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The Determinants of Disagreement Between the FOMC and the Fed's Staff: New Insights Based on a Counterfactual Interest Rate

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The Determinants of Disagreement Between the FOMC 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 Federal Open Market Committee (FOMC) and the Federal Reserve's (Fed's) staff about the appropriate policy rate for the period 1987–2011. For that purpose, we compute a counterfactual interest rate for the Fed's staff, based on its own Greenbook forecasts and a Taylor (1993) rule, and compare it with the actual target rate. First, we find that the FOMC behaved more hawkish (dovish) during the 1990s (during the early 2000s) compared to the suggestions of the Fed's staff. Second, we reveal that a higher share of hawkish dissents, a higher share of voting women, a more experienced FOMC, and a higher share of members with a background in finance, the government, or the Bank staff are associated with relatively more hawkish monetary policy. In addition, the FOMC is found to prefer tighter monetary policy under a Democratic President, if there is a clear majority in the Congress, and during tranquil times.

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 United States. Whereas the Fed's staff offer a pessimistic view of the economic outlook, the view of the FOMC members is more optimistic. 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 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 (additional) 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 the FOMC policymakers. However, even if many historical episodes, for instance, the policy meetings

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

of July 1979[2] and February 1991[3], suggest such differences, 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; Meade 2010), and voiced disagreement in speeches by FOMC members (Hayo and Neuenkirch 2013). Thus far, little is known about disagreement between the FOMC and the Fed's staff.

We aim at filling this gap in the literature by examining the degree and sources of disagreement between the FOMC and the Fed's staff. For that purpose, we assume a situation where the Fed's staff hypothetically sets interest rates based on its own Greenbook forecasts and a Taylor (1993) rule. The Fed's staff implied interest rate (henceforth, FSIIR) reflects a counterfactual policy recommendation and allows us to compute an unobserved variable based on observed macroeconomic forecasts. Our sample contains 196 regularly scheduled interest rate decisions between August 1987 and December 2011. Hence, our sample also covers 24 decisions at the zero-lower bound (ZLB) of interest rates.

In a first step, we contrast the FSIIR to the actual target rate set by the FOMC. The comparison reveals that there are persistent differences between the actual target rate and the FSIIR, suggesting persistent *internal disagreement* about the appropriate policy rate. In particular, FOMC members behaved more hawkish during the 1990s and more dovish during the early 2000s when compared to the suggestions of the Fed's staff.

In a second step, we explain the differences between the actual target rate set by the FOMC and the FSIIR. The extant literature has identified four sources that explain heterogeneity in monetary policy preferences across FOMC members, which also might explain internal disagreement between the FOMC and the Fed's staff. The first source is related to the background characteristics and political affiliations of policy-

[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).

makers. Malmendier et al (2017) find that personal experiences of inflation strongly influence the hawkish or dovish leanings of central bankers. Eichler and Lähner (2014) 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 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 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 have provided 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 have found 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 (including different weights in the Taylor rule), (ii) dissent within the FOMC, (iii) personal and career characteristics of the FOMC members, (iv) political factors, and (v) regional disparities in the United States help explain the disagreement between the FOMC and the Fed's staff about the appropriate policy rate.[4]

Our results reveal that a higher share of hawkish dissents, a higher share of voting women, a more experienced FOMC, and a higher share of members with a background in finance, the government, or the Bank staff are associated with a relatively more hawkish monetary policy. In addition, the FOMC is found to prefer tighter monetary policy (as compared to its staff) under a Democratic President, if there is a clear majority in the Congress, and during tranquil times.

The remainder of this paper is organized as follows. Section 2 introduces the counterfactual interest rate for the Fed's staff 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 Implied Interest Rate

In a first step, we derive our counterfactual interest rate, that is, the FSIIR, against which we compare the actual interest rate set by the FOMC. Taylor (1993) proposed the following rule to describe the Fed's interest rate setting:

$$i_t = r + \pi_t + 0.5(\pi_t - \pi^*) + 0.5y_t \tag{1}$$

i_t is the target rate, r the equilibrium real interest rate, π_t the inflation rate, π^* the "target value" for inflation, and y_t the output gap, that is, the difference between actual

[4]We also considered differences in forecasts between the FOMC and the Fed's staff as a source of internal disagreement. However, the data set by Romer (2010) only consists of 18 rounds of FOMC forecasts between 1992 and 2000, and the FOMC's summary of economic projections is only available from October 2007 onwards. This makes these data sets too short to be reasonably employed in our estimations.

output and potential output. Assuming a real interest rate of 2% and an "inflation target" of 2%, Eq. (1) can be re-written as follows:

$$i_t = 1 + 1.5\pi_t + 0.5y_t \tag{2}$$

The Fed's target rate should be equal to 1% plus 1.5 times the inflation rate, and 0.5 times the output gap. Empirically, we observe that central banks do not abruptly reset their target rate to the proposed Taylor interest rate. Rather, they gradually adjust it towards the new target in small steps (Clarida et al 1998). Similarly, the Fed's staff, when hypothetically allowed to put forward its own interest rate, has to use the actual target rate of the previous meeting as the starting point. Accounting for this interest rate smoothing behavior leads to the following specification:

$$i_t = 0.9i_{t-1} + 0.1\,(1 + 1.5\pi_t + 0.5y_t) \tag{3}$$

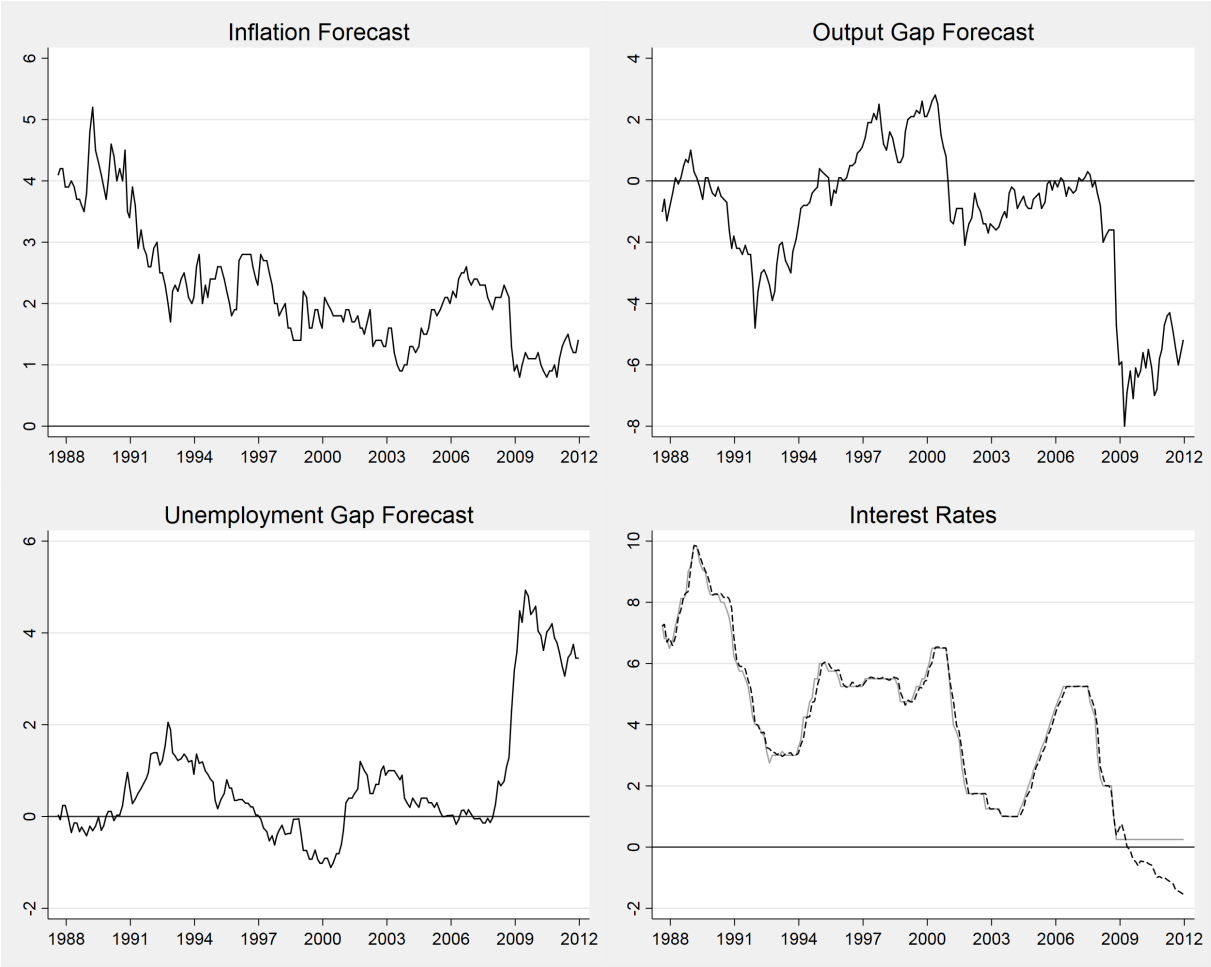
Eq. (3) implies that 90% of the previous period's target rate carries over to the current period and that 10% is reset due to changes in the macroeconomic situation. In the following, we assume that the Fed's staff proposes an interest rate based on Eq. (3). It has to be noted that, while for convenience we make assumptions on the Taylor coefficients, we will relax these as part of our robustness tests.

As macroeconomic variables, we use the Fed staff's projections of inflation, the output gap, and the unemployment gap found in the Greenbook.[5] 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.[6]

[5]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."

[6]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 inflation, 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).

Since monetary policy is supposed to be forward-looking, our implied Taylor rules for the Fed's staff utilize the four-quarter ahead expected inflation rate $E_t\pi_{t+4}$ as a nominal macroeconomic indicator. As a real macroeconomic indicator, we use (i) output gap forecasts $E_t y_{t+4}$, and (ii) unemployment gap forecasts $E_t u_{t+4}$. The latter is included since the Fed's dual mandate focuses on employment as real macroeconomic indicator rather than on the output gap.

Preliminary estimations indicate that, while a weight of 0.5 is appropriate for the expected output gap, a weight of 1.0 is more reasonable for the expected unemploy-

ment gap.[7] As mentioned before, we have to take into account the ZLB of interest rates in our calculations of implied interest rates. As a consequence, we estimate four different types of benchmark interest rates. Eqs. (4) and (5) use the lagged actual target rate (i_{t-1}), the expected output gap and the expected unemployment gap, respectively. Here, the sample ends in December 2008, when the FOMC cut its target rate to a range of 0% to 0.25%. Eqs. (6) and (7) repeat this exercise with the lagged shadow rate (i^s_{t-1}) for the full sample period (August 1987–December 2011):

$$c^y_t = 0.9 i_{t-1} + 0.1\,(1 + 1.5 E_t \pi_{t+4} + 0.5 E_t y_{t+4}) \tag{4}$$

$$c^u_t = 0.9 i_{t-1} + 0.1\,(1 + 1.5 E_t \pi_{t+4} - 1.0 E_t u_{t+4}) \tag{5}$$

$$c^{s,y}_t = 0.9 i^s_{t-1} + 0.1\,(1 + 1.5 E_t \pi_{t+4} + 0.5 E_t y_{t+4}) \tag{6}$$

$$c^{s,u}_t = 0.9 i^s_{t-1} + 0.1\,(1 + 1.5 E_t \pi_{t+4} - 1.0 E_t u_{t+4}) \tag{7}$$

c^y_t and c^u_t are the counterfactual interest rates based on the actual target rate, the expected output gap and the expected unemployment gap, respectively. $c^{s,y}_t$ and $c^{s,u}_t$ are the corresponding counterfactuals based on the shadow rate.

Next, we relate these counterfactual interest rates to the actual target rate (i_t) set by the FOMC and the shadow rate (i^s_t). Consequently, we create four different indicators measuring the "bias" of the FOMC with the respect to the recommendation by the Fed's staff:

$$bias^y_t = i_t - c^y_t \tag{8}$$

$$bias^u_t = i_t - c^s_t \tag{9}$$

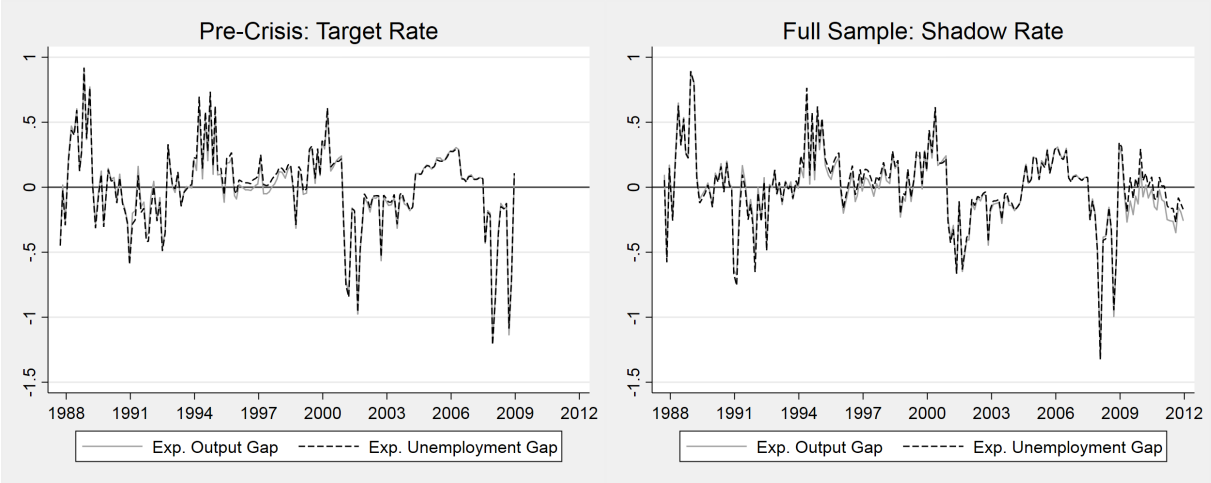
$$bias^{s,y}_t = i^s_t - c^{s,y}_t \tag{10}$$

$$bias^{s,u}_t = i^s_t - c^{s,u}_t \tag{11}$$

[7] Table A1 in the Appendix displays the coefficients of estimated Taylor rules to illustrate that the coefficients do not deviate too much from the assumed Taylor weights in Eq. (3) used for the Fed staff's counterfactual interest rates. Nevertheless, we explore the robustness of our findings with respect to different weights in the Taylor rule (see the end of Section 4 and Table A3 in the Appendix).

A positive (negative) value of the bias implies that the actual interest rate is higher (lower) than the recommendation by the Fed's staff. The left panel in Figure 2 shows the bias based on Eqs. (8) and (9). The right panel repeats this exercise for Eqs. (10) and (11).

Figure 2: Differences between the Target (Shadow) Rate and the FSIIR



Notes: Figure shows differences between the target rate (left panel)/shadow rate (right panel) and the implied interest rate for the Fed's staff based on Eqs. (8)–(11). A positive (negative) value implies that the actual interest rate is higher (lower) than the recommendation by the Fed's staff.

A comparison of the FSIIR based on both, output gap forecasts and unemployment gap forecasts with the target rate (shadow rate) yields a similar pattern. In general, the 1990s are characterized by a target rate higher than the implied interest rate, while during the early 2000s until the end of 2008 the opposite can be observed. This suggests that the pre-2000 (post-2000) era corresponds to a period when FOMC members were behaving more hawkish (dovish) than the recommendations of the Fed's staff. Finally, it is worth noting that the implied target rate based on the unemployment gap is more in line with the shadow rate at the ZLB than the one based on the output gap.

3 Econometric Methodology

Our paper aims at explaining disagreement between the FOMC and the Fed's staff. Consequently, our four different dependent variables correspond to the FOMC's bias

introduced in Eqs. (8)–(11). The general specification is as follows:

$$bias_t^j = \alpha + X_t'\beta + \epsilon_t \tag{12}$$

The vector X_t contains five different types of explanatory variables.[8] First, we consider different weights in the Taylor rule as a reason for disagreement between the FOMC and the Fed's staff. In addition, the financial and broader macroeconomic environment, in particular, macroeconomic uncertainty, might lead to a different assessment of preferred interest rates across these two bodies. Hence, we look at oil prices (in logs), the S&P 500 index (in logs), and the Economic Policy Uncertainty index by Baker et al (2016) as additional sources that might explain the FOMC's bias.[9]

Second, we take into account that dissent within the FOMC might also affect disagreement between monetary policymakers and the Fed's staff. Consequently, we include two variables measuring the percentage share of hawkish dissents and dovish dissents, respectively, over all casted votes at each FOMC meeting.

Third, personal and career characteristics of the FOMC members with voting rights include the percentage share of women at each meeting and the (squared) average tenure of the FOMC. We also take into account the previous work experience of the FOMC members in six different sectors (academia, government, industry, finance, Board staff, and Bank staff) and use the respective percentage shares over all voting members in the estimations.[10]

Fourth, we take into account that political factors might influence FOMC decisions, whereas the Fed's staff could be considered as being less prone to external pressure. We include dummy variables for (i) Ben Bernanke's tenure as Chairman of the FOMC (first meeting in March 2006), (ii) the meetings half a year before a new U.S. president is inaugurated, (iii) whether a Democratic President is in power, (iv) whether the U.S. Congress (Senate and House of Representatives) is controlled by Democrats, and (v)

[8] Table A2 in the Appendix sets out descriptive statistics for all variables.

[9] Unfortunately, we cannot consider the VIX volatility index as a proxy for financial market volatility since it is available only from 1990 onwards.

[10] Due to perfect multicollinearity, we use work experience in academia as the base category and only implement the five remaining sectors in the regressions.

whether the U.S. Congress is controlled by Republicans.[11] Finally, we also employ the percentage share of governors appointed under a Democratic President as additional covariate.

Our final set of variables reflects the regional (district-specific) influence on the FOMC. As additional explanatory variables, we use (i) the percentage share of Bank presidents voting at each meeting (as opposed to governors), (ii) the standard deviation of the district-specific unemployment rates, and (iii) the standard deviation of the district-specific leading index.[12]

Our sample covers all regularly scheduled meetings from August 1987 (Alan Greenspan's inauguration as Chairman of the Fed) until December 2011. The end date of the sample is determined by the five-year delay of publishing the Greenbook data. In total, our sample contains 196 observations. As mentioned earlier, we provide results for the pre-crisis period ending in December 2008 and for the full sample ending in December 2011. While we drop the last 24 meetings from the sample for the estimations from the pre-crisis subsample and rely on the actual federal funds target rate, we utilize the shadow rate for the estimations covering the full sample.

4 Empirical Results

Tables 1–4 show the results for the determinants of the bias based on the output gap and the unemployment gap, respectively, and for the pre-crisis subsample and the full sample period, respectively. In the following, we interpret the FOMC's bias from the point of view of the monetary policymakers. This means that positive coefficients explain why the FOMC behaves more hawkish than proposed by the Fed staff's counterfactual interest rate and, vice versa. To conserve space, we focus on clear patterns in the results, that is, we do not overemphasize findings where we detect just a single significant coefficient per explanatory variable.

[11] The reference category for (iv) and (v) is a split Congress.

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

Table 1: Explaining the Bias I (Output Gap for the Pre-Crisis Subsample)

	(Y1)	(Y2)	(Y3)	(Y4)	(Y5)	(Y6)
Constant	5.29***	–0.01	0.70	–0.17	0.17	1.91
	(0.99)	(0.03)	(0.46)	(0.11)	(0.25)	(1.76)
Inflation Forecast	–0.14**					–0.04
	(0.06)					(0.06)
Output Gap Forecast	0.05					–0.06
	(0.04)					(0.05)
Unemployment Gap Forecast	–0.05					–0.21*
	(0.10)					(0.11)
Log(SP500)	–0.41***					–0.16
	(0.13)					(0.22)
Log(Oil Price)	0.06					–0.06
	(0.08)					(0.09)
Log(Uncertainty)	–0.54***					–0.27
	(0.13)					(0.17)
Vote% Dissent Higher		0.42				0.83***
		(0.41)				(0.30)
Vote% Dissent Lower		–0.98				–0.58
		(0.81)				(0.70)
Vote% Women			0.72*			0.87*
			(0.37)			(0.48)
Average Experience			–0.42***			–0.23*
			(0.13)			(0.13)
Average Experience Squared			0.04***			0.03**
			(0.01)			(0.01)
Vote% Government			1.15**			1.38**
			(0.53)			(0.58)
Vote% Industry			–0.61			–0.26
			(0.57)			(0.68)
Vote% Finance			1.20***			1.64***
			(0.41)			(0.31)
Vote% Board Staff			–1.56**			1.21
			(0.65)			(0.89)
Vote% Bank Staff			–0.15			0.78
			(0.45)			(0.54)
Chairman Bernanke				–0.22**		–0.05
				(0.11)		(0.19)
Presidential Election				0.03		–0.03
				(0.09)		(0.07)
Democratic President				0.13**		0.24**
				(0.06)		(0.10)
Democratic Congress				0.16		0.27**
				(0.12)		(0.13)
Republican Congress				0.31***		0.16*
				(0.08)		(0.09)
Vote% Democratic President				–0.31*		–0.10
				(0.19)		(0.29)
Vote% Banks					–0.60	0.12
					(0.59)	(0.79)
SD(Regional UR)					0.26*	0.00
					(0.14)	(0.32)
SD(Regional LI)					–0.15*	–0.26
					(0.08)	(0.16)
R^2	0.34	0.02	0.24	0.23	0.08	0.55

Notes: Table shows determinants of the FOMC's bias calculated with the output gap for the pre-crisis subsample. Number of observations: 171. Newey/West (1987) standard errors are in parentheses. ***/**/* indicate significance at the 1%/5%/10% level.

Table 2: Explaining the Bias II (Unemployment Gap for the Pre-Crisis Subsample)

	(U1)	(U2)	(U3)	(U4)	(U5)	(U6)
Constant	5.29***	0.01	0.69	–0.14	0.21	1.91
	(0.99)	(0.03)	(0.48)	(0.11)	(0.26)	(1.76)
Inflation Forecast	–0.14**					–0.04
	(0.06)					(0.06)
Output Gap Forecast	0.10**					–0.01
	(0.04)					(0.05)
Unemployment Gap Forecast	0.05					–0.11
	(0.10)					(0.11)
Log(SP500)	–0.41***					–0.16
	(0.13)					(0.22)
Log(Oil Price)	0.06					–0.06
	(0.08)					(0.09)
Log(Uncertainty)	–0.54***					–0.27
	(0.13)					(0.17)
Vote% Dissent Higher		0.38				0.83***
		(0.42)				(0.30)
Vote% Dissent Lower		–1.10				–0.58
		(0.82)				(0.70)
Vote% Women			0.92**			0.87*
			(0.37)			(0.48)
Average Experience			–0.41***			–0.23*
			(0.13)			(0.13)
Average Experience Squared			0.04***			0.03**
			(0.01)			(0.01)
Vote% Government			1.18**			1.38**
			(0.53)			(0.58)
Vote% Industry			–0.87			–0.26
			(0.57)			(0.68)
Vote% Finance			1.21***			1.64***
			(0.42)			(0.31)
Vote% Board Staff			–1.78***			1.21
			(0.64)			(0.89)
Vote% Bank Staff			–0.24			0.78
			(0.46)			(0.54)
Chairman Bernanke				–0.21*		–0.05
				(0.11)		(0.19)
Presidential Election				0.03		–0.03
				(0.09)		(0.07)
Democratic President				0.18***		0.24**
				(0.06)		(0.10)
Democratic Congress				0.11		0.27**
				(0.13)		(0.13)
Republican Congress				0.29***		0.16*
				(0.09)		(0.09)
Vote% Democratic President				–0.35*		–0.10
				(0.19)		(0.29)
Vote% Banks					–0.57	0.12
					(0.61)	(0.79)
SD(Regional UR)					0.25*	0.00
					(0.14)	(0.32)
SD(Regional LI)					–0.22***	–0.26
					(0.09)	(0.16)
R^2	0.37	0.03	0.26	0.26	0.09	0.58

Notes: Table shows determinants of the FOMC's bias calculated with the unemployment gap for the pre-crisis subsample. Number of observations: 171. Newey/West (1987) standard errors are in parentheses. ***/**/* indicate significance at the 1%/5%/10% level.

Table 3: Explaining the Bias III (Output Gap for the Full Sample)

	(Y1')	(Y2')	(Y3')	(Y4')	(Y5')	(Y6')
Constant	3.89***	–0.00	0.48	–0.12	0.38*	2.31
	(0.78)	(0.03)	(0.34)	(0.08)	(0.20)	(1.43)
Inflation Forecast	–0.07					–0.07
	(0.04)					(0.05)
Output Gap Forecast	0.11***					–0.02
	(0.03)					(0.05)
Unemployment Gap Forecast	0.15***					–0.11
	(0.05)					(0.08)
Log(SP500)	–0.31***					–0.18
	(0.09)					(0.17)
Log(Oil Price)	0.09					0.09
	(0.07)					(0.07)
Log(Uncertainty)	–0.44***					–0.41***
	(0.13)					(0.15)
Vote% Dissent Higher		–0.26				0.05
		(0.36)				(0.26)
Vote% Dissent Lower		–0.09				0.33
		(0.61)				(0.53)
Vote% Women			0.32			0.37
			(0.27)			(0.36)
Average Experience			–0.32***			–0.18**
			(0.10)			(0.09)
Average Experience Squared			0.03***			0.02**
			(0.01)			(0.01)
Vote% Government			0.81**			1.06**
			(0.38)			(0.51)
Vote% Industry			–1.57***			–0.12
			(0.46)			(0.50)
Vote% Finance			1.16***			1.64***
			(0.36)			(0.29)
Vote% Board Staff			–0.63			0.89
			(0.40)			(0.60)
Vote% Bank Staff			–0.02			1.31***
			(0.29)			(0.42)
Chairman Bernanke				–0.14**		–0.05
				(0.06)		(0.17)
Presidential Election				–0.00		–0.04
				(0.08)		(0.05)
Democratic President				0.15***		0.24***
				(0.06)		(0.09)
Democratic Congress				0.10		0.13
				(0.09)		(0.09)
Republican Congress				0.23***		0.07
				(0.06)		(0.07)
Vote% Democratic President				–0.29*		0.08
				(0.16)		(0.24)
Vote% Banks					–1.03**	–0.58
					(0.51)	(0.57)
SD(Regional UR)					0.11	0.16
					(0.10)	(0.21)
SD(Regional LI)					0.00	0.03
					(0.09)	(0.11)
R^2	0.31	0.00	0.24	0.22	0.04	0.53

Notes: Table shows determinants of the FOMC's bias calculated with the output gap for the full sample. Number of observations: 195. Newey/West (1987) standard errors are in parentheses. ***/**/* indicate significance at the 1%/5%/10% level.

Table 4: Explaining the Bias IV (Unemployment Gap for the Full Sample)

	(U1')	(U2')	(U3')	(U4')	(U5')	(U6')
Constant	3.89***	0.02	0.45	–0.11	0.29	2.31
	(0.78)	(0.03)	(0.35)	(0.09)	(0.20)	(1.43)
Inflation Forecast	–0.07					–0.07
	(0.04)					(0.05)
Output Gap Forecast	0.16***					0.03
	(0.03)					(0.05)
Unemployment Gap Forecast	0.25***					–0.01
	(0.05)					(0.08)
Log(SP500)	–0.31***					–0.18
	(0.09)					(0.17)
Log(Oil Price)	0.09					0.09
	(0.07)					(0.07)
Log(Uncertainty)	–0.44***					–0.41***
	(0.13)					(0.15)
Vote% Dissent Higher		–0.27				0.05
		(0.37)				(0.26)
Vote% Dissent Lower		–0.27				0.33
		(0.62)				(0.53)
Vote% Women			0.59**			0.37
			(0.26)			(0.36)
Average Experience			–0.32***			–0.18**
			(0.10)			(0.09)
Average Experience Squared			0.03***			0.02**
			(0.01)			(0.01)
Vote% Government			0.66*			1.06**
			(0.38)			(0.51)
Vote% Industry			–1.74***			–0.12
			(0.46)			(0.50)
Vote% Finance			1.18***			1.64***
			(0.36)			(0.29)
Vote% Board Staff			–0.55			0.89
			(0.39)			(0.60)
Vote% Bank Staff			0.08			1.31***
			(0.30)			(0.42)
Chairman Bernanke				–0.11*		–0.05
				(0.06)		(0.17)
Presidential Election				–0.00		–0.04
				(0.08)		(0.05)
Democratic President				0.21***		0.24***
				(0.06)		(0.09)
Democratic Congress				0.07		0.13
				(0.10)		(0.09)
Republican Congress				0.21***		0.07
				(0.06)		(0.07)
Vote% Democratic President				–0.30*		0.08
				(0.17)		(0.24)
Vote% Banks					–0.79	–0.58
					(0.52)	(0.57)
SD(Regional UR)					0.16*	0.16
					(0.10)	(0.21)
SD(Regional LI)					–0.07	0.03
					(0.09)	(0.11)
R^2	0.33	0.01	0.24	0.23	0.05	0.55

Notes: Table shows determinants of the FOMC's bias calculated with the unemployment gap for the full sample. Number of observations: 195. Newey/West (1987) standard errors are in parentheses. ***/**/* indicate significance at the 1%/5%/10% level.

The findings of the stepwise regressions indicate that macroeconomic and financial conditions constitute important determinants of disagreement between the FOMC and the Fed's staff. A higher output gap forecast increases internal disagreement on the hawkish side, while a higher stock market index or more uncertainty raises disagreement on the dovish side.

Next, we find that the personal and career characteristics of FOMC members are significant. A higher share of voting women in the FOMC is associated with a more hawkish bias. This might be explained by the fact that women tend, on average, to be more conservative in their monetary policy preferences, possibly in order to establish a reputation, as suggested by Farvaque et al (2014). Furthermore, we observe a non-linear pattern effect related to the average experience of FOMC members. The linear term indicates that committees with a low level of experience tend to disagree on the dovish side. However, this effect reaches its minimum after roughly five to six years of experience and increases thereafter, as indicated by the coefficients for the non-linear term. As for professional experiences, a higher percentage share of members with a significant background in finance or the government (the industry) are associated with more disagreement on the hawkish (dovish) side, compared to the base category, that is, the share of members with experience in academia.

When we focus on the political factors, there is a bias towards a hawkish monetary policy when a Democratic President holds the executive office and Congress is controlled by Republicans. The tenure of Chairman Bernanke and a higher percentage share of governors that were appointed by a Democratic President, however, are associated with a bias towards a dovish monetary policy. The latter finding, in combination with the finding that the FOMC tends to disagree on the hawkish side under a Democratic President, illustrates once again that it is important to distinguish between a political influence via the appointment of governors and an influence via political pressure at the time of the decision.

As for the regional variables, a higher standard deviation of the district-specific unemployment rates, that is, larger disparities within the United States, leads to an increase in the FOMC's hawkish bias. This result is in line with previous studies that

find the regional unemployment rate has a significant impact on FOMC members' monetary policy preferences (Meade and Sheets 2005; Chappell et al 2008; Coibon and Goldstein 2012; Jung and Latsos 2015).

When we include all of the variables in a single model, the findings are broadly in line with those of the stepwise regressions. Our key results are that a higher share of hawkish dissents, a higher share of voting women, a more experienced FOMC, and a higher share of members with a background in finance, the government, or the Bank staff are associated with a relatively more hawkish monetary policy. In addition, the FOMC is found to prefer tighter monetary policy (as compared to its staff) under a Democratic President, if there is a clear majority in the Congress, and during tranquil times.

Finally, as a robustness test, we use the coefficients of the estimated Taylor rule in Table A1 and extract the residuals. We then explain the residuals with the same variables as in Eq. (12). The results in Table A3 indicate that our findings are robust with respect to the career characteristics of FOMC members and the political factors.

5 Conclusions

This paper examines the degree and sources of internal disagreement between the FOMC and the Fed's staff about setting 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 Taylor (1993) rule. Our sample contains 196 regularly scheduled interest rate decisions between August 1987 and December 2011, thereby also covering 24 decisions at the zero-lower bound of interest rates.

In a first step, we contrast this implied 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 particular, FOMC members behaved more hawkish during the 1990s, and more dovish during the early 2000s when compared to the suggestions of the Fed's staff.

In a second step, we explain the differences between the actual target rate set by the FOMC and the Fed staff's implied interest rate. Our results reveal that a higher share of hawkish dissents, a higher share of voting women, a more experienced FOMC, and a higher share of members with a background in finance, the government, or the Bank staff are associated with a relatively more hawkish monetary policy. In addition, the FOMC is found to prefer a tighter monetary policy under a Democratic President, if there is a clear majority in the Congress, and during tranquil times.

Our analysis of disagreement between the FOMC 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 by the FOMC and the advice given by the Fed's staff. Hence, even though the FOMC is considered to be independent from the government, our results indicate that political factors can explain disagreement between the FOMC and its staff.

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Appendix

Table A1: Estimated Taylor Rules

	Pre-Crisis Period		Full Sample	
	Target Rate	Target Rate	Shadow Rate	Shadow Rate
Constant	0.03	0.09	0.06	0.07
	(0.06)	(0.07)	(0.06)	(0.07)
Lag. Dep. Var.	0.89***	0.92***	0.91***	0.94***
	(0.03)	(0.03)	(0.02)	(0.02)
Inflation Forecast	0.21***	0.13**	0.16***	0.10**
	(0.06)	(0.06)	(0.05)	(0.05)
Output Gap Forecast	0.12***		0.08***	
	(0.02)		(0.01)	
Unemp. Gap Forecast		–0.20***		–0.10***
		(0.06)		(0.02)
Observations	171	171	195	195
R^2	0.98	0.98	0.99	0.99

Notes: Table shows different versions of estimated Taylor rules. Newey/West (1987) standard errors are in parentheses. ***/**/* indicate significance at the 1%/5%/10% level.

Table A2: Descriptive Statistics

Variable	Mean	Std. Dev.	Min.	Max.
Federal Funds Target Rate	4.11	2.52	0.25	9.88
Shadow Rate	4.02	2.73	–1.54	9.85
Inflation Forecast	2.21	0.95	0.80	5.20
Output Gap Forecast	–1.13	2.32	–8.00	2.80
Unemployment Gap Forecast	0.76	1.37	–1.11	4.93
Log(SP500)	6.65	0.56	5.49	7.33
Log(Oil Price)	3.43	0.61	2.39	4.92
Log(Uncertainty)	4.60	0.29	4.05	5.50
Vote% Dissent Higher	0.04	0.07	0.00	0.30
Vote% Dissent Lower	0.01	0.04	0.00	0.20
Vote% Women	0.14	0.09	0.00	0.36
Average Experience	5.31	1.59	2.26	8.71
Average Experience Squared	30.67	17.42	5.09	75.81
Vote% Government	0.15	0.07	0.00	0.30
Vote% Industry	0.06	0.05	0.00	0.20
Vote% Finance	0.20	0.10	0.00	0.40
Vote% Board Staff	0.05	0.06	0.00	0.22
Vote% Bank Staff	0.30	0.10	0.09	0.56
Vote% Academia	0.25	0.11	0.00	0.45
Chairman Bernanke	0.24	0.43	0.00	1.00
Presidential Election	0.12	0.33	0.00	1.00
Democratic President	0.45	0.50	0.00	1.00
Democratic Congress	0.46	0.50	0.00	1.00
Republican Congress	0.41	0.49	0.00	1.00
Vote% Democratic President	0.24	0.24	0.00	0.67
Vote% Banks	0.46	0.04	0.36	0.63
SD(Regional UR)	0.76	0.27	0.43	1.46
SD(Regional LI)	0.54	0.24	0.26	1.36

Notes: Number of observations: 196.

Table A3: Explaining the FOMC's Bias: Robustness Test

	Pre-Crisis Period		Full Sample	
	Output Gap	Unemp. Gap	Output Gap	Unemp. Gap
Constant	2.08	1.59	2.22	1.82
	(1.77)	(1.76)	(1.43)	(1.43)
Inflation Forecast	–0.09	–0.03	–0.09	–0.05
	(0.06)	(0.06)	(0.05)	(0.05)
Output Gap Forecast	–0.13**	–0.01	–0.05	0.03
	(0.05)	(0.05)	(0.05)	(0.05)
Unemployment Gap Forecast	–0.23**	0.02	–0.10	0.05
	(0.11)	(0.11)	(0.08)	(0.08)
Log(SP500)	–0.18	–0.12	–0.16	–0.11
	(0.22)	(0.22)	(0.17)	(0.16)
Log(Oil Price)	–0.06	–0.06	0.09	0.11
	(0.09)	(0.09)	(0.07)	(0.07)
Log(Uncertainty)	–0.27	–0.26	–0.41***	–0.40**
	(0.17)	(0.17)	(0.15)	(0.15)
Vote% Dissent Higher	0.82***	0.85***	0.05	0.06
	(0.31)	(0.30)	(0.26)	(0.25)
Vote% Dissent Lower	–0.56	–0.64	0.31	0.26
	(0.70)	(0.69)	(0.53)	(0.55)
Vote% Women	0.87*	0.86*	0.37	0.38
	(0.49)	(0.48)	(0.36)	(0.36)
Average Experience	–0.23*	–0.23*	–0.18**	–0.19**
	(0.13)	(0.13)	(0.09)	(0.09)
Average Experience Squared	0.03**	0.03**	0.02**	0.02**
	(0.01)	(0.01)	(0.01)	(0.01)
Vote% Government	1.36**	1.42**	1.08**	1.12**
	(0.58)	(0.57)	(0.51)	(0.50)
Vote% Industry	–0.27	–0.23	–0.08	0.06
	(0.68)	(0.67)	(0.50)	(0.50)
Vote% Finance	1.65***	1.63***	1.65***	1.69***
	(0.31)	(0.30)	(0.29)	(0.28)
Vote% Board Staff	1.23	1.15	0.82	0.62
	(0.90)	(0.86)	(0.59)	(0.59)
Vote% Bank Staff	0.78	0.80	1.32***	1.34***
	(0.55)	(0.53)	(0.42)	(0.41)
Chairman Bernanke	–0.04	–0.09	–0.06	–0.10
	(0.19)	(0.19)	(0.17)	(0.16)
Presidential Election	–0.03	–0.03	–0.04	–0.05
	(0.07)	(0.07)	(0.05)	(0.06)
Democratic President	0.25**	0.23**	0.24***	0.23**
	(0.11)	(0.10)	(0.09)	(0.09)
Democratic Congress	0.27**	0.27**	0.13	0.12
	(0.13)	(0.13)	(0.09)	(0.09)
Republican Congress	0.15*	0.17*	0.07	0.07
	(0.09)	(0.09)	(0.07)	(0.07)
Vote% Democratic President	–0.08	–0.19	0.04	–0.09
	(0.29)	(0.28)	(0.24)	(0.24)
Vote% Banks	0.13	0.10	–0.61	–0.71
	(0.79)	(0.78)	(0.57)	(0.57)
SD(Regional UR)	0.00	–0.01	0.15	0.14
	(0.32)	(0.32)	(0.21)	(0.21)
SD(Regional LI)	–0.25	–0.30*	0.01	–0.06
	(0.17)	(0.16)	(0.11)	(0.12)
R^2	0.48	0.54	0.46	0.52

Notes: Table shows determinants of different versions of the FOMC's bias. Newey/West (1987) standard errors are in parentheses. Number of observations: 171 (pre-crisis period) and 195 (full sample), respectively. ***/**/* indicate significance at the 1%/5%/10% level.