

# The Role of the Bias in Crafting Consensus: FOMC Decision Making in the Greenspan Era\*

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We examine the role of the “bias” associated with a monetary policy directive—wording in the directive that concerns possible policy shifts in the period between one FOMC meeting and the next—in FOMC decision making in the Greenspan years. Previous studies have suggested that the bias provided the Chairman a tool for orchestrating Committee consensus. Our evidence shows that when the bias had meaningful implications for intermeeting funds rate changes (1987–92), it influenced voting by FOMC members. Biases both provoked and discouraged dissents, depending on the direction of the bias and the preferences of individual Committee members. When the bias did not have meaningful implications for intermeeting policy adjustments (1993–99), we find no evidence that it affected members’ voting choices. Overall, our results are consistent with the view that FOMC members voted on the basis of a rational assessment of the policy content of proposed directives.

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*An important function of the bias was (and perhaps still is) to aid the Chairman in reducing the number of dissenting votes and to allow members to have their views “count” without dissenting. For example, if the Chairman wanted to achieve a consensus on “no change” in the funds rates while limiting dissents he could offer a bias towards higher rates. Members who wanted a decision for higher rates might accept a bias instead of dissenting.*

(Hoskins 1999, 3)

## 1. Introduction

From 1983 through 1999, monetary policy directives adopted by the Federal Open Market Committee (FOMC) included a statement of “bias,” wording that purportedly described the likelihood of policy shifts in the period between one FOMC meeting and the next.<sup>1</sup> Although the stated purpose of the bias was to describe policy choices in a probabilistic manner, a second possible role has been emphasized by Thornton and Wheelock (2000) and Meade (2005), who argue that the wording of the bias was often framed to orchestrate Committee consensus.

An appropriately formulated policy bias might have encouraged consensus in two ways. First, if the bias were a meaningful indicator of upcoming policy moves, then it could have permitted the Committee to adopt a middle ground when some members preferred a policy shift and others did not. Such an action might have increased consensus and lowered the likelihood of dissent voting. Second, even if the bias were not a meaningful indicator of policy, it might have fostered consensus by offering conciliatory language. Suppose that the Committee decided to maintain the status quo funds rate, but

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<sup>1</sup>Consider the following example, taken from the policy directive adopted at the FOMC meeting held on July 2–3, 1996: “In the implementation of policy for the immediate future, the Committee seeks to maintain the existing degree of pressure on reserve positions. In the context of the Committee’s long-run objectives for price stability and sustainable economic growth, and giving careful consideration to economic, financial, and monetary developments, somewhat greater reserve restraint would or slightly lesser reserve restraint might be acceptable in the inter-meeting period.” The distinction between “somewhat greater reserve restraint,” which *would* be acceptable in the intermeeting period, and “slightly lesser reserve restraint,” which *might* be acceptable in the intermeeting period, indicates that this directive is biased (or asymmetric) toward tightness.

a minority preferred a move. While the Committee might have had no intention of moving, it could have adopted a bias in an effort to placate the losers. Such an action, while not meaningful in terms of policy intent, might have reduced dissent if members were assuaged by the inclusive gesture from the majority.

The setting of the bias also had the potential to create discord. If a proposed policy had detractors on both sides (with some favoring ease and others tightness), any bias moving toward one group would have risked alienating the other group. Furthermore, if the Chairman used the bias to advance his agenda at the expense of other Committee members, he could have provoked additional dissent.

In this paper, we investigate the role that the bias played in the formulation of FOMC policy directives and in Committee voting on those directives during the 1987–99 portion of Alan Greenspan’s tenure as Chairman of the FOMC. Specifically, we ask (i) whether a “favorable” bias reduced the probability of a member casting a dissenting vote, (ii) whether an “unfavorable” bias increased the probability of a member casting a dissenting vote, (iii) whether biases were usually set in a way that induced members to view them favorably, and (iv) whether the importance of the bias in voting choices reflected its importance as an indicator of policy.

Our findings throughout are consistent with the view that FOMC members voted in a rational, policy-oriented manner. From 1987 through 1992, the bias was a good indicator of upcoming intermeeting policy moves, and the setting of the bias also affected individual FOMC members’ votes—biases favorable to an individual generated assents, and biases that were unfavorable generated dissents. After 1993, the bias was a less reliable predictor of intermeeting funds rate movements, and it simultaneously lost significance as a predictor of individuals’ votes. These results cast doubt on the view that bias setting might have produced consensus without the offer of a meaningful policy concession. Given the pattern of adopted biases and dissenting votes observed in our sample period, it is not obvious that bias setting lowered the observed frequency of dissenting votes.

## 2. FOMC Decision Making

In the Greenspan era, FOMC meetings followed a routine agenda. The policymaking portion of the meeting began with a staff report on economic conditions and subsequent questioning and discussion

by the Committee. This was followed by an “economics go-around” in which Committee members presented personal assessments of economic conditions. In the economics go-around, District Reserve Bank presidents generally reported on anecdotal regional information, while governors assessed national conditions. The staff then presented a report describing policy options, and this was followed by a “policy go-around” in which Committee members described their own policy preferences. Chairman Greenspan typically spoke first in the policy go-around and offered a policy proposal that provided a frame of reference for subsequent speakers. After the policy go-around, the Chairman proposed final policy specifications, including both a target funds rate and a setting for the bias, for a formal vote. Voting members could either “assent” or “dissent.” As a practical matter, Greenspan’s original proposal was usually adopted with broad support; only about 7 percent of all votes cast were dissents.

Members’ voting choices presumably depend on how their own policy preferences compare with those adopted by the Committee, but members also value consensus and recognize that the Chairman’s views are accorded greater weight than their own when preferences are aggregated (Chappell, McGregor, and Vermilyea 2004). Under these circumstances, members are likely to cast assenting votes if the Chairman’s proposal is not too different from their own. Because the Chairman also values consensus, his proposals are likely to give weight to his perception of the central tendency of the Committee<sup>2</sup>—he might sometimes marginally sacrifice his own preference in order to achieve a consensual outcome.<sup>3</sup> An appropriately crafted bias

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<sup>2</sup>Alan Greenspan has described his ability to divine the Committee’s view this way: “I’ve been around this committee for a number of years and I think I can say that I pretty much know how every single member of this committee would come out under [any given hypothetical] event. In other words, I could take the vote myself if I had to and I bet I’d get it on the nose three times out of four. The reason for that is that I know where you’re all coming from” (*FOMC Transcripts*, May 18, 1993, p. 54).

<sup>3</sup>Blinder (2004, 58–59) states that “if push ever comes to shove, the chairman knows that he lacks the de jure authority to force his committee members to accept his position. Rebellion is always possible, if the chairman is out of step with the committee. The strong desire for de facto consensus therefore enables the rest of the committee to serve as a kind of check on the chairman, who cannot easily pursue extreme policies, follow highly idiosyncratic procedures, or base policy on controversial theories.”

could offer a way to make such a policy concession and, because of its importance on the margin, could limit dissent. Moreover, a bias could also give the Chairman discretion to act between meetings; however, if members prefer to constrain the Chairman, a bias that grants added discretion could provoke dissents.<sup>4</sup>

### 3. Data: Policies, Preferences, and Votes

In this section, we describe the data sources we have used in our analysis. Because votes on the policy directive provide the most visible and timely indication of the degree of consensus within the Committee, our analysis employs formal voting records reported in the meeting summaries published in the monthly *Federal Reserve Bulletin*.<sup>5</sup> We supplement the voting record with detailed indicators of members' policy preferences derived from transcripts of FOMC deliberations.<sup>6</sup> Because the transcripts describe the policies that members advocated before submitting formal votes, it is possible to link members' voting decisions to more-detailed expressions of their policy preferences.

In the course of the policy go-around in a Greenspan-era FOMC meeting, it was common for members to identify themselves with a specific target federal funds rate. Members often indicated agreement with the Chairman, but it was not unusual for members to advocate higher or lower rates, typically associating themselves with alternatives specified in the Bluebook or with 25- or 50-basis-point movements relative to the prevailing funds rate.<sup>7</sup> Whenever

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<sup>4</sup>Meeting transcripts show that members did sometimes voice concerns with discretion exercised by the Chairman between meetings. Governor Wayne Angell once complained, "I vote with the majority and I end up losing. And, Governor Johnson, I just have to congratulate you . . . you voted in the minority and you've won! . . . I would like some assurance that we are not going to just keep doing this, Mr. Chairman" (*FOMC Transcripts*, February 9, 1988, p. 64).

<sup>5</sup>Before 1993, the meeting summaries were published under the title "Record of Policy Actions of the Federal Open Market Committee"; from 1993 through the end of our sample, they were published under the title "Minutes of the Federal Open Market Committee."

<sup>6</sup>FOMC meeting transcripts are available (after a five-year lag) on the Federal Reserve Board web site at [www.federalreserve.gov/fomc/transcripts](http://www.federalreserve.gov/fomc/transcripts).

<sup>7</sup>The Bluebook prepared by the Federal Reserve Board staff for each FOMC meeting presents a set of policy scenarios for discussion as the Committee crafts a monetary policy directive.

individual members stated preferences in this manner, we recorded a preferred target funds rate for them.<sup>8</sup> For the 1987–99 period, members’ desired target federal funds rates could be directly inferred from statements in the transcripts in 91.9 percent of all member-meeting observations; for each of these observations, we directly observe whether members’ preferences differ from the Chairman’s proposal and, if so, by how much. Less frequently, members described their preferences in qualitative terms. In these cases, we coded members as “leaning toward tightness,” “leaning toward ease,” or “assenting” relative to a benchmark funds rate. For example, a member might state a funds rate preference as “4.75 percent or a bit higher,” which we would code as “leaning toward tightness” relative to the 4.75 percent benchmark.<sup>9</sup>

The meeting transcripts also provide information on members’ desired bias settings. Members who voiced agreement with the Chairman’s proposal on the funds rate also usually revealed a preferred bias setting; these preferences on the bias are recorded in our data set. Members who advocated a funds rate different from the Chairman’s proposal typically did not state a preference about the bias.

#### **4. A Natural Experiment: The Changing Meaning of the Bias**

While formal decision-making procedures were essentially unchanged over our sample period, an important change occurred in practice, as figure 1 illustrates. The figure plots intermeeting changes in the

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<sup>8</sup>For most of the meetings in our sample, Bluebook policy scenarios reported target levels of the federal funds rate, and policy discussions were carried out with reference to funds rate targets. Early in the Greenspan era, policy scenarios reported both target levels of reserve borrowing and the funds rate targets associated with those borrowing levels. In the policy discussions, some members referred to borrowing targets, while other members referred to funds rate targets. For the former, we used the mapping between funds rates and borrowing targets provided in the Bluebook to code the implied target federal funds rate. See Chappell, McGregor, and Vermilyea (2005) for details.

<sup>9</sup>See Chappell, McGregor, and Vermilyea (2005, 57–69) for a detailed description of our coding procedures. The codings themselves for the 1987–96 period appear in appendix 5 of that work. We have extended our sample through 1999 for the analysis in this paper.



rules, the *Times* reported that there was a new understanding that Greenspan did not challenge.<sup>11</sup> Statistical evidence also supports the hypothesis of a regime change. Lapp and Pearce (2000) have provided evidence confirming that the bias was a significant predictor of intermeeting funds rate movements over the period from August 1987 through December 1998. Using their model specifications and data, but restricting their sample to the post-1992 period, we find that the bias ceased to be a significant predictor of intermeeting rate changes.

This regime shift provides us with a useful natural experiment. If FOMC members' votes simply reflect a rational assessment of the policy content of the directive, then the bias should affect voting behavior in the early part of the sample but not in the later part of the sample. If voting choices respond to the bias in the later period, this would suggest that a conciliatory bias can assuage those in the minority even when it has no implications for intermeeting policy adjustments.

## 5. Empirical Analysis

We initially use our data to classify FOMC members' monetary policy positions into five categories based on a comparison of their preferences to the Chairman's proposed directives. Our categorical variables are described below in order of least to greatest difference of preference (our ordering assumes that target funds rates are more salient than biases).

- $D_0$  *No Disagreement.* There are no revealed differences between the Chairman's proposed directive and the policy preferred by the member, either in terms of the target funds rate or the bias.
- $D_1$  *No Disagreement on Rate/Disagreement on Bias.* There is no indicated disagreement between a member's desired funds rate

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<sup>11</sup>The abandonment of intermeeting policy changes may have been related to the evolving procedural shift from borrowed reserves targeting to federal funds rate targeting. Intermeeting policy adjustments under a borrowed reserves targeting regime were probably less transparent and therefore less objectionable to Committee members; however, the shift to funds rate targeting was complete by 1989, so it clearly preceded the decision to limit intermeeting policy moves.



and the Chairman's proposed target, but there is disagreement on the bias.<sup>12</sup>

- $D_2$  *Disagreement on Rate/Bias Is Favorable.* The member prefers a target rate that differs from that proposed by the Chairman, and the proposal has a bias that is favorable to the member. For example, a member might prefer a funds rate of 4.00 percent when the Chairman proposes 4.25 percent. If the Chairman's proposal incorporates a bias toward ease, this would be favorable to the member.
- $D_3$  *Disagreement on Rate/No Bias.* The member prefers a target rate that differs from that proposed by the Chairman, and the directive is symmetric.
- $D_4$  *Disagreement on Rate/Bias Is Unfavorable.* The member prefers a target rate that differs from that proposed by the Chairman, and the proposal has a bias that is unfavorable to the member. For example, a member might prefer a funds rate of 4.00 percent when the Chairman proposes 4.25 percent. If the Chairman's proposal incorporates a bias toward tightness, this would be unfavorable to the member.

Our analysis uses 1,005 member voting observations (excluding votes of the Chairman) over ninety-nine FOMC meetings held in the 1987–99 period.<sup>13</sup> In table 1, we report dissent frequencies (the number of dissenting votes as a fraction of the number of observations) for observations falling into each of the five categories defined by variables  $D_0$  through  $D_4$ . The reported statistics for the full sample confirm our expectation that dissent frequencies will increase as

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<sup>12</sup>The category "disagreement on the bias" could be further refined. Consider a member who favors a bias toward ease. This member would disagree with a symmetric directive or a bias favoring tightness, with the latter case implying more-severe disagreement. In our data set, we had just one observation of the latter type, so we did not create a categorical variable to distinguish it.

<sup>13</sup>The FOMC met 100 times in our sample period, but there is no transcript of the policy go-around for the meeting held on March 29, 1988. Because we do not have information on members' policy preferences for this meeting, we exclude it from our analysis.

**Table 1. Dissent Frequency by Category of Disagreement with the Chairman's Proposal**

	$D_0$	$D_1$	$D_2$	$D_3$	$D_4$
<b>Full Sample: 8/87 through 12/99</b>					
Assent	689	121	69	43	10
Dissent	3	14	24	22	10
Dissent Frequency (percent)	0.43	10.37	25.81	33.85	50.00
<b>Early Years: 8/87 through 12/92</b>					
Assent	252	74	45	15	8
Dissent	2	13	11	10	9
Dissent Frequency (percent)	0.79	14.94	19.64	40.00	52.94
<b>Late Years: 2/93 through 12/99</b>					
Assent	437	47	24	28	2
Dissent	1	1	13	12	1
Dissent Frequency (percent)	0.23	2.08	35.14	30.00	33.33

we move through the categories from  $D_0$  to  $D_4$ .<sup>14</sup> Dissent voting frequencies rise monotonically from 0.43 percent in category  $D_0$  to 50 percent in category  $D_4$ . This pattern is also evident in the early 1987–92 subperiod, when the bias was known to be a good predictor of intermeeting funds rate movements.

However, for the 1993–99 period in which the bias was not a good predictor of intermeeting rate adjustments, the results are strikingly different. Dissent voting frequencies for observations in categories  $D_0$  and  $D_1$  are very low, implying that if a member agrees with the

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<sup>14</sup>Note that three dissents occurred for observations where our preference coding did not reveal a disagreement. In one case, the dissent vote was motivated by a difference of opinion about the appropriate operating procedure rather than about the appropriate policy specifications. In the other two cases, the individuals' statements in the transcript were ambiguous, although the explanations the members later provided in the Committee's minutes were not. In such cases, our coding procedure requires us to infer "no revealed disagreement." It would be inappropriate for us to use the voting record, which provides our dependent variable, to assist in coding preferences, which are the basis for our explanatory variables.

funds rate target in the proposal, that member is unlikely to dissent. Moreover, the probability of dissent apparently does not depend on the setting of the bias. Dissent voting frequencies for observations in categories  $D_2$ ,  $D_3$ , and  $D_4$  are much higher and are approximately equal across the categories. These results imply that if a member disagrees with the funds rate target in the proposal, that member has a higher probability of dissenting; again, though, this probability does not depend on the setting of the bias. Therefore, the descriptive statistics strongly suggest that the setting of the bias affected dissent voting propensities before 1993 but not after.

We also examine dissent voting behavior in the framework of a logit model. Our simplest logit model specifies that an individual Committee member's probability of dissent is a function of the four categorical variables  $D_1$ ,  $D_2$ ,  $D_3$ , and  $D_4$  (with the  $D_0$  category captured by the intercept). Estimates reported in the first column of table 2 show a pattern consistent with that revealed by the simple dissent voting frequencies for the full sample. All coefficients are positive and significantly different from zero, indicating higher dissent probabilities in categories  $D_1$  through  $D_4$  than in the "complete agreement" category captured in the intercept.<sup>15</sup> Further, the coefficients are successively larger for categories arranged in order of increasing disagreement and, in most cases, pairwise comparisons of the coefficients produce differences that are statistically significant.<sup>16</sup>

The estimations for the 1987–92 sample mirror those reported for the full sample—coefficient patterns consistently imply that a stronger difference between a member's preference and the proposed policy increases the probability of a dissenting vote.<sup>17</sup> For the 1993–99 sample, the results differ notably. The  $D_1$  coefficient is not significantly different from zero, implying that when members agree with

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<sup>15</sup>Note that the coefficients for the intercept and  $D_4$  in the full-sample estimation are identical in magnitude but opposite in sign. This result is coincidental. In our sample, the dissent voting frequency for observations in the  $D_4$  category is exactly 50 percent, requiring that the intercept and  $D_4$  coefficients sum to zero (in the logit model, the probability of dissent is given by  $\frac{e^{\mathbf{X}\beta}}{1+e^{\mathbf{X}\beta}}$ ; for this probability to be 0.50,  $\mathbf{X}\beta$  must be 0).

<sup>16</sup>With five disagreement categories, there are ten possible pairwise comparisons, and eight of ten comparisons indicate significant differences at the 0.05 level or better.

<sup>17</sup>In the subsample, six of ten pairwise comparisons indicate significant differences at the 0.05 level or better.

**Table 2. Logistic Regression: Probability of Dissenting as a Function of Categories of Disagreement**

	Full Sample 8/87 through 12/99	Early Years 8/87 through 12/92	Late Years 2/93 through 12/99
Intercept	-5.437*** (0.579)	-4.836*** (0.710)	-6.080*** (1.001)
$D_1$	3.280*** (0.644)	3.097*** (0.771)	2.230 (1.423)
$D_2$	4.381*** (0.625)	3.427*** (0.785)	5.467*** (1.059)
$D_3$	4.767*** (0.635)	4.430*** (0.819)	5.233*** (1.059)
$D_4$	5.437*** (0.731)	4.954*** (0.860)	5.387*** (1.582)
N	1,005	439	566
<b>Tests of Additional Hypotheses (<math>\chi^2</math> Statistic)</b>			
$D_2 = D_3$	1.193	3.598*	0.231
$D_2 = D_4$	4.354**	6.673***	0.004
$D_3 = D_4$	1.671	0.680	0.015
<p><b>Note:</b> The numbers in parentheses are standard errors. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.</p>			

the proposed rate, the bias has no effect on voting (recall that the  $D_0$  category is captured in the intercept). Similarly, we are unable to reject the hypothesis that the coefficients of  $D_2$ ,  $D_3$ , and  $D_4$  are all equal, implying that when members disagree on the rate, alternative settings of the bias have no effect on dissent voting probabilities.

The estimates reported in table 2 use only categorical data to describe the relationship of a member's policy preference to the Chairman's policy proposal. In fact, we have continuous measures of both the proposed funds rate and a member's desired funds rate for 935 of the 1,005 observations in our data set (see table 3 for details).

**Table 3. Difference Between Member's Desired Rate and Greenspan's Proposal**

$ R_{it}^* - R_t^* $	0.0	0.0313	0.0625	0.125	0.1875	0.25	0.5	Qual. Agree. <sup>a</sup>	Qual. Disagree. <sup>b</sup>
Frequency	817	1	11	10	3	65	28	10	60
<p><sup>a</sup>“Qualitative agreement” refers to situations in which an FOMC member did not explicitly state a funds rate preference and did not voice disagreement with Greenspan’s proposal.</p> <p><sup>b</sup>“Qualitative disagreement” refers to situations in which an FOMC member voiced disagreement with Greenspan’s proposal but did not explicitly state a funds rate preference.</p>									

Where it is possible to measure the quantitative extent of a member’s reported difference with the proposed funds rate, it is desirable to include that information in the model. We therefore construct the following variables to add to the specification:

$V_1$  *Absolute Chairman-Member Deviation.*  $V_1$  is equal to  $|R_{it}^* - R_t^*|$ , the absolute value of the deviation between the member’s desired funds rate,  $R_{it}^*$ , and the Chairman’s proposed funds rate,  $R_t^*$ , for cases where both  $R_{it}^*$  and  $R_t^*$  are directly observed. Otherwise,  $V_1$  is equal to 0.

$V_2$  *Categorical Chairman-Member Deviation.*  $V_2$  is a dummy variable equal to 1 if  $R_{it}^*$  is not directly observed but is known to differ from  $R_t^*$  based on categorical information. Otherwise,  $V_2$  is equal to 0.

Estimates of this model are reported in table 4 for the full sample and for each of the two subsamples. The coefficients for the  $V_1$  variable differ significantly from zero in each estimation, confirming that the propensity to dissent is influenced by the magnitude of policy differences. The  $V_2$  coefficient is also positive, but it is significant only for the complete sample.

Conclusions about the impact of the bias derived from table 4 are consistent with those reported for the more parsimonious model in table 2. In the complete sample and the 1987–92 subperiod, the bias has predictable consequences for voting. Given agreement on the rate (i.e., both  $V_1$  and  $V_2$  equal 0), the significant positive  $D_1$

**Table 4. Logistic Regression: Probability of Dissenting as a Function of Indicators of Disagreement**

	Full Sample 8/87 through 12/99	Early Years 8/87 through 12/92	Late Years 2/93 through 12/99
Intercept	-5.437*** (0.579)	-4.836*** (0.710)	-6.080*** (1.001)
$V_1$	6.513*** (1.689)	8.303*** (2.365)	6.108* (3.227)
$V_2$	1.273* (0.670)	1.405 (1.070)	1.327 (1.125)
$D_1$	3.280*** (0.644)	3.097*** (0.771)	2.230 (1.423)
$D_2$	2.522*** (0.879)	0.812 (1.262)	3.822** (1.497)
$D_3$	3.151*** (0.801)	2.613*** (1.007)	3.595** (1.444)
$D_4$	4.001*** (0.836)	3.219*** (1.026)	3.860** (1.776)
N	1,005	439	566
<b>Tests of Additional Hypotheses (<math>\chi^2</math> Statistic)</b>			
$D_2 = D_3$	2.471	6.052**	0.191
$D_2 = D_4$	6.607**	9.690***	0.001
$D_3 = D_4$	2.424	0.786	0.042
<p><b>Note:</b> The numbers in parentheses are standard errors. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.</p>			

coefficient implies that disagreement on the bias produces dissents. When there is disagreement on rates, the coefficients on  $D_2$ ,  $D_3$ , and  $D_4$  are consistently ordered, implying that favorable biases lower the propensity to dissent, while unfavorable biases raise it.<sup>18</sup>

<sup>18</sup>Pairwise differences are significant in one of three cases in the complete sample period and two of three cases in the early sample period.

The third column of table 4 reports results for the 1993–99 sub-period. The  $D_1$  coefficient is no longer significantly different from zero, and we cannot reject the hypothesis that the coefficients of  $D_2$ ,  $D_3$ , and  $D_4$  are equal. As with the more parsimonious model, these results imply that the setting of the bias has no effect on dissent voting decisions in the later subperiod.

The incremental probability effects implied by our model provide additional insight into our findings. In the early period, if there is a 25-basis-point disagreement on the funds rate target, then the probability of dissent rises from 0.125 to 0.463 to 0.613 as we move through categories  $D_2$ ,  $D_3$ , and  $D_4$ . Viewed another way, if we take a 25-basis-point rate disagreement and no bias as our base case, then we see that a move to a favorable bias reduces the probability of dissent by 0.338, while a move to an unfavorable bias increases the probability of dissent by only 0.150. Thus, when there is disagreement on the funds rate target, a favorable bias has a greater effect in reducing the likelihood of dissent than an unfavorable bias has in raising the likelihood of dissent. This finding is consistent with Meade's (2005) argument that favorable bias statements helped Greenspan obtain a consensus vote on the proposed monetary policy directive. Nevertheless, our results also show how the bias can provoke dissent not only when there is disagreement on the rate but also when there is agreement on the rate but a disagreement on the bias. In the early period, if we assume no difference in funds rate preferences ( $V_1 = V_2 = 0$ ), then a disagreement on the bias increases the probability of dissent from 0.008 to 0.149.<sup>19</sup>

The results we have described are robust to a variety of specification changes. First, we note that the composition of the Committee changed over time. Three individuals (Wayne Angell, Lee Hoskins, and Martha Seger) frequently dissented prior to 1993, but all had left the Committee by early 1994. This suggests that the decline in the frequency of dissents in the later period might reflect the departure of these frequent dissenters rather than a change in the meaning of

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<sup>19</sup>The incremental probability effects for the later period are much smaller. Given a 25-basis-point difference in rates, probabilities of dissent go from 0.184 to 0.155 to 0.189 as we move through the  $D_2$ ,  $D_3$ , and  $D_4$  categories. If we assume no difference in rates, then a disagreement on the bias increases the probability of dissent from 0.002 to 0.021 in the later period.

**Table 5. Logistic Regression: Probability of Dissenting as a Function of Indicators of Disagreement—Robustness Check Removing Angell, Hoskins, and Seger from the Sample**

	Full Sample 8/87 through 12/99	Early Years 8/87 through 12/92	Late Years 2/93 through 12/99
Intercept	−5.388*** (0.579)	−4.705*** (0.710)	−6.075*** (1.001)
$V_1$	4.888** (2.198)	9.756** (4.076)	3.244 (3.657)
$V_2$	1.210 (0.803)	3.074* (1.638)	0.536 (1.221)
$D_1$	3.267*** (0.654)	3.114*** (0.784)	2.247 (1.423)
$D_2$	2.556** (0.999)	−1.026 (1.944)	4.524*** (1.578)
$D_3$	3.231*** (0.891)	1.872 (1.325)	4.312*** (1.497)
$D_4$	3.639*** (0.979)	1.906 (1.384)	4.571** (1.827)
N	911	353	558
<b>Tests of Additional Hypotheses (<math>\chi^2</math> Statistic)</b>			
$D_2 = D_3$	2.105	6.137**	0.153
$D_2 = D_4$	2.122	5.772**	0.001
$D_3 = D_4$	0.335	0.001	0.040
<b>Note:</b> The numbers in parentheses are standard errors. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.			

the bias. Table 5 replicates table 4 but eliminates all of the Angell, Hoskins, and Seger observations. The key results are unchanged—in the early period, the  $D_1$  coefficient is positive and significant, and the coefficients on  $D_2$ ,  $D_3$ , and  $D_4$  are consistently ordered (with significant differences in two of three pairwise comparisons). In the



later period, the  $D_1$  coefficient is insignificant, as are all pairwise comparisons among the  $D_2$ ,  $D_3$ , and  $D_4$  coefficients.<sup>20</sup>

We have also investigated the sensitivity of results to the timing of the regime shift that resulted in the abandonment of frequent intermeeting funds rate moves. We initially assumed that the early period ended in December 1992, but our results are similar when we instead assume that the break occurred in December 1993 (figure 1 strongly suggests that the break occurred sometime in 1993). Table 6 presents the results for these estimations.

Another possible regime shift is the transition from borrowed reserves targeting to federal funds rate targeting. This transition had been completed by 1989, so as an additional robustness check, we reestimate our models, omitting 1987 and 1988 from the sample. Results presented in table 6 show that our conclusions are unaffected by this modification to our sample period.

Finally, our original specification assumed that the voting model is the same for governors and Reserve Bank presidents. In table 7, we have modified the specification to permit an intercept shift for governors. The relevant coefficient is significant only in the estimation for the 1993–99 subsample. The negative sign implies that, for given levels or categories of disagreement, governors were less likely to dissent than Bank presidents in that period. This result could reflect turnover in the Committee; however, all results regarding the impact of the bias on dissent voting are again robust to this change.

Overall, our results show that a policy-relevant bias can either provoke or limit dissent, depending on its setting vis-à-vis members' preferences. Somewhat surprisingly, we find that the bias was often set in a manner that might have provoked dissent. Over the ninety-nine Greenspan-era meetings in our sample, members advocated policy positions on both sides of the Chairman on thirty-five occasions, so some conflict was inevitable. In the 1987–92 subperiod when the bias had demonstrable policy content, there were notably more unfavorable bias settings (104 observations in the combined  $D_1$  and  $D_4$  categories) than favorable ones (56 observations in the  $D_2$  category). In this period, Greenspan frequently used the bias

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<sup>20</sup>Our results for the full sample and the early and late subsamples also hold if we use a model that accounts for member fixed effects.

**Table 6. Logistic Regression: Probability of Dissenting as a Function of Indicators of Disagreement—Robustness Check for Alternative Sample Splits by Date**

	Eliminating Borrowed Reserves Regime from Early Years 2/89 through 12/92	Early Years with Alternative Sample Break Point 8/87 through 12/93	Late Years with Alternative Sample Break Point 2/94 through 12/99
Intercept	−5.267*** (1.002)	−5.084*** (0.709)	−5.903*** (1.001)
$V_1$	5.881* (3.568)	8.491*** (2.197)	3.402 (3.691)
$V_2$	0.508 (1.515)	1.497 (0.916)	0.715 (1.256)
$D_1$	3.658*** (1.051)	3.367*** (0.766)	
$D_2$	2.287 (1.914)	1.144 (1.188)	4.356*** (1.592)
$D_3$	4.382*** (1.484)	2.898*** (0.991)	3.891** (1.517)
$D_4$	3.983*** (1.540)	3.421*** (1.003)	4.359** (1.831)
N	326	527	478
<b>Tests of Additional Hypotheses (<math>\chi^2</math> Statistic)</b>			
$D_2 = D_3$	4.839**	7.741***	0.654
$D_2 = D_4$	2.928*	9.521***	0.000
$D_3 = D_4$	0.223	0.640	0.128
<p><b>Note:</b> The numbers in parentheses are standard errors. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively. When the sample is split after 1993 rather than after 1992, we have no dissents in the <math>D_1</math> category during the later period (1994–99). Estimating the model for the later period requires us to omit this category from the specification.</p>			

to provide himself with justification for intermeeting moves when Committee sentiment for those moves was in doubt.<sup>21</sup> Although we

<sup>21</sup>Meade (2005) reports that a series of dissents by Governor John LaWare and Federal Reserve Bank of St. Louis President Thomas Melzer in 1991 and 1992 were probably motivated by Greenspan's reliance on the bias to justify intermeeting moves when the directive had not explicitly called for a change in the target rate.

**Table 7. Logistic Regression: Probability of Dissenting as a Function of Indicators of Disagreement—Governors versus Reserve Bank Presidents**

	Full Sample 8/87 through 12/99	Early Years 8/87 through 12/92	Late Years 2/93 through 12/99
Intercept	−5.338*** (0.596)	−4.933*** (0.745)	−5.638*** (1.013)
$V_1$	6.484*** (1.691)	8.486*** (2.416)	8.351** (3.567)
$V_2$	1.254* (0.672)	1.518 (1.105)	2.100* (1.226)
$D_1$	3.271*** (0.644)	3.107*** (0.772)	2.185 (1.425)
$D_2$	2.506*** (0.880)	0.762 (1.273)	3.011* (1.567)
$D_3$	3.155*** (0.803)	2.567** (1.013)	2.913* (1.508)
$D_4$	4.013*** (0.839)	3.159*** (1.034)	2.857 (1.850)
Gov	−0.195 (0.293)	0.174 (0.393)	−1.128** (0.568)
N	1,005	439	566
<b>Tests of Additional Hypotheses (<math>\chi^2</math> Statistic)</b>			
$D_2 = D_3$	2.610	6.019**	0.034
$D_2 = D_4$	6.793***	9.538***	0.013
$D_3 = D_4$	2.461	0.751	0.002
<p><b>Note:</b> The numbers in parentheses are standard errors. *, **, and *** indicate statistical significance at the 0.10, 0.05, and 0.01 levels, respectively.</p>			

cannot draw unambiguous conclusions, it seems doubtful that bias settings reduced aggregate dissent frequencies.<sup>22</sup>

## 6. Conclusions

We have examined how the bias associated with monetary policy directives influenced dissent voting patterns of FOMC members in the Greenspan years. We find that the setting of the bias affected voting, but it did so only when the bias was a meaningful policy indicator for the upcoming intermeeting period. Specifically, bias settings affected voting choices in the 1987–92 period, when the bias was a good predictor of intermeeting movements in funds rates, but failed to do so in the 1993–99 period, when the bias was a poor predictor of intermeeting rate changes.

Our work encompasses and extends that of Meade (2005). We corroborate her finding that favorable biases helped to orchestrate consensus in FOMC decisions; however, our approach also incorporates an explicit analysis of how biases might have provoked dissent votes (a possibility considered only informally by Meade). Moreover, we have examined how the influence of the bias on Committee members' voting decisions changed over the course of the Greenspan era; specifically, we show that in the period when biases affected voting, they had the power to cause dissents as well as to diminish them, depending on whether the bias was viewed favorably or unfavorably by individual voters.

All of our results are compatible with the view that FOMC members based their votes on a rational assessment of the policy content of proposed directives—biases affected voting only when they meaningfully represented alternative policy options for the upcoming intermeeting period. Conversely, our results provide no support for the hypothesis that bias settings produced consensus with conciliatory language that lacked meaningful policy content. Biases were often set in a way that was “unfavorable” to individual Committee members; if biases were purely intended to provide symbolic

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<sup>22</sup>Had there been no option for setting a bias, both the Chairman's proposals and members' stated preferences might have changed. As a consequence, we cannot draw unequivocal conclusions about how dissent frequencies might have differed in the absence of bias setting.

appeasement, this pattern would be difficult to explain. Ultimately, then, dissent voting frequencies depended on how adopted policies, including meaningful adopted biases, matched up with the preferences of individual Committee members.

If statements of bias after 1993 no longer conveyed any information about likely intermeeting policy moves, one might ask why the FOMC continued to adopt and report them until 1999. One possibility is simply that the Federal Reserve waits to acknowledge institutional change until it is certain that the change is permanent. It is also possible, though, that bias statements had value in terms of communicating the Committee's outlook, even if they lacked relevance for intermeeting rate adjustments.

We can find some support for this hypothesis. If we modify the Lapp and Pearce (2000) methodology to test whether an adopted bias aids in predicting the funds rate adopted at the *next* FOMC meeting (rather than a move *before* the next meeting), we find that it does, even over the 1994–99 period.<sup>23</sup> This suggests that the role of the bias changed—before 1994, it was a component of the policy choice for the current intermeeting period; afterward, it helped to communicate the Committee's forecast of the future course of policy over a longer horizon. Under this interpretation, our results show that FOMC members' votes were influenced by current policy choices but not by implied forecasts of future choices.<sup>24</sup>

In January 2000, the FOMC dropped the bias from the directive and instead began reporting a “balance-of-risks” statement. The latter statement provides an indication of whether the Committee's concerns are tilted toward inflationary pressures or economic weakness. Like the bias, it has been interpreted as an indicator of future countervailing policy moves, but with a time horizon that extends somewhat beyond the upcoming intermeeting period.<sup>25</sup> Our

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<sup>23</sup>In a reaction-function specification, the lagged bias setting is significant in explaining the adopted target at better than the 0.01 level, after controlling for forecasts of macroeconomic conditions.

<sup>24</sup>In the interest of transparency, even FOMC members who anticipate that they will oppose a future policy move might favor giving the public an accurate indication of its likelihood.

<sup>25</sup>Preliminary evidence provided by Rasche and Thornton (2002) and Pakko (2005) suggests that the setting of the balance-of-risks statement does help to predict future monetary policy actions.

analysis is compatible with the view that by the time the bias was formally abandoned, its function already approximated that of the new balance-of-risks statement.

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