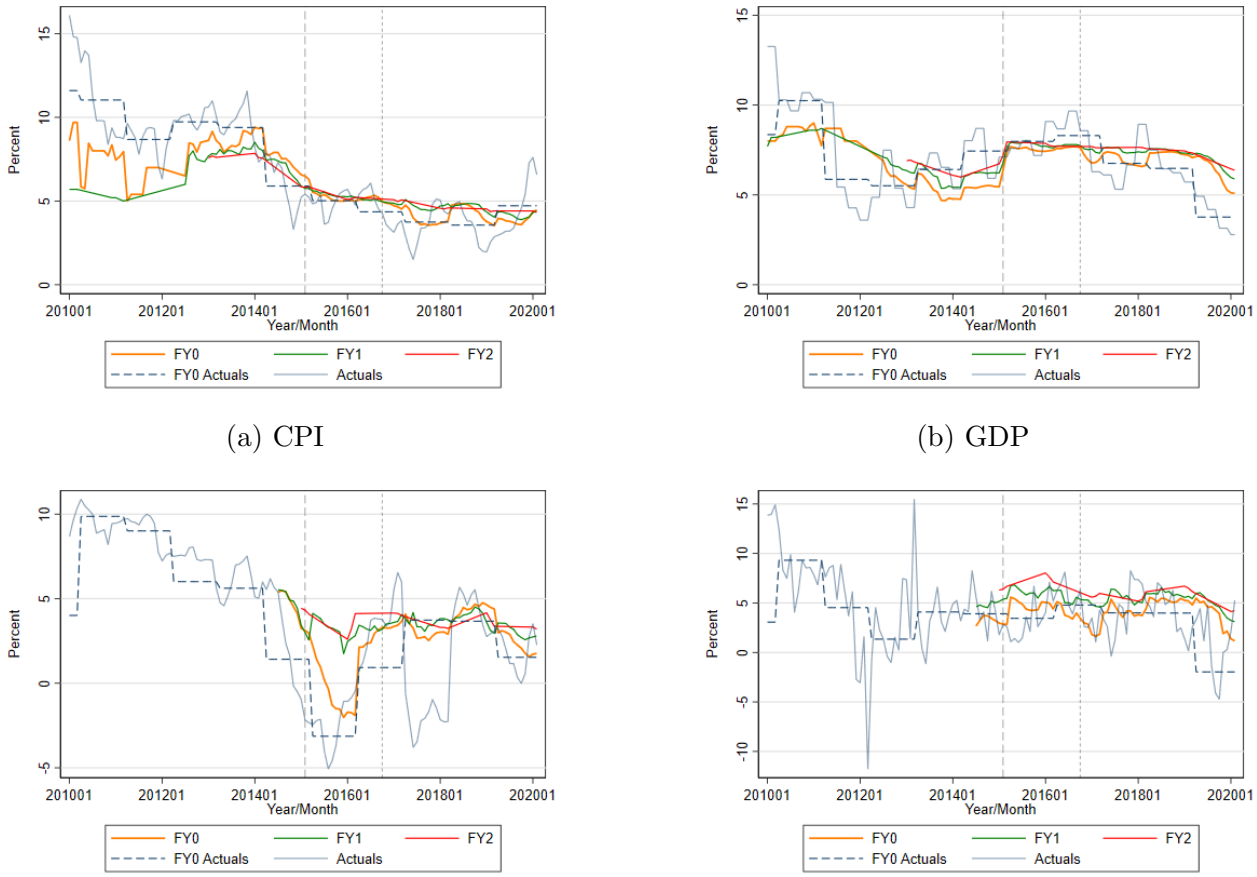
Notes: The long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date. *Source:* Forecast values are from Bloomberg Forecasts and the RBI Survey of Professional Forecasters.

A.4 Robustness Checks

A.4.1 Using Survey Forecasts from Bloomberg ECFC Instead of Consensus Economics

Visual Approach We first verify the sensibility of the forecasts from Bloomberg ECFC as we did for Consensus Economics.

Figure A.5: Time Series of Bloomberg Economic Forecast Estimates vs. Actual Values



(a) CPI

(b) GDP

(c) WPI

(d) IIP

Notes: The long-dash line at February 2015 represents the FIT start date. The short-dash line at October 2016 represents the alternate FIT start date. *Source:* Forecast values are from Bloomberg Economic Forecasts. CPI, WPI, and IIP actuals are originally from CMIE. GDP actuals are originally from FRED.

Regression Approach Next, we re-estimate our baseline OLS regressions at both the annual and quarterly frequencies using the Bloomberg ECFC data for macroeconomic forecasts along with OIS-rates-based interest rate expectations. The results are presented below.

Table A.7: Bloomberg Economic Forecasts: FIT adoption = February 2015 (Annual)

	Dependent Variable: 3-Month Interest Rate			
	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT
	(1)	(2)	(3)	(4)
CPI Inflation	-0.280*	0.501***	-0.104	0.460***
	(-2.23)	(4.37)	(-1.06)	(4.74)
GDP Growth	-0.708***	0.508***	-0.571***	0.726***
	(-7.20)	(6.34)	(-6.93)	(7.54)
Exchange Rate Growth			0.0527	-0.0692***
			(1.96)	(-3.76)
Constant	14.43***	0.402	12.34***	-1.054*
	(10.15)	(1.01)	(12.24)	(-2.14)
Observations	103	135	84	115
R^2	0.468	0.584	0.472	0.700
Adjusted R^2	0.457	0.578	0.452	0.692

Notes: The pre-FIT period runs from January 2010 through February 2015, while the post-FIT period runs from March 2015 through February 2020. T-statistics are in parentheses. *Source:* CPI, GDP, and exchange rate forecast values are from Bloomberg Economic Forecasts. OIS rates are from Bloomberg.

Table A.8: Bloomberg Economic Forecasts: FIT adoption = February 2015 (Quarterly)

	Dependent Variable: 3-Month Interest Rate Forecast			
	Pre-FIT	Post-FIT	Pre-FIT	Post-FIT
	(1)	(2)	(3)	(4)
CPI Inflation	-0.0967	0.240***	-0.0889	0.272***
	(-1.84)	(4.71)	(-1.49)	(5.00)
GDP Growth	-0.449***	0.702***	-0.426***	0.755***
	(-9.51)	(15.95)	(-7.80)	(16.33)
Exchange Rate Growth			0.0474	-0.0378
			(1.45)	(-1.96)
Constant	11.50***	0.223	11.33***	-0.330
	(22.60)	(0.62)	(18.46)	(-0.84)
Observations	210	240	193	220
R^2	0.344	0.471	0.339	0.517
Adjusted R^2	0.337	0.466	0.329	0.511

Notes: The pre-FIT period runs from January 2010 through February 2015, while the post-FIT period runs from March 2015 through February 2020. T-statistics are in parentheses. *Source:* CPI, GDP, and exchange rate forecast values are from Bloomberg Economic Forecasts. OIS rates are from Bloomberg.

Table A.9: Estimates of the Market-Perceived Reaction Function with CE Interest Rate and Exchange Rate Forecasts

	Dependent Variable: 3-Month Interest Rate							
	Pre-FIT Short	Post-FIT Short	Pre-FIT Medium	Post-FIT Medium	Pre-FIT Forward	Post-FIT Forward	Pre-FIT Pooled	Post-FIT Pooled
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Combined Inflation	0.432***	0.479**	0.461**	0.577*	0.334***	0.356*	0.423***	0.516***
	(3.56)	(2.85)	(3.01)	(2.52)	(4.08)	(2.11)	(4.20)	(3.90)
GDP Growth	-0.695***	0.473**	-0.580***	0.552*	-0.436***	0.550**	-0.653***	0.500***
	(-6.51)	(2.87)	(-5.59)	(2.06)	(-5.46)	(3.39)	(-8.26)	(3.60)
Exchange Rate Growth	-0.137*	-0.0430	-0.0797*	-0.0782***	-0.0915*	-0.0703*	-0.111***	-0.0692***
	(-2.40)	(-1.40)	(-2.14)	(-3.59)	(-2.07)	(-2.29)	(-3.53)	(-3.94)
Constant	8.571***	1.261*	7.872***	0.201	7.626***	1.340*	8.476***	0.887
	(9.08)	(2.01)	(7.14)	(0.19)	(11.67)	(2.03)	(11.28)	(1.64)
Observations	62	60	62	60	62	60	124	120
R^2	0.521	0.677	0.471	0.686	0.477	0.629	0.492	0.673
Adjusted R^2	0.496	0.659	0.443	0.670	0.450	0.609	0.480	0.665

Notes: The pre-FIT period runs from January 2010 through February 2015, while the post-FIT period runs from March 2015 through February 2020. T-statistics are in parentheses. *Source:* CPI inflation, WPI inflation, GDP growth, exchange rate, and interest rate forecasts are from Consensus Economics.

Table A.10: Estimates of the Market-Perceived Reaction Function with CE Interest Rate for China

	Dependent Variable: Interest Rate					
	Pre-FIT Short	Post-FIT Short	Pre-FIT Medium	Post-FIT Medium	Pre-FIT Forward	Post-FIT Forward
	(1)	(2)	(3)	(4)	(5)	(6)
CPI Inflation	0.479***	0.154	0.538***	0.600***	0.390***	0.455***
	(15.81)	(1.81)	(12.29)	(7.61)	(10.41)	(5.45)
GDP Growth	-0.242***	0.666***	-0.0441	1.040***	-0.0264	0.956***
	(-13.96)	(4.06)	(-1.13)	(7.26)	(-0.85)	(5.89)
Constant	6.484***	-0.283	4.697***	-3.603**	5.043***	-2.840*
	(41.88)	(-0.24)	(20.18)	(-3.46)	(22.22)	(-2.37)
Observations	62	59	62	59	62	59
R^2	0.786	0.352	0.729	0.561	0.728	0.394
Adjusted R^2	0.779	0.329	0.720	0.546	0.719	0.372

Notes: The pre-FIT period runs from January 2010 through February 2015, while the post-FIT period runs from March 2015 through February 2020. T-statistics are in parentheses. *Source:* CPI inflation, GDP growth, and interest rate forecasts are from Consensus Economics.