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Disagreement Between FOMC Members and the Fed's Staff: New Insights Based on a Counterfactual Interest Rate*

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Abstract

We examine the degree and sources of disagreement between the members of the Federal Open Market Committee (FOMC) and the Federal Reserve's (Fed's) staff about the appropriate policy rate for the period 1994–2011. For that purpose, we compute a recommended interest rate for the Fed's staff based on its own Greenbook forecasts and a time-varying monetary policy rule à la Taylor (1993), and compare it with the actual target rate. First, we find that there has been persistent internal disagreement between FOMC members and the Fed's staff about the appropriate policy rate. Second, we reveal that members with an occupational background in finance favor a relatively more hawkish monetary policy. In addition, a preference towards a tighter monetary policy is found under a Democratic President and during Alan Greenspan's tenure as the Fed's Chairman. Finally, higher oil prices, a low degree of uncertainty, and episodes of financial stability are also associated with higher interest rates as compared to the Fed staff's recommendation.

JEL Codes: E52; E58.
Keywords: Disagreement; Federal Open Market Committee; Federal Reserve Staff; Monetary Policy; Taylor Rule.

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1 Introduction

Almost all also indicated that the upside risks to their forecasts for economic growth had increased as a result of prospects for more expansionary fiscal policies in coming years. Many participants underscored the need to continue to weigh other risks and uncertainties attending the economic outlook. In that regard, several noted upside risks to U.S. economic activity from the potential for better-than-expected economic growth abroad or an acceleration of domestic business investment.

Minutes of the FOMC, December 13–14, 2016.[1]

The risks to the forecast for real GDP were seen as tilted to the downside, reflecting the staff's assessment that monetary policy appeared to be better positioned to offset large positive shocks than substantial adverse ones. In addition, the staff continued to see the risks to the forecast from developments abroad as skewed to the downside. Consistent with the downside risks to aggregate demand, the staff viewed the risks to its outlook for the unemployment rate as tilted to the upside.

Fed's staff forecasts from Minutes of the FOMC, December 13–14, 2016.

The meeting in December 2016 highlights disagreement between the Fed's staff and the monetary policymakers in the FOMC about future economic risks for the U.S. Whereas the Fed's staff offers a pessimistic view of the economic outlook, the view of the FOMC members is more optimistic. Hence, although the actual policy decision implemented at this meeting was free of dissent, with a rise of the federal funds target rate by 25 basis points to a range of 0.50% to 0.75%, internal disagreement between the FOMC members and the Fed's staff can be observed in the minutes of this meeting.

Romer and Romer (2008) emphasize that FOMC policymakers believe they have useful information to add to the staff's forecasts. This is evidenced by the economic *go-around* during each policy meeting where each member of the FOMC gives his or her own view of future economic conditions. This role played by FOMC policymakers in forecasting and predicting the consequences of policy actions might explain the internal disagreement observed between the Fed's staff and the FOMC policymakers. However, even if many historical episodes, for instance, the policy meetings of July

[1] Source: https://www.federalreserve.gov/monetarypolicy/files/fomcminutes20161214.pdf.

1979[2] and February 1991,[3] suggest such disagreement, previous literature about the FOMC's decision-making process mainly focuses on dissent within the FOMC in its interest rate decisions (see, among many others, Belden 1989; Gildea 1990; Havrilesky and Schweitzer 1990; Havrilesky and Gildea 1991), voiced disagreement within the FOMC in its deliberations (see, for instance, Meade 2005 and 2010), and voiced disagreement in speeches by FOMC members (Hayo and Neuenkirch 2013).

Thus far, little is known about internal disagreement between the FOMC members and the Fed's staff, even though the degree and sources of disagreement may allow a proper identification of the determinants of FOMC's policy decisions. This is because the Fed's staff is not supposed to be influenced by a political, regional, or professional bias when producing its forecasts.[4] Hence, utilizing the staff's forecasts might provide a proxy for an "unbiased recommendation" of the policy rate, against which the actual votes of the FOMC members—which are more likely to be subject to a bias (see, for instance, Eichler and Lähner 2014a and 2014b)—can be compared. Therefore, this paper highlights all economic and non-economic factors that may influence the policy decisions implemented by the FOMC that are not taken into account by the Fed's staff in its forecasts.

For that purpose, we assume a situation where the Fed's staff hypothetically recommends interest rates based on its own Greenbook forecasts and a time-varying monetary policy rule à la Taylor (1993). The recommended interest rate (henceforth, FSRIR) reflects a counterfactual policy recommendation and allows us to compute an unobserved variable based on observed macroeconomic forecasts. Our sample contains 144 regularly scheduled interest rate decisions between January 1994 and December 2011.

[2] *Although the staff forecast is a reasonable one, I find myself a little more pessimistic. I am concerned about both the likelihood of less real growth and more inflation.* (Robert P. Mayo, FOMC Transcript, July 11, 1979, 20–21).

[3] *I actually don't quite agree with the Greenbook because I think the inflation forecast is too high. From what I can sense, looking at the internal price structure of a lot of companies and talking to a lot of people ... it may turn out to be doing better.* (Alan Greenspan, FOMC Transcript, February 5–6, 1991, 49).

[4] The Fed's staff uses the FRB/US model for forecasting and for a detailed analysis of monetary policy. See: https://www.federalreserve.gov/econresdata/notes/feds-notes/2014/a-tool-for-macroeconomic-policy-analysis.html.

Hence, our sample also covers 24 decisions at the zero-lower bound (ZLB) of interest rates.

In a first step, we compare the FSRIR with the actual target rate set by the FOMC. The comparison reveals that there are persistent differences between the actual target rate and the FSRIR, suggesting persistent internal disagreement between the FOMC members and the Fed's staff about the appropriate policy rate. In a second step, we explain the differences between the individual votes by FOMC members and the FSRIR using a panel model. The existing literature has identified four sources that explain heterogeneity in monetary policy votes across FOMC members, which also might explain internal disagreement between the FOMC members and the Fed's staff. The first source is related to the background characteristics of policymakers. Eichler and Lähner (2014a) show that FOMC members with longer careers in government, industry, academia, non-governmental organizations, and on the staff of the Board of Governors are more focused on output stabilization. In contrast, FOMC members with longer careers in the financial sector, or on the staffs of regional Fed banks, are more focused on inflation stabilization.

The second source of heterogeneity is related to the regional background of FOMC members. Jung and Latsos (2015) find that regional variables help explain the interest rate preferences of most Bank presidents. Coibon and Goldstein (2012) show that the Fed sets interest rates partly in response to regional economic disparities. Additional evidence showing the influence of regional cycles on FOMC members' policy votes and preferences is provided by Meade and Sheets (2005) and Chappell et al (2008).

The third source of heterogeneity is related to the different economic forecasts used by the FOMC members and the Fed's staff to set the policy rate. Romer and Romer (2008) show that the predictive ability of the staff's forecasts is substantially better than the FOMC's forecasts. Worse, they also find evidence that differences between both forecasts help predict monetary policy shocks, suggesting that policymakers act in part on the basis of their apparently misguided information. Subsequent papers provide motives to explain these differences. Tillmann (2011) argues that there is

strategic forecasting among FOMC members as non-voters systematically overpredict (underpredict) inflation if they favor tighter (looser) policy. Ellison and Sargent (2012) suggest that the FOMC uses forecasts based on a worst-case scenario to design its policy decisions.

The final source of heterogeneity is related to political factors. Several studies find that political affiliations influence FOMC members' voting behavior (for a survey of the literature, see Gerlach-Kristen and Meade 2010). In general, Board members appointed by Republican Presidents appear to favor tighter monetary policies than those appointed by Democratic Presidents.

Extending the list of explanatory factors documented in the above-mentioned literature (see, for instance, Smales and Apergis 2016), we test: if (i) macroeconomic and financial conditions, (ii) personal and career characteristics of the FOMC members, (iii) political factors, (iv) regional disparities in the U.S., and (v) differences in (the timing of) forecasts help explain the internal disagreement between the FOMC members and the Fed's staff about the appropriate policy rate.

Our results reveal that FOMC members with an occupational background in finance favor a relatively more hawkish monetary policy. In addition, a preference towards a tighter monetary policy is found under a Democratic President and during Alan Greenspan's tenure as the Fed's Chairman. Finally, higher oil prices, a low degree of uncertainty, and episodes of financial stability are also associated with higher interest rates as compared to the Fed staff's recommendation.

The remainder of this paper is organized as follows. Section 2 introduces the Fed's staff recommended interest rate and compares it to the actual target rate set by the FOMC. Section 3 explains the econometric methodology and the data set. Section 4 presents the empirical results. Section 5 concludes.

2 The Fed Staff's Recommended Interest Rate

In a first step, we derive our counterfactual interest rate, that is, the FSRIR, and compare it with the actual interest rate voted for by the FOMC members. We assume that

the Fed's staff recommends its policy rate based on a time-varying monetary policy rule à la Taylor (1993). In an effort to avoid making assumptions, we will not rely on a normative Taylor rule with predefined weights to compute the FSRIR.[5] Instead, we estimate a two-regime Markov-switching Taylor rule that also allows for flexibility in the staff's preferences.[6] In addition, we account for interest rate smoothing behavior as the Fed's staff, when hypothetically allowed to put forward its own interest rate, has to use the actual target rate set by the FOMC in its previous meeting as the starting point.

Since monetary policy is supposed to be forward-looking, the FSRIR utilizes the four-quarter ahead expected inflation gap $E_t\widehat{\pi}_{t+4}$, defined as expected inflation minus an inflation "target" of 2%, as a nominal macroeconomic indicator. As a real macroeconomic indicator, we use either output gap forecasts $E_t\widehat{y}_{t+4}$ or unemployment gap forecasts $E_t\widehat{u}_{t+4}$. The latter is included since the Fed's dual mandate focuses on employment as the real macroeconomic indicator rather than on the output gap. We use the Fed staff's projections of inflation, the output gap, and the unemployment gap found in the Greenbook.[7] The projections are prepared for each regularly scheduled FOMC meeting by the Division of Research and Statistics and, therefore, part of the information set FOMC members have at hand when making their decision. Figure 1 shows the Greenbook forecasts over time. In addition, the bottom right panel shows the actual interest rate and the shadow interest rate (Wu and Xia 2016), the latter is used for estimations that also take into account the period after 2008.[8]

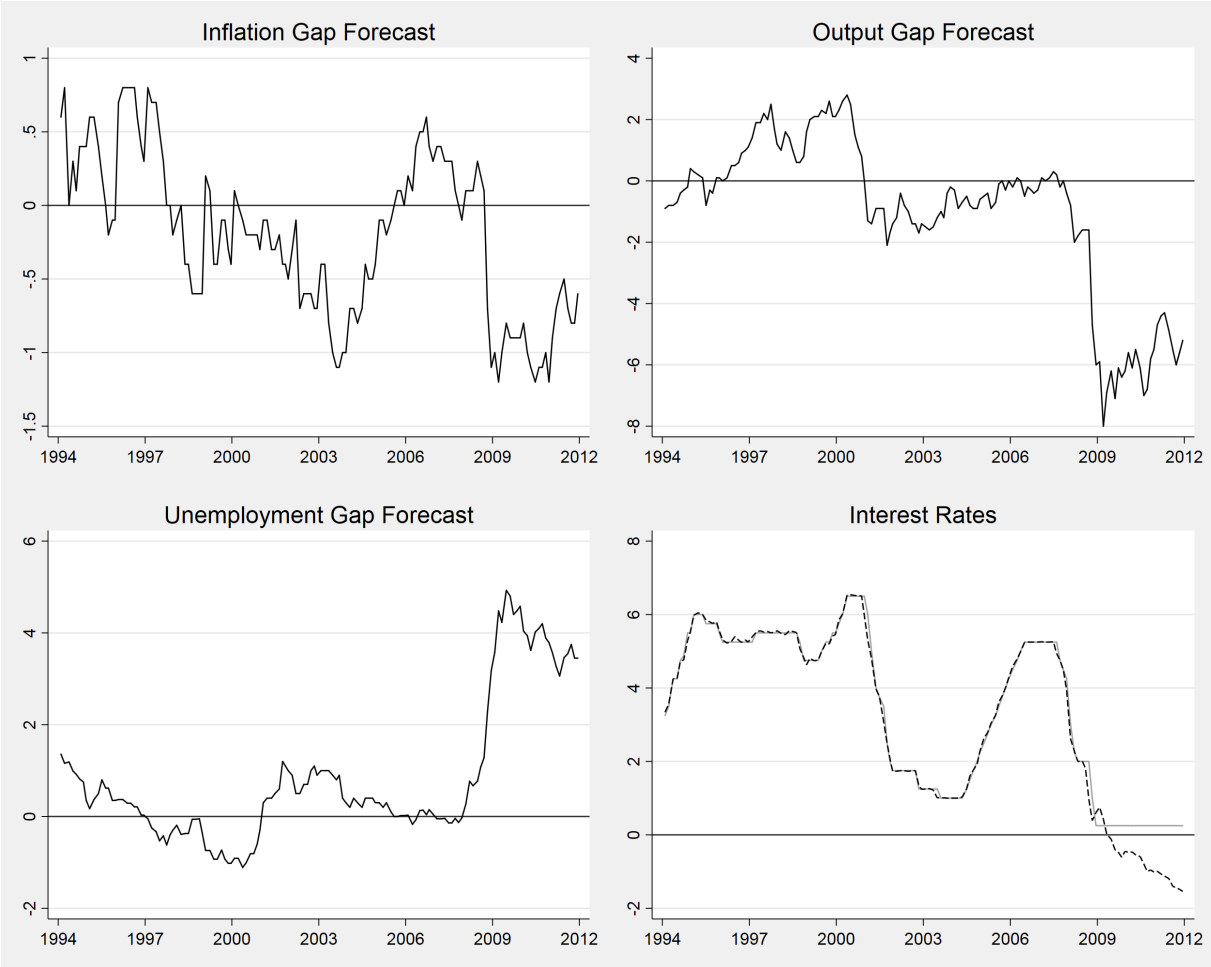
[5]Note that we explore the robustness of our findings with respect to a normative Taylor rule and pre-defined weights (see Section 4.3).

[6]Ben Bernanke himself has indicated that the Fed's monetary policy since the mid-1990s could be better described by putting a weight of 1.0 on the output gap in the Taylor rule (instead of 0.5 as in the original Taylor rule), a finding that might also be reflected in the staff's recommendation. See: https://www.brookings.edu/blog/ben-bernanke/2015/04/28/the-taylor-rule-a-benchmark-for-monetary-policy.

[7]Note that the Greenbook and the Bluebook were combined into the Tealbook in June 2010. Since then, the relevant forecasts can be found in the Tealbook A. In the following, however, we stick to the more commonly known label "Greenbook."

[8]Shadow rates provide a quantification of all unconventional monetary policy measures in a single interest rate and also allow for negative interest rates when the actual policy rate is at the ZLB.

Figure 1: Fed's Staff Macroeconomic Projections and Interest Rates



Notes: Figure shows forecasts presented in the Greenbook for the inflation gap, the output gap, and the unemployment gap prepared by the Fed's staff before each regularly scheduled FOMC meeting. The unemployment gap is based on the staff's estimate of the non-accelerating inflation rate of unemployment. The bottom right panel shows the Fed's target rate and the (dashed) shadow interest rate (Wu and Xia 2016).

The general specification to compute the FSRIR with the federal funds rate as indicator for the monetary policy stance and the expected output gap as real macroeconomic indicator is as follows:

$$\begin{aligned} \text{State 1:} \quad i_t &= \rho_1 i_{t-1} + r_1 + \beta_1 E_t \widehat{\pi}_{t+4} + \gamma_1 E_t \widehat{y}_{t+4} + \epsilon_t \\ \text{State 2:} \quad i_t &= \rho_2 i_{t-1} + r_2 + \beta_2 E_t \widehat{\pi}_{t+4} + \gamma_2 E_t \widehat{y}_{t+4} + \epsilon_t \end{aligned} \tag{1}$$

ρ_1 and ρ_2 are the interest rate smoothing parameters for both states, r_1 and r_2 are the intercepts, β_1 and β_2 are the coefficients for the expected inflation gap $E_t \widehat{\pi}_{t+4}$, γ_1 and

γ_2 are the coefficients for the expected output gap $E_t\widehat{y}_{t+4}$, and ϵ_t is the white noise error. Eq. (1) allows for two different monetary policy regimes where the model can shift in the four parameters. If the timing of switches is known, the above model can be expressed as follows:

$$\begin{aligned} i_t = \quad & s_t \quad \cdot (\rho_1 i_{t-1} + r_1 + \beta_1 E_t\widehat{\pi}_{t+4} + \gamma_1 E_t\widehat{y}_{t+4}) + \\ & (1-s_t) \cdot (\rho_2 i_{t-1} + r_2 + \beta_2 E_t\widehat{\pi}_{t+4} + \gamma_2 E_t\widehat{y}_{t+4}) + \epsilon_t \end{aligned} \tag{2}$$

s_t is equal to 1 if the process is in State 1 and equal to 0 if the process is in State 2. However, we do not want to make any assumptions about which state the Fed is in at a given time t, implying that s_t is not observed. Hence, our model specifies the unobserved s_t as a Markov chain, which leads to the following state-dependent Taylor rule:

$$i_t = \rho_{s_t} i_{t-1} + r_{s_t} + \beta_{s_t} E_t\widehat{\pi}_{t+4} + \gamma_{s_t} E_t\widehat{y}_{t+4} + \epsilon_t \tag{3}$$

Here, $\rho_{s_t} = \rho_1$ if $s_t = 1$ and $\rho_{s_t} = \rho_2$ if $s_t = 0$. The same applies to the other Taylor rule parameters. The conditional density of i_t is assumed to be dependent only on the realization of the current state s_t and is given by $f(i_t \mid s_t = \{1, 0\}; \theta)$ where θ is the vector of the model's parameters. Hence, there are two conditional densities for two states, and the estimation of θ is performed by updating the conditional likelihood using a non-linear filter.

In the following, we assume that the Fed's staff proposes an interest rate based on the estimated parameters of Eq. (3). To increase estimation efficiency, we test for equality of coefficients across both states. If the test cannot be rejected, we simplify the state-dependent parameters into a single state-independent parameter and re-estimate a restricted version of Eq. (3).

Table 1 displays the estimated Taylor parameters for the two different states. As mentioned before, we have to take into account the ZLB of interest rates in our calculations of recommended interest rates. As a consequence, we estimate four different types of benchmark interest rates. First, we focus on the pre-crisis subsample that

ends in December 2008 when the FOMC cut its target rate to a range of 0% to 0.25%, and explain the actual target rate, i_t, with either the expected output gap $E_t\widehat{y}_{t+4}$ (column 1) or the expected unemployment gap $E_t\widehat{u}_{t+4}$ (column 2) as the indicator of real economic activity. Second, we utilize the full sample period (ends in December 2011) and explain the shadow rate s_t with either the expected output gap (column 3) or the expected unemployment gap (column 4). All models include the respective lagged dependent variable and the expected inflation gap.

The results in Table 1 show that the monetary policy reaction function differs significantly across the two states. Interestingly, there is no need for separate interest rate smoothing parameters and separate coefficients on the expected unemployment gap when choosing the latter as the real macroeconomic indicator. However, in this case there is a need for separate intercept terms with the equilibrium nominal interest rate being larger in State 2 than in State 1. In general, we observe a tighter monetary policy regime in State 2 with a larger coefficient on the expected inflation gap than in State 1 (column 4), smaller coefficients on the expected output gap (columns 1 and 3), and a more persistent interest rate setting behavior (columns 1 and 3). In addition, we find the expected signs for all variables (if significant) throughout both states and all models. Only the constant term and the coefficient on the expected inflation gap in State 1 of column (4) and the coefficient on the expected inflation gap in column (3) are insignificant.

Both states are very persistent as indicated by $p11$ ($p22$), which provides the probability of being in State 1 (2) in period $t+1$ when the process is in State 1 (2) in period t. For instance, in column (1) the probability of staying in State 1 (2) is 93.8% (94.1%), implying that the likelihood of a change into State 2 (1) is only 6.2% (5.9%). When employing the expected output gap as real macroeconomic indicator (columns 1 and 3), we do not observe a dominant state as the sum of probabilities over all observations (rows "Observations" (State 1) and "Observations" (State 2)) is roughly the same across states. In the case of the expected unemployment gap (columns 2 and 4), however, State 2 appears to be (slightly) dominant.

Table 1: Estimated Taylor Rule Parameters for the Fed's Staff

	(1) Pre-Crisis Output		(2) Pre-Crisis Unemp.		(3) Full Sample Output		(4) Full Sample Unemp.	
	State 1	State 2	State 1	State 2	State 1	State 2	State 1	State 2
Lagged Dependent Variable	0.796***	0.884***	0.902***		0.879***	0.957***	0.892***	
	(0.024)	(0.019)	(0.017)		(0.015)	(0.019)	(0.016)	
Constant	0.637***		0.179*	0.583***	0.346***		−0.015	0.597***
	(0.078)		(0.097)	(0.078)	(0.059)		(0.099)	(0.070)
Inflation Gap Forecast	0.243***		0.455***		0.064		−0.187	0.129**
	(0.063)		(0.076)		(0.056)		(0.128)	(0.054)
Output Gap Forecast	0.216***	0.083**			0.205***	0.065***		
	(0.027)	(0.042)			(0.021)	(0.010)		
Unemployment Gap Forecast			−0.182***				−0.079***	
			(0.050)				(0.017)	
Equality Test Unrestr. Model	$\chi^2(2) = 1.52$		$\chi^2(3) = 7.61$		$\chi^2(2) = 0.41$		$\chi^2(2) = 0.87$	
R^2	0.986		0.983		0.992		0.993	
Observations (Total)	119		119		143		143	
"Observations" (State 1)	60.1		39.2		72.9		60.8	
"Observations" (State 2)	58.9		79.8		70.1		82.2	
$p11$	0.938		0.933		0.966		0.976	
$p22$	0.941		0.963		0.972		0.980	

Notes: Table shows estimates of Eq. (3) with robust standard errors in parentheses. ***/**/* indicate significance at the 1%/5%/10% level. $p11/p22$: probability of staying in state 1/2.

In the following, we utilize the coefficients in Table 1 and obtain the fitted values of Eq. (3), which serve as the FSRIR $\hat{i}_t^y$, $\hat{i}_t^u$, $\hat{s}_t^y$, and $\hat{s}_t^u$ for columns (1)–(4), respectively. We relate these recommended interest rates to the actual target rate i_t set by the FOMC and the shadow rate s_t. Put differently, we obtain the residuals from the estimation of Eq. (3) and create four different indicators measuring the *bias* of the FOMC with the respect to the policy recommendation by the Fed's staff:

$$bias_t^{i,y} = i_t - \hat{i}_t^y \tag{4}$$

$$bias_t^{i,u} = i_t - \hat{i}_t^u \tag{5}$$

$$bias_t^{s,y} = s_t - \hat{s}_t^y \tag{6}$$

$$bias_t^{s,u} = s_t - \hat{s}_t^u \tag{7}$$

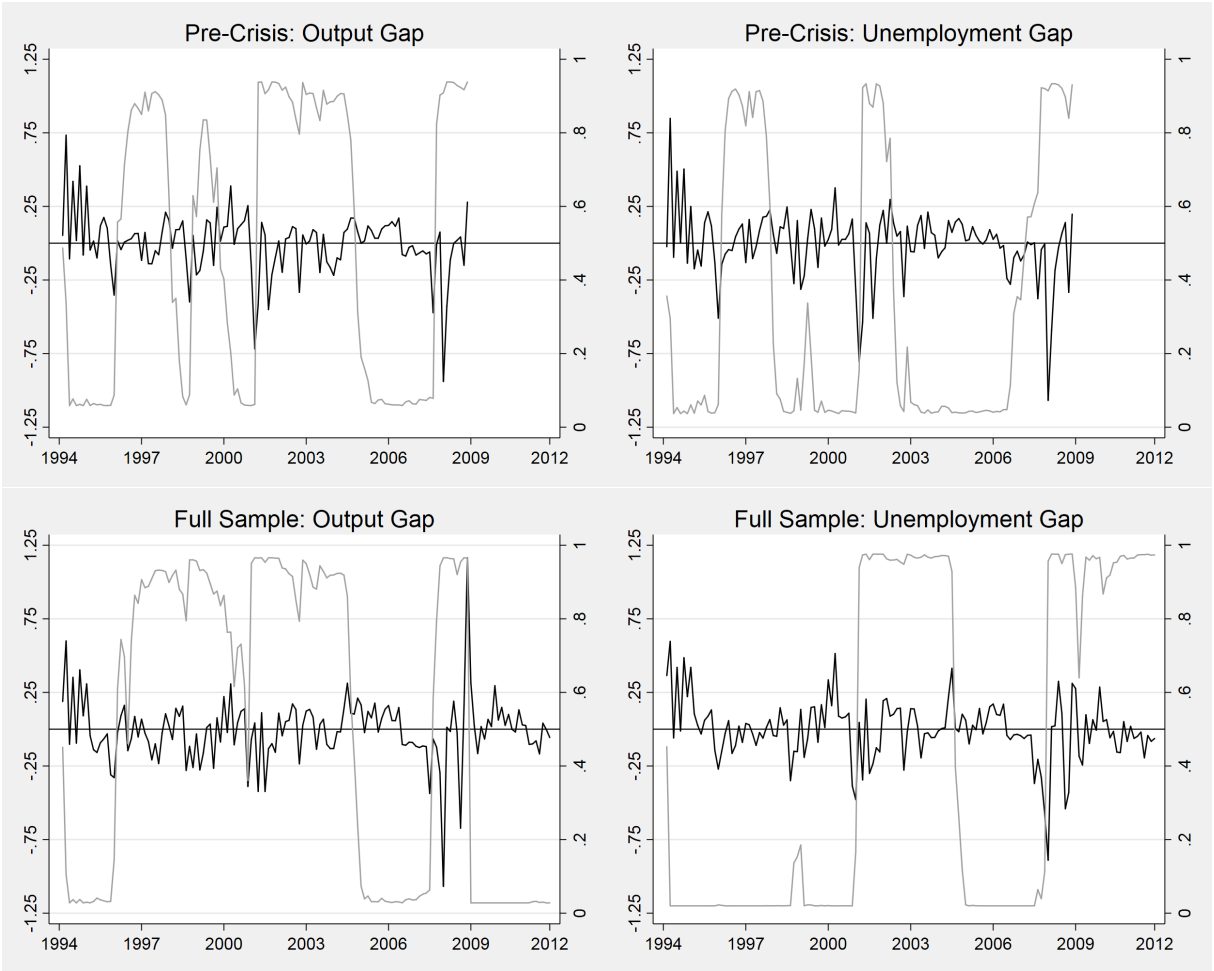
A positive (negative) value of the bias implies that the actual interest rate is higher (lower) than the recommendation by the Fed's staff, hence, that the FOMC has a hawkish (dovish) bias. Figure 2 shows the bias based on Eqs. (4)–(7) (left axis). The gray lines represent the probability of being in State 1 (right axis), that is, the less restrictive monetary policy regime.

The biases, based on both the output gap and the unemployment gap, yield a (very) similar pattern as the correlation is 0.91 when employing the target rate and the pre-crisis subsample (upper panel), and 0.80 for the shadow rate and the full sample (lower panel). This, of course, is a reflection of the fact that the recommendation by the Fed's staff is always based on the actual interest rate set by the FOMC in its previous meeting. Nevertheless, we detect some episodes of persistent internal disagreement between the FOMC and the Fed's staff about the appropriate policy rate, despite the fact that the latter is forced to "smooth" its recommendation.

At the beginning of our sample period, we detect a hawkish bias, that is, the FOMC implemented a target rate higher than the FSRIR. This may be due to the exceptional macroeconomic performance of the U.S. during the 1990s and the great responsiveness of interest rates to inflation, a finding that corroborates Rudebusch (1998), Mankiw

(2001), and Basistha and Startz (2004). In the early 2000s, however, the bias turns dovish, that is, the target rate is below the FSRIR. This might be a result of the FOMC's sharp decrease in its policy rate in response to the "Dot.com bubble" and the decline in stock prices. Interestingly, the bias based on our two-regime monetary policy rule does not reflect Taylor's (2007 and 2010) criticism that monetary policy was "too low for too long" during the early 2000s, as we find that the FOMC acted more hawkishly than recommended in some meetings during the period 2002–2006. Finally, the bias again turns dovish in the years 2007 and 2008, reflecting the FOMC's strong accommodative reaction to the onset of the financial crisis.

Figure 2: Differences between the Target (Shadow) Rate and the FSRIR: The "Bias"



Notes: Figure shows differences between the target rate (upper panel)/shadow rate (lower panel) and the recommended interest rate for the Fed's staff based on Eqs. (4)–(7) (left axis). A positive (negative) value implies that the actual interest rate is higher (lower) than the recommendation by the Fed's staff. The gray lines represent the probability of being in State 1 (right axis).

3 Econometric Methodology

Our paper seeks to explain the sources of disagreement between members of the FOMC and the Fed's staff about the appropriate policy rate. Consequently, our four different dependent variables are based on the FOMC-wide bias introduced in Eqs. (4)–(7). The availability of attributed voting records for the FOMC decisions allows us to create a member-specific version of the bias, which might be different than the committee-wide version if an FOMC member dissented in the vote in favor of tighter or looser monetary policy. Hence, our empirical approach will rely on a panel framework that allows us to account for educational and professional characteristics of FOMC members, and to include individual forecasts in the estimation procedure. The general specification is as follows:

$$bias_{i,t}^{j} = \alpha + X_{i,t}'\beta + \epsilon_{i,t} \tag{8}$$

Subscript i refers to the individual FOMC member, subscript t to the respective meeting of the FOMC, and superscript j denotes one of the four bias indicators in Eqs. (4)–(7). Matrix $X_{i,t}$ contains four different types of explanatory variables, which are explained in the next paragraph.[9] We use all of the variables that have been identified by the literature as exerting an influence on FOMC members' voting behavior and, hence, might explain disagreement between the FOMC members and the Fed's staff about the appropriate policy rate.

First, there simply might be differences in the reaction function of the FOMC members as compared to the Fed's staff. Hence, we consider different weights in the Taylor rule as a reason for disagreement between both bodies. We control for the inflation forecast in every estimation and switch between output gap forecast and unemployment gap forecast depending on the model. In addition, monetary policy in the U.S. is found to have weaker effects when uncertainty is high (Aastveit et al 2013), and the response of the FOMC may be more marked during economic downturns (Blanchard 2008; Bloom 2009; Caggiano et al 2017). Consequently, the financial and broader

[9] Table A1 in the Appendix sets out descriptive statistics for all variables.

macroeconomic environment, in particular, macroeconomic uncertainty, may lead to a different assessment of preferred interest rates across these two bodies and explain the FOMC's bias. Hence, we include the following four additional variables into vector $X_{i,t}$: (i) oil prices (in logs) for supply shocks, (ii) S&P 500 returns for the financial cycle, (iii) the Economic Policy Uncertainty index by Baker et al (2016), and (iv) the St. Louis Fed Financial Stress index.

Second, the existing literature (Gildea 1990; Havrilesky and Schweitzer 1990; Havrilesky and Gildea 1991; Chappell et al 1995) stresses the importance of professional background in shaping FOMC members' voting behavior, and thus, the bias. Following this literature, we account for the latest occupation before joining the FOMC and employ five dummy variables for the government, industry, finance, the Board staff, and the staff of one of the twelve regional Banks with academia serving as the base category. Moreover, an additional determinant of FOMC members' voting behavior is gender (see Chappell and McGregor 2000). Recent studies emphasize the hawkish preferences of women who serve on the FOMC (Bennani et al 2018). Therefore, we include a dummy for women in the FOMC to control for gender effects in monetary policy-making. Finally, Neuenkirch (2015) finds that newly appointed governors fight inflation more aggressively during the first four to eight quarters of their tenure, showing that there is a relationship between experience and monetary policy preferences. We thus include a variable measuring experience in the FOMC for each member.

Third, political connections also are to be considered as, for instance, FOMC members appointed by a Democratic President seem to be more dovish (Havrilesky and Gildea 1991 and 1995; Chappell et al 1993 and 1995; Tootell 1996; Chang 2003; Meade and Sheets 2005). Hence, we consider that political factors may influence FOMC members' voting decisions, whereas the Fed's staff could be considered to be less prone to such external influence. We include dummy variables for: (i) the meetings half a year before a new U.S. president is inaugurated to test whether there is an "electoral cycle" in internal disagreement (Abrams and Lossifov 2006; Hellerstein 2017), (ii) whether

a Democratic President is in power, (iii) whether the U.S. Congress (both Senate and House of Representatives) is controlled by Democrats, (iv) whether the U.S. Congress is controlled by Republicans, and (v) the governors appointed under a Democratic President. Finally, we use a dummy variable for Ben Bernanke's tenure as Chairman of the FOMC (first meeting in March 2006) to compare disagreement during the chairmanships of Greenspan and Bernanke.

Our final set of variables takes into account regional (district-specific) influences on the FOMC members. Previous literature (Belden 1989; Tootell 1991; Gildea 1992; Meade and Sheets 2005; Chappell et al 2008; Eichler and Lähner 2014b) has shown that the regional unemployment rate and the regional price index affect FOMC members' voting behavior. Hence, we employ: (i) a dummy variable to distinguish between Bank presidents and governors, (ii) the district-specific unemployment rates, and (iii) the district-specific Leading Index as additional covariates to test for regional determinants of the bias.[10]

It has to be noted that we cannot include individual-fixed effects into Eq. (8), since these would absorb the effects of all personal characteristics. In addition, we cannot control for time-fixed effects as these would absorb all variables without cross-sectional variation (i.e., macroeconomic and financial variables, as well some of the political variables). Finally, we cluster standard errors at the level of individual FOMC members to account for potential FOMC member-specific patterns of autocorrelation and heteroskedasticity. In addition, clustering also ensures that the estimation precision is not overstated in our panel setup.

Our panel covers all regularly scheduled meetings from January 1994 until December 2011. The start date is dictated by the availability of data for the financial stress indicator and the end date is determined by the five-year delay of publishing the Greenbook data. As mentioned earlier, we provide results for the pre-crisis period ending in December 2008, that is, when the target rate effectively reached the zero-lower bound, and for the full sample. Due to lack of variation in the target rate after

[10]State leading indexes are aggregated to the district level using population weights.

December 2008, we rely on the shadow rate for all estimations that use the full sample period. Our sample contains 1,278 observations for the pre-crisis subsample and 1,519 for the full sample.

4 Empirical Results

4.1 Baseline Results

Table 2 sets out the results of a panel least squares estimation of Eq. (8) for all four versions of the bias. In the following, we interpret the bias from the point of view of the monetary policymaker. This means that positive coefficients explain why an FOMC member voted more hawkishly than the recommended interest rate of the Fed's staff (hawkish bias), and vice versa (dovish bias).

The results indicate that macroeconomic and financial conditions constitute important determinants of disagreement between FOMC members and the Fed's staff about the appropriate policy rate. We find that a higher inflation forecast (only in the pre-crisis subsample) and output gap forecast increase internal disagreement on the dovish side, while a higher unemployment gap forecast increases disagreement in favor of a more hawkish monetary policy. As an illustration, a one percentage point (pp) increase in inflation expectations is associated with a more dovish bias of 0.13 pp in column (1). Similarly, a one pp increase in the expected output gap (expected unemployment gap) leads to a 0.07 pp more dovish (0.14 pp more hawkish) bias in column 1 (2).

Higher uncertainty and more financial stress increase disagreement on the dovish side, that is, the FOMC prefers lower rates during turbulent times. Here, it is useful to consider the standard deviation (SD) of these variables as a yardstick to document their economic significance. A one SD increase in economic uncertainty (0.31) and a one SD increase in financial stress (0.81) are associated with a 0.08 pp and a 0.06 pp more dovish bias in column (1), respectively. A one SD increase in the oil price (0.63) is associated with a more hawkish bias by 0.10 pp in column (1), implying that the FOMC responds to supply shocks in addition to reacting to inflation expectations.

Put differently, this reaction—that we document for the pre-crisis subsample only—could be interpreted as partly compensating for the FOMC's relatively "lax" reaction to inflation expectations. Finally, the impact of stock prices on the FOMC's bias differs depending on the sample considered in the analysis. Higher stock prices lead to more disagreement for a dovish monetary policy when considering the full sample period, whereas we do not find any significant response to stock returns in the pre-crisis subsample. Hence, FOMC members were accommodating the sharp increase in stock returns between 2009 and 2011.

Next, we find that career characteristics of FOMC members are significant in explaining internal disagreement. The variable related to the length of time FOMC committee members have served, indicates that members with more experience tend to disagree on the dovish side, which is in accordance with the finding of Neuenkirch (2015). However, we only document a significant effect when considering the pre-crisis subsample. Economically, this effect is not very large as each additional year of experience is associated with a more dovish bias of 0.003 pp in columns (1) and (2). As for professional experiences, members with a background in finance and industry are associated with 0.06 pp and 0.02 pp more disagreement on the hawkish side in column (1), compared to the base category, that is, the members with experience in academia. These results show that monetary policy preferences shaped during the previous professional experience of FOMC members are likely to translate into different votes during the decision-making process. Finally, and in line with the existing literature on actual voting behavior in the FOMC (e.g., Chappell et al 1995), we find that members with previous experience as Bank staff are more likely to disagree on the hawkish side (as compared to the base category academia) by 0.03 pp in column (1).

Table 2: Explaining Individual Biases of FOMC Members

	Pre-Crisis Subsample		Full Sample	
	Output	Unemp.	Output	Unemp.
	(1)	(2)	(3)	(4)
Constant	0.745**	1.588***	1.133***	1.229***
	(0.313)	(0.264)	(0.363)	(0.275)
Inflation Forecast	−0.134***	−0.291***	−0.008	0.002
	(0.015)	(0.016)	(0.013)	(0.016)
Output Gap Forecast	−0.068***		−0.062***	
	(0.007)		(0.010)	
Unemployment Gap Forecast		0.144***		0.053***
		(0.014)		(0.013)
SP500 Returns	−0.080	0.003	−0.470***	−0.459***
	(0.132)	(0.143)	(0.087)	(0.103)
Log(Oil Price)	0.152***	0.152***	0.009	0.012
	(0.032)	(0.030)	(0.015)	(0.019)
Log(Uncertainty)	−0.250***	−0.367***	−0.276***	−0.287***
	(0.050)	(0.042)	(0.069)	(0.053)
Financial Stress	−0.074***	−0.120***	0.029*	−0.026***
	(0.012)	(0.009)	(0.015)	(0.009)
Female	−0.019	−0.020	−0.007	−0.011
	(0.016)	(0.018)	(0.012)	(0.014)
Experience	−0.003***	−0.003**	−0.001	−0.002
	(0.001)	(0.001)	(0.001)	(0.001)
Government	−0.006	−0.005	0.007	0.007
	(0.012)	(0.014)	(0.010)	(0.014)
Industry	0.023*	0.017	0.039*	0.049**
	(0.013)	(0.014)	(0.021)	(0.022)
Finance	0.059***	0.057***	0.050***	0.052***
	(0.013)	(0.013)	(0.015)	(0.015)
Board Staff	0.027	0.015	0.008	0.029
	(0.023)	(0.017)	(0.012)	(0.020)
Bank Staff	0.032**	0.027*	0.026*	0.027
	(0.014)	(0.016)	(0.014)	(0.017)
Chairman Bernanke	−0.069**	−0.049*	−0.169***	−0.171***
	(0.031)	(0.025)	(0.024)	(0.027)
Presidential Election	0.050**	0.071***	0.046***	0.039**
	(0.021)	(0.024)	(0.012)	(0.019)
Democratic President	0.395***	0.438***	0.008	0.059***
	(0.037)	(0.038)	(0.012)	(0.017)
Democ. Pres. (Appointment)	0.001	0.005	0.002	−0.007
	(0.012)	(0.013)	(0.011)	(0.014)
Democratic Congress	0.012	0.005	0.089**	0.066*
	(0.033)	(0.028)	(0.037)	(0.034)
Republican Congress	−0.049***	−0.128***	0.077***	−0.005
	(0.016)	(0.017)	(0.018)	(0.022)
FRB President	0.007	0.010	0.011	0.012
	(0.010)	(0.010)	(0.009)	(0.010)
District Leading Index	0.011	0.007	0.013	−0.008
	(0.010)	(0.009)	(0.010)	(0.010)
District Unemployment	0.001	−0.002	−0.008	−0.006
	(0.008)	(0.008)	(0.007)	(0.008)
Observations	1278	1278	1519	1519
R^2	0.21	0.31	0.18	0.16

Notes: Table shows estimates of Eq. (8) with standard errors (clustered at the individual level) in parentheses. ***/**/* indicate significance at the 1%/5%/10% level.

When we focus on political factors, the results show there is a bias towards a hawkish monetary policy when a Democratic President holds the executive office. Since a Democratic administration is more likely to pursue expansionary policies than a Republican administration (Hibbs 1994), FOMC members may be more hawkish than the Fed's staff to counterbalance the inflationary effects of these policies. Moreover, when both chambers of the Congress are controlled by Democrats, FOMC members tend to disagree with the Fed's staff on the hawkish side also (full sample period only). This hawkish behavior may arise due to the ease of approving spending bills when Congress is controlled by a clear Democratic majority. In contrast, when both chambers of the Congress are controlled by Republicans we observe both, a significant positive bias for the pre-crisis subsample and negative bias for the full sample (column 3 only). In addition, the FOMC favors a more hawkish monetary policy during the six months before an election, possibly to counteract the inflationary policies resulting from political budget cycles (Shi and Svensson 2006). Finally, the dovish leaning of FOMC members during the chairmanship of Bernanke, when compared to Greenspan's chairmanship, is not surprising since the tenure of Bernanke coincides with crises periods (the subprime mortgage crisis and the global financial crisis).

To illustrate the economic significance, we focus on column (4) as the effects for the Democratic President and Democratic Congress are only significant at the same time when considering this specification. On average, the FOMC disagrees by 0.06 pp on the hawkish side with the Fed's staff under a Democratic President, by 0.07 pp if the Congress is controlled by Democrats, and by 0.04 pp if there is upcoming presidential election. The negative conditional effect of Ben Bernanke as Chairman amounts to -0.17 pp.

As for the regional variables, we find no significant effect of the district Leading Index, nor of the district unemployment rates, suggesting that there is no regional influence on internal disagreement. Similarly, disagreement of regional Bank presidents with the Fed's staff is not significantly different from the disagreement of the governors.

Overall, our results show that macroeconomic and financial conditions, the professional experience of FOMC members, and political variables significantly affect the direction of disagreement of FOMC members with respect to the policy recommendation by the Fed's staff. In particular, the results for professional experience and financial conditions are in line with previous results for disagreement in the FOMC and Taylor rules in general. Our paper, however, documents that these factors are also relevant to explain disagreement between FOMC members and the Fed's staff, a finding that is new to the literature.

One note of caution is warranted, the inclusion of 22 different explanatory variables at the same time might give rise to multicollinearity problems. Hence, we calculate the variance inflation factors (VIFs) for all four models. In the case of both models for the full sample period, all VIFs are well below the rule of thumb threshold of 10. In the case of both models for the pre-crisis subsample, the VIF for a Democratic President is slightly above 10. Hence, we estimated models (1) and (2) without this variable. Our key results, however, are mostly unaffected with respect to the exclusion of this variable, which is why we decided to keep it in all estimations.

4.2 Extension: Differences in the Information Sets

Some of the subsequent upward and downward "jumps" in the FOMC's bias depicted in Figure 2 may be the result of a different timing in the information sets. One potential explanation of these reversals may be that FOMC members react to macroeconomic news earlier or later than the Fed's staff. To account for this possibility, we replace the contemporaneous values of macroeconomic forecasts in Eq. (8) with their lead or lagged values to test whether the FOMC's bias can be better explained by these variables. This might be indicative of the Fed's staff having a different information set than FOMC members when formulating its policy recommendation. Table 3 shows the estimated results when considering the lead values, the contemporaneous values (these results are taken from Table 2), and the lagged values of macroeconomic forecasts.

Table 3: Explaining Individual Biases: Different Timing of Information Sets

	Pre-Crisis: Output Gap			Pre-Crisis: Unemp. Gap		
	Lead	Contemp.	Lag	Lead	Contemp.	Lag
	(1)	(2)	(3)	(4)	(5)	(6)
Inflation Forecast	−0.024	−0.134***	−0.011	−0.136***	−0.291***	−0.091***
	(0.015)	(0.015)	(0.016)	(0.013)	(0.016)	(0.018)
Output Gap Forecast	−0.047***	−0.068***	−0.046***			
	(0.006)	(0.007)	(0.008)			
Unemp. Gap Forecast				0.084***	0.144***	0.094***
				(0.015)	(0.014)	(0.018)
Observations	1278	1278	1278	1278	1278	1278
R^2	0.18	0.21	0.17	0.22	0.31	0.20
	Full Sample: Output Gap			Full Sample: Unemp. Gap		
	Lead	Contemp.	Lag	Lead	Contemp.	Lag
	(7)	(8)	(9)	(10)	(11)	(12)
Inflation Forecast	−0.008	−0.008	0.013	−0.002	0.002	−0.012
	(0.013)	(0.013)	(0.012)	(0.016)	(0.016)	(0.014)
Output Gap Forecast	−0.040***	−0.062***	−0.060***			
	(0.009)	(0.010)	(0.010)			
Unemp. Gap Forecast				0.039***	0.053***	0.055***
				(0.014)	(0.013)	(0.012)
Observations	1509	1519	1519	1509	1519	1519
R^2	0.11	0.18	0.16	0.15	0.16	0.17

Notes: Table shows selected estimates of a modified version of Eq. (8) with standard errors (clustered at the individual level) in parentheses. ***/**/* indicate significance at the 1%/5%/10% level. All omitted results are available on request.

Table 3 suggests that, for the pre-crisis subsample, including the lead or the lag of macroeconomic forecasts in the model has less explanatory power for the FOMC's bias. Concerning the full sample, we obtain the same results regardless of the timing of the macroeconomic forecasts used in the model. Hence, these findings are not indicative that the FOMC has earlier information (as compared to the official releases of the Fed's staff) on the macroeconomic forecasts or that the FOMC reacts with a time lag.

Next, we consider that differences in forecasts between the FOMC members and the Fed's staff may be a potential source of internal disagreement. For that purpose, we include differences between the individual forecast by each FOMC member prepared for the semi-annual monetary policy report to the Congress[11] and the Fed's staff forecasts as additional regressors. This data set consists of 26 bi-annual rounds for FOMC member forecasts between 1994 and 2006. Hence, the variables measuring the differ-

[11] *Source*: https://www.philadelphiafed.org/research-and-data/real-time-center/monetary-policy-projections.

ences between both forecasts are set to zero if there is no individual forecast and the estimations are restricted to the pre-crisis subsample. Table 4 sets out the results.

Table 4: Explaining Individual Biases: Different Information Sets

	Pre-Crisis: Output Gap	Pre-Crisis: Unemp. Gap
	(1)	(2)
Inflation Forecast	−0.131***	−0.291***
	(0.014)	(0.015)
… Difference to Staff Forecast	0.034	0.005
	(0.029)	(0.030)
Output Gap Forecast	−0.066***	
	(0.008)	
… Difference to Staff Forecast	0.008	
	(0.005)	
Unemployment Gap Forecast		0.144***
		(0.014)
… Difference to Staff Forecast		0.010
		(0.049)
Observations	1278	1278
R^2	0.21	0.31

Notes: Table shows selected estimates of a modified version of Eq. (8) with standard errors (clustered at the individual level) in parentheses. ***/**/* indicate significance at the 1%/5%/10% level. All omitted results are available on request.

Table 4 shows that, when compared to the Fed staff's forecasts, the individual FOMC member forecasts for inflation, the output gap, and the unemployment gap do not significantly explain the bias. Hence, even with the individual forecasts of FOMC members being different from those of the Fed's staff on a regular basis, these differences do not explain, on average, why FOMC members deviate from the FSRIR. Summarizing the results of both extensions, we find that differences in the (timing of the) information set do not constitute an additional source of internal disagreement between the FOMC members and the Fed's staff.

4.3 Robustness Test: Bias based on a Normative Taylor Rule

Instead of using the Markov-switching Taylor rule employed in Eq. (3) to compute the bias, we use a normative Taylor rule with inflation forecasts and output gap forecasts and the parameters proposed by Taylor (1993). We do not consider the unemployment gap forecast since the latter is not part of the original Taylor rule. For the interest rate smoothing parameter, we assume a value of 0.9 given that this is the middle ground

of the interest rate smoothing parameters in columns (1) and (3) in Table 1. Consequently, the counterfactual interest rates for the target rate c_t^y and the shadow rate $c_t^{s,y}$ are computed as follows:

$$c_t^y = 0.9i_{t-1} + 0.1\,(4 + 1.5E_t\widehat{\pi}_{t+4} + 0.5E_t\widehat{y}_{t+4}) \tag{9}$$

$$c_t^{s,y} = 0.9s_{t-1} + 0.1\,(4 + 1.5E_t\widehat{\pi}_{t+4} + 0.5E_t\widehat{y}_{t+4}) \tag{10}$$

Again, we relate these recommended interest rates to the actual target rate (i_t) set by the FOMC and the shadow rate (s_t) to compute the bias based on a normative Taylor rule:

$$bias_t^y = i_t - c_t^y \tag{11}$$

$$bias_t^{s,y} = s_t - c_t^{s,y} \tag{12}$$

We then explain the bias with the help of Eq. (8) and the same set of covariates as in the baseline analysis. Table 5 sets out the results.

The results paint a very similar picture as those in Table 2 in terms of sign, size, and significance. This shows that our results are robust to the type of Taylor rule used to compute the bias, that is, either a two-regime estimated Markov-switching Taylor rule or a normative Taylor rule with assumed weights. One of the differences is that the variable for experience on the Board staff experience is now significant in this robustness test (column (2)). In addition, the dummy variable for the meetings half a year before a new U.S. president is inaugurated is now negative and significant when considering the full sample period. Consequently, we do not overemphasize the positive coefficient found in the baseline results as indicative for the existence of an electoral cycle .

Table 5: Explaining Individual Biases: Robustness Test with Assumed Weights

	Pre-Crisis: Output Gap	Full Sample: Output Gap
	(1)	(2)
Constant	0.711*	1.974***
	(0.394)	(0.427)
Inflation Forecast	−0.094***	−0.022
	(0.022)	(0.017)
Output Gap Forecast	−0.026***	−0.024**
	(0.007)	(0.011)
SP500 Returns	−0.318**	−0.543***
	(0.120)	(0.077)
Log(Oil Price)	0.190***	0.018
	(0.048)	(0.033)
Log(Uncertainty)	−0.293***	−0.488***
	(0.057)	(0.071)
Financial Stress	−0.202***	−0.037***
	(0.014)	(0.010)
Female	−0.027	−0.016
	(0.020)	(0.016)
Experience	−0.004***	−0.002
	(0.001)	(0.002)
Government	−0.003	0.012
	(0.019)	(0.015)
Industry	0.030	0.049***
	(0.020)	(0.018)
Finance	0.081***	0.064***
	(0.017)	(0.016)
Board Staff	0.044	0.044**
	(0.033)	(0.020)
Bank Staff	0.039**	0.031**
	(0.017)	(0.015)
Chairman Bernanke	−0.098**	−0.121***
	(0.042)	(0.044)
Presidential Election	−0.001	−0.042***
	(0.025)	(0.014)
Democratic President	0.527***	0.186***
	(0.053)	(0.019)
Democ. Pres. (Appointment)	0.001	−0.005
	(0.021)	(0.017)
Democratic Congress	0.073*	0.164***
	(0.042)	(0.046)
Republican Congress	−0.024	0.160***
	(0.024)	(0.020)
FRB President	0.008	0.013
	(0.014)	(0.010)
District Leading Index	0.003	−0.007
	(0.013)	(0.012)
District Unemployment	−0.002	0.000
	(0.010)	(0.009)
Observations	1278	1519
R^2	0.50	0.41

Notes: Table shows estimates of a modified version of Eq. (8) with standard errors (clustered at the individual level) in parentheses. ***/**/* indicate significance at the 1%/5%/10% level.

4.4 Robustness Test: Bias based on Monetary Policy Preferences

As a final robustness test, we calculate the individual bias of the FOMC members based on their preferences in the policy go-around before each vote. The rationale here is that dissents occurred infrequently during Alan Greenspan's tenure as Chairman (see, e.g., Gerlach-Kristen and Meade 2010). FOMC members cast dissenting votes only when they strongly disagreed with a proposed directive and cast assenting votes in the case of weak disagreement. In the latter case, FOMC members must rely on other channels if they want to express their opposition to the interest rate proposal. One of these channels is voiced disagreement in internal Committee discussions. Meade (2005) illustrates that the rate of disagreement in Committee discussions about interest rate setting was about 30%. Hence, we create a member-specific version of the bias, which can might different from the committee-wide version in Eqs. (4)–(7) if an FOMC member voiced disagreement in favor of tighter or looser monetary policy in the policy go-around. Table 6 sets out the results. Here, the focus lies on the pre-crisis subsample as quantifying disagreement for the size of unconventional monetary policy measures is a very difficult exercise.

The results, again, paint a very similar picture as those in Table 2 in terms of sign, size, and significance. This holds despite the fact that the number of observations is somewhat smaller as individual preferences in the policy go-around are not found for each voting member at each meeting. The only two differences are that the variables for experience on the Bank staff and for a clear Democratic majority in the Congress are insignificant in this robustness test. Hence, we drop these two findings from our key results.

Table 6: Explaining Individual Biases Based on Monetary Policy Preferences

	Pre-Crisis: Output Gap	Pre-Crisis: Unemp. Gap
	(1)	(2)
Constant	0.721*	1.587***
	(0.357)	(0.313)
Inflation Forecast	−0.142***	−0.297***
	(0.023)	(0.028)
Output Gap Forecast	−0.064***	
	(0.008)	
Unemployment Gap Forecast		0.150***
		(0.016)
SP500 Returns	−0.177	−0.109
	(0.147)	(0.157)
Log(Oil Price)	0.156***	0.159***
	(0.030)	(0.030)
Log(Uncertainty)	−0.246***	−0.371***
	(0.059)	(0.051)
Financial Stress	−0.075***	−0.129***
	(0.013)	(0.013)
Female	−0.021	−0.031
	(0.017)	(0.019)
Experience	−0.003*	−0.003
	(0.001)	(0.002)
Government	−0.017	−0.023
	(0.017)	(0.019)
Industry	0.017	0.001
	(0.025)	(0.028)
Finance	0.073***	0.078***
	(0.013)	(0.016)
Board Staff	0.035	0.012
	(0.031)	(0.023)
Bank Staff	0.002	0.003
	(0.021)	(0.023)
Chairman Bernanke	−0.092**	−0.046
	(0.045)	(0.035)
Presidential Election	0.052**	0.069***
	(0.022)	(0.025)
Democratic President	0.414***	0.478***
	(0.031)	(0.041)
Democ. Pres. (Appointment)	0.005	0.015
	(0.018)	(0.021)
Democratic Congress	0.037	0.014
	(0.050)	(0.036)
Republican Congress	−0.052**	−0.134***
	(0.022)	(0.023)
FRB President	0.017	0.017
	(0.016)	(0.015)
District Leading Index	0.012	0.009
	(0.009)	(0.009)
District Unemployment	0.002	−0.003
	(0.010)	(0.010)
Observations	1075	1075
R^2	0.20	0.28

Notes: Table shows estimates of a modified version of Eq. (8) with standard errors (clustered at the individual level) in parentheses. ***/**/* indicate significance at the 1%/5%/10% level.

5 Conclusions

This paper examines the degree and sources of internal disagreement between the FOMC members and the Fed's staff about the appropriate policy rate. For that purpose, we assume that the Fed's staff hypothetically sets interest rates based on its own Greenbook forecasts and a time-varying monetary policy rule à la Taylor (1993). Our sample contains 144 regularly scheduled interest rate decisions between January 1994 and December 2011, thereby also covering 24 decisions at the zero-lower bound of interest rates.

In a first step, we contrast this recommended interest rate to the actual target rate set by the FOMC. The comparison reveals that there are persistent differences between the actual target rate and the Fed staff's counterfactual rate, suggesting continuous disagreement about the appropriate policy rate. In a second step, we explain the differences between the individual votes of FOMC members and the Fed staff's recommended interest rate. Our results reveal that FOMC members with an occupational background in finance favor a relatively more hawkish monetary policy. In addition, a preference towards a tighter monetary policy is found under a Democratic President and during Alan Greenspan's tenure as the Fed's Chairman. Finally, higher oil prices, a low degree of uncertainty, and episodes of financial stability are also associated with higher interest rates as compared to the Fed staff's recommendation. These findings are robust even when considering a normative Taylor rule with assumed weights to compute the FSRIR and the monetary policy preferences of FOMC members to measure the bias.

Our analysis of disagreement between the FOMC members and the Fed's staff yields some interesting insights for central bank watchers. Indeed, we find that FOMC members' background characteristics and political cycles are important factors explaining differences between the actual interest rate setting behavior by the FOMC and the policy recommendation given by the Fed's staff. Hence, even though the FOMC is considered to be independent from the government, our results indicate that some political variables can explain disagreement between the FOMC members and the Fed's staff.

In addition, economic uncertainty and financial stability should be considered when assessing monetary policy in the United States.

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Appendix

Table A1: Descriptive Statistics

Variable	Mean	Std. Dev.	Min	Max
Bias Pre-Crisis Output Gap	0.00	0.21	−1.19	0.73
Bias Pre-Crisis Unemp. Gap	0.01	0.23	−1.32	0.85
Bias Full Sample Output Gap	0.00	0.22	−1.32	1.16
Bias Full Sample Unemp. Gap	0.01	0.21	−1.14	0.61
Inflation Forecast	1.79	0.54	0.80	2.80
Output Gap Forecast	−0.96	2.51	−8.00	2.80
Unemployment Gap Forecast	0.81	1.50	−1.11	4.93
SP500 Returns	0.01	0.05	−0.24	0.11
Log(Oil Price)	3.58	0.63	2.39	4.92
Log(Uncertainty)	4.57	0.31	4.05	5.50
Financial Stress	0.40	0.81	−0.86	4.45
Female	0.17	0.37	0	1
Experience	5.54	4.81	0	23.76
Academia	0.25	0.43	0	1
Government	0.16	0.37	0	1
Industry	0.06	0.23	0	1
Finance	0.18	0.38	0	1
Board Staff	0.05	0.22	0	1
Bank Staff	0.30	0.46	0	1
Chairman Bernanke	0.31	0.46	0	1
Presidential Election	0.11	0.32	0	1
Democratic President	0.55	0.50	0	1
Democ. Pres. (Appointment)	0.18	0.38	0	1
Democratic Congress	0.26	0.44	0	1
Republican Congress	0.57	0.49	0	1
Bank President	0.46	0.50	0	1
District Leading Index	−0.10	0.63	−3.55	1.80
District Unemployment Rate	−0.18	0.71	−2.67	2.08

Notes: Number of observations: 1,519. Exception: Bias indicators for pre-crisis subsample (1,278 observations.