Are District Presidents More Conservative than Board Governors?

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It is widely believed that the Federal Open Market Committee policy votes of Federal Reserve Bank presidents are more "conservative" than those of their Board governor counterparts. Belden (1989) supports the conclusion that "District Bank presidents, who serve without executive or legislative approval, prefer policy that produces lower inflation and higher unemployment, relative to the Board." Puckett (1984) and Havrilesky and Gildea (1990) have also claimed to have found evidence reinforcing this conventional wisdom. In both academia and Congress, the suspicion runs deep that the political appointment procedure exercised over Federal Reserve Board governors—nomination by the President and confirmation by the Senate—results in monetary policy that is more concerned with output and less concerned with inflation than the policy produced by the more politically independent District Bank presidents. This article examines the data to determine whether it supports this conventional wisdom.

It is impossible, using the methodology utilized in the dissent studies, to test the hypothesis that is required to support this literature's conclusions. The statistical techniques used in this paper permit a test of the hypothesis necessary to support their conclusions. The evidence rejects the conclusion that significant differences exist between the policy votes of District Bank presidents and those of Board governors.

The previous literature examining this issue suffers from several important methodological problems. Many of these works, Belden (1989), Puckett (1984), and Havrilesky and Gildea (1990), for example, have compared the frequencies of dissent for tighter or looser monetary policy of District presidents and Board governors. Comparing simple frequencies of dissent, however, may suffer from a serious omitted-variable bias. Actual votes on monetary policy depend on the economic variables of interest to the Federal Reserve (Fed) as well as the Fed's expectations of the future values of these variables. This study uses multinomial logit analysis to incorporate these omitted variables into the

voting function.[1] To test whether presidents care more about inflation, a common theory in the dissent literature, requires a comparison of the voting reactions of presidents and governors to movements in that variable. Furthermore, this article examines not two but three policy choices—votes for tighter policy, looser policy, or no change in policy—to more accurately represent differences in the members' votes.[2] These improvements on the previously used methodology allow an accurate exploration of the predilections of different members of the Federal Open Market Committee (FOMC) and the stability of these tendencies over time. Only by examining the voting functions of different subgroups of the FOMC can a reliable assessment be made about whether Reserve Bank presidents are relatively more conservative than Board governors.

This article proceeds as follows. The first section outlines the important theoretical and empirical issues in this debate. Section II presents the results of the multinomial logit estimation. A comparison of the policy propensities of Bank presidents relative to Board governors is performed. The evidence reveals that no significant difference exists in the voting behavior of these two different groups. The stability of these voting patterns over time is then examined. The third section illustrates how robust the results are to alternate forms of the voting function. Finally, the implications of this study for the current policy debate are discussed in the conclusion.

I. The Model

Luckett and Potts (1978) point out the hazards of analyzing Fed behavior by quantifying the movement of one of its potential instruments. Misspecifying the policy instrument the Fed is actually using invalidates any resulting conclusions about Fed behavior. If, for example, the Fed is setting interest rates and money demand unexpectedly increases, the subsequent rise in the money supply M does not signify a change in Fed intentions.[3] Such a misspecification would be impossible if everyone in the economy agreed on the correct instrument; unfortunately, a consensus about the optimal tool of monetary policy has not been reached, inside or outside the Fed. As a result, any conclusions about Fed intentions based on the movement of a hypothesized Fed instrument are suspect. To avoid this problem, FOMC votes are used here to discern the Fed's intentions directly. Accordingly, these votes are modeled as functions of certain target variables. The reaction of the FOMC to these variables indicates the FOMC's relative and absolute concerns for these various objectives.[4]

On the other hand, differentiating one subgroup's behavior from that of the rest of the FOMC by simply comparing dissents suffers from omitted-variable bias. Is a dissent for tighter policy when the economy is in a recession identical to a dissent for tighter action when the economy is booming? Counting frequencies alone would suggest that the two are equivalent. Furthermore, different FOMC members could have different targets, which makes imputing their conservatism about a target from dissents impossible. Assume that Bank presidents target real GNP and Board governors are more concerned about inflation. If, for example, the economy experiences a positive supply shock and output growth increases while prices decline, the more numerous Board governors will tend to vote for looser policy while the Bank presidents will tend to dissent for tighter action. Which group is more conservative? Counting dissents would imply that the Bank presidents tend to advocate tighter policy, yet those who target real GNP are generally considered less conservative than those who target inflation. Without knowing how FOMC members react to the fundamental variables driving their behavior, no conclusions can be drawn

[1] Previous attempts have been made to estimate the factors that influence FOMC votes, as in Luckett and Potts (1978, 1980) and Hakes (1990). Both Luckett and Potts and Hakes use discrimination analysis between two FOMC choices, votes for tighter or votes for looser policy, to test a form of the partisan politics hypothesis. The methodology here uses logit estimation and allows three policy choices. Furthermore, the issues examined in this paper differ from those in the earlier studies.

[2] Including the vote of no change allows a distinction to be made between dissenting to a tightening of policy, for example, because one is for no change in policy versus when one is for a loosening of policy. Furthermore, since votes for no change are the most frequent category, the occasions for arbitrary judgment of what is loose and tight policy are reduced.

[3] Although technically the federal funds rate and the money supply are short-run targets, while reserves are the instrument, the connection between reserves and either of these targets is assumed to be secure enough to refer to them as instruments.

[4] Abrams, Froyen, and Waud (1980) discuss the inability to discern the preferences of the Fed when examining a Fed instrument, as movements in that instrument also contain information about the Fed's perceptions of the structural equations in the economy. Looking at FOMC votes defuses much of this criticism. Votes give only the direction of the policy, not the magnitude of the movement in the instrument needed to bring about the desired effect. In fact, the directives are clear about when a change is due to technical, "structural" factors or altered directions in policy. Disputes due to differences of opinion about the structural equations guiding the economy are made as technical dissents, and are not included as policy differences in this paper.

about their relative goals. It is essential to understand why members dissent in order to determine if they dissented because they are "conservative"; by omitting the variables that explain their behavior, one omits any possibility of judging whether their behavior is "conservative." This problem is avoided by directly examining the objectives of the different members of the FOMC.

Comparing dissents by Bank presidents and Board governors also begs the question of which members of the FOMC can be treated as identical; is the important distinction to be made between president and governor, or do individuals differ significantly? In the econometric literature this issue is referred to as the agent heterogeneity problem. If, for example, one Reserve Bank were to dissent for tighter policy every time the FOMC voted for looser policy or no change in policy, the frequency of dissents for Bank presidents as a group would be high compared to governors. But such dissents would illuminate more about one institution, or individual, than about the differing appointment procedures of Bank presidents and Board governors. For both theoretical and empirical reasons it is necessary to analyze not only whether differences exist between Bank presidents and Board members, but whether the Banks themselves should be aggregated.

A simple model suggests which variables to include in the FOMC voting function. To begin with, it is assumed that members of the FOMC care only about the growth in real output and the rate of inflation. The Fed attempts to minimize a loss function, as proposed in Kydland and Prescott (1977) and Barro and Gordon (1983),

$$\underset{\pi}{\text{MIN}}\ \alpha(\dot{Q})^2 + \Gamma(\pi)^2 \qquad (1)$$

where $\dot{Q} \equiv$ the growth rate in real GNP and $\pi \equiv$ inflation. When real GNP growth declines, members are more likely to vote for ease and less likely for tightening, while a rise in inflation will increase the probability of voting to tighten policy and decrease the probability of voting to ease.[5] The weights allow the tastes for these targets to vary over the two objectives and between the members of the FOMC. If $\alpha = \Gamma$, for example, the FOMC cares equally about inflation and real GNP growth and is, thus, targeting nominal GNP. Comparing these parameters across Bank presidents and Board governors indicates whether one group is "more conservative," in the sense that its members care more about inflation. Any analysis of the absolute tightness or looseness of any group's policy must be determined by examining some measure of these weights.

The dependent variable is the actual vote of the FOMC members. Since they can vote for a tightening, a loosening, or no change in policy, a multinomial logit model is used to determine the effects of these two target variables on the probabilities that the FOMC members vote for a given policy. Ordered probits were also performed on all the data; these results are omitted as they completely replicate the findings reported in the remainder of the paper. The collection of these votes is not devoid of judgment. Anyone who has read the FOMC minutes is aware that the directives can be fairly cryptic. Furthermore, dissents are sometimes made for technical reasons, not because of disagreements over the direction of policy per se; since this paper is concerned with FOMC predilections, these dissents are not counted as disagreements with the FOMC policy. Although this exercise is not completely objective, all studies that examine votes or dissents suffer from such intrusions of judgment.

Without knowing how FOMC members react to the fundamental variables driving their behavior, no conclusions can be drawn about their relative goals.

The possibility that all members of the FOMC are not alike must be examined in order to ensure the accuracy of any estimates of the effects of business cycle variables on policy votes. The multinomial logit model is used primarily for cross-sectional analysis over a distribution of individuals. Since FOMC voting contains many observations of the same agent over time, however, idiosyncratic differences in individual tastes can bias tests on the coefficients, as is thoroughly discussed in Chamberlain (1980).[6] Essentially,

[5] The terms are squared in this equation since the Fed is assumed to dislike large deviations in either direction. For example, the Fed hates deflation as much as it does inflation. It is price level changes that have costs to society, no matter the direction.

[6] This agent heterogeneity is similar to heteroskedasticity in the errors, and must be corrected for in order to accurately estimate and test the parameters in the model.

differences in individuals or institutions should be incorporated into the parameter estimates. If, for example, all 12 District Banks are aggregated, and one particular Bank has a strong predilection for zero inflation, that Bank's higher probability of choosing tightening must be accounted for in order to get an accurate measurement of District Banks' voting functions. Thus, to produce proper estimates of the FOMC voting functions, one must examine the issue of whether differences exist, between Board and Bank or between Bank and Bank. A variety of tests were performed to guarantee that this heterogeneity was not a serious problem in the data.

II. FOMC Voting Functions

Because monetary policy affects the economy only with lags, the FOMC's expectations of GNP growth and inflation should determine its votes. Fortunately, a good instrument for these expectations is available. The Fed staff's forecasts of these variables are contained in the Green Book, which is distributed to all FOMC members before each meeting. Since the Green Book does not consistently contain forecasts for the variables of interest before 1965 and Green Book forecasts are not made public until five years after their use, the sample consists of FOMC votes from 1965 to 1985; all inferences drawn from this sample pertain only to that period. Each FOMC meeting contains the votes of the seven Board governors and five of the District Bank presidents; the Federal Reserve Bank of New York always has a vote while the other four votes are rotated among the remaining eleven Banks.[7] With roughly 217 meetings over the sample period, the data set consists of 2,584 votes.[8]

The actual voting frequencies of the FOMC contain information about the FOMC's inclinations, its models, and the economic conditions experienced over the sample.

The actual voting frequencies of the FOMC contain information not only about the FOMC's inclinations, but about its models and the economic conditions experienced over the sample as well. Of all these votes, 59 percent were for no change, 25 percent were for tightening, and 16 percent were for loosening. The voting frequencies for Bank presidents do differ somewhat from those of Board governors. The frequency of "no change" votes by District presidents was about 2 percentage points lower than that of Board governors, their "tighten" voting frequency about 3.5 percentage points higher, and their "loosen" voting frequency about 1.5 percentage points less. The large number of votes for no change suggests that the Fed altered policy gradually and deliberately rather than wildly chasing its targets. The previous literature assumed that these frequencies represented differences in tastes while omitting that they also contain information about the models of the FOMC and the shocks experienced by the economy over this time period.

The results of a multinomial logit estimation based on the objective function in text equation (1) for the FOMC as a whole are contained in equation 1 of Table 1. The coefficients measure the effect of the independent variables on the probability of voting for looser or tighter policy relative to a vote of no change, at given values of these independent variables. As predicted by theory, an increase in the Green Book forecast of future real GNP growth raises the probability of voting for tighter policy and reduces the probability of voting for looser policy relative to a vote of no change. The output coefficient for the probability of both loosening and tightening is significant and correctly signed. Furthermore, the expected future inflation rate has the predicted effect on the probabilities of voting for tighter or looser policy, and both its coefficients are significant. Equation 1 of Table 1 clearly shows that the FOMC responds to Fed expectations of the future performance of the economy. This result is robust over different measures of the output target. De-trended growth rates, growth rates with drift, and growth rates with dummies accounting for the post-1974 sample were all tested, in an attempt to quantify deviations from a potential

[7] Cleveland and Chicago alternate turns on the FOMC. The remaining nine District banks are divided into groups of three, and they rotate FOMC votes within those sub-groups.

[8] Green Book forecasts were unavailable for three meetings over this sample. Any lagged variables were appropriately corrected for these observations. Furthermore, random absences of presidents and governors prevented the number of observations from simply being (12)x(217).

Table 1
Multinominal Logit Estimation of FOMC Voting

	(1) FOMC	(2) Bank	(3) Board	(4) FOMC	(5) Bank	(6) Board
Tightening						
C	−2.241	−1.928	−2.513	−.851	−.730	−.950
	(13.20)	(7.83)	(10.69)	(18.0)	(10.49)	(14.72)
$\dot{Q}^E$	.136	.124	.148			
	(8.07)	(5.05)	(6.34)			
$\dot{P}^E$	.163	.137	.185			
	(7.30)	(4.21)	(6.05)			
Loosening						
C	.177	.193	.165	−1.204	−1.261	−1.163
	(.97)	(.68)	(.70)	(22.37)	(14.93)	(16.66)
$\dot{Q}^E$	−.211	−.225	−.201			
	(11.79)	(8.08)	(8.61)			
$\dot{P}^E$	−.177	−.189	−.168			
	(6.11)	(4.18)	(4.47)			
Log Likelihood	−2338.3	−1017.83	−1315.39	−2496.22	−1087.43	−1404.89
Likelihood Ratio	10.16			7.8		

Note: C is the constant; $\dot{Q}^E$ and $\dot{P}^E$ are the Green Book forecasts of real output growth and inflation, respectively. The likelihood ratio test for the first three equations is a χ^2 with 6 restrictions. A χ^2_6 over 10.6 would reject that the two groups vote the same at the 10 percent level. Thus the Null Hypothesis that the two groups are identical cannot be rejected, even at the 10 percent level. Testing the identity of the constants in equations (5) and (6) is a χ^2_2; a value of the likelihood ratio above 5.99 rejects the equivalence of these constants at the 5 percent level. (T-Statistics in parentheses.)

Fed targeted growth rate, yet they all produced essentially the same coefficients and levels of significance as the output variable given in equation 1 of Table 1. Only the unemployment rate and changes in the unemployment rate did not perform as well.

Governors versus Presidents

Equations 2 and 3 of Table 1 contain the logit estimations for Bank presidents and Board governors separately, in order to compare the responses of presidents and governors to changes in the two proposed target variables. A cursory examination of the coefficients suggests that although the Bank presidents may be less apt to loosen when the economy is booming, they are also less apt to tighten. The constants in the two equations are also very close. Because of the lack of independence between coefficients, specifically between the constant term and the remaining parameters, the superior test of whether these two groups are identical is a joint test of all their coefficients. This log likelihood ratio test fails to reject the hypothesis that the coefficients of Bank presidents are identical to those of Board governors, even at the 10 percent level.[9] The hypothesis that District Bank presidents and Board governors have significantly different voting predilections is not sustained by the data.

The problem with the simple comparison of

[9] Statistical comparisons of individual coefficients were performed. Although this procedure attempts to answer different questions than whether substantial differences exist between District presidents and Board governors, these single tests might reveal what may cause some disagreements in policy. The results of these tests strongly support the conclusion that the two groups are identical. Performing the same test on just the inflation coefficient, or just the real output parameter, still could not reject, at the 5 percent level, the hypothesis that each coefficient was the same for these two groups. One group clearly does not feel any stronger about real growth or inflation than the other. In some model specifications a Bank dummy for tightening was small, positive, and significant. Yet this is an uninteresting result for several reasons. First, the exact model chosen is necessary to truly test whether the constant for tightening is the same between the two agents, and the most complete specification found this dummy both statistically and economically insignificant. Furthermore, the dependence of the estimate of the constant on the other parameters in the model requires a joint test. Finally, even in the models where the constant did differ, it was economically irrelevant; at the mean of the independent variables the District president probability of tightening increased by 2 percent, and their probability of voting for no change decreased by 2 percent.

Board governor and Bank president dissent frequencies in, for example, Belden (1989), Puckett (1984), and Havrilesky and Gildea (1990), can be clearly illustrated using logit analysis. The equivalent procedure in the logit framework is to compare the logit estimations for the Bank presidents and Board governors when a constant is the only independent variable; in this case, the constants are the actual voting frequencies. Equations 4 to 6 in Table 1 provide the coefficients from this procedure for the FOMC as a whole and for the District presidents and Board governors separately. The constants are negative because the votes for both loosening and tightening are relative to votes for no change, which were by far the largest category over the sample period. The likelihood ratio test accepts at the 5 percent level that the constants in the Board and Bank equations are significantly different.[10] However, the constants in equations 5 and 6 clearly differ from those in equations 2 and 3, emphasizing the effect of omitting the business cycle targets from the voting functions. The estimated constant is a function of the other explanatory variables and their estimated coefficients; omission of these other variables biases the estimation of the constant. Thus, the inclusion of the business cycle objectives is essential to reversing the conclusion found in the frequency-of-dissent analysis that the two groups are different.

Various steps were taken to ensure that the aggregation of the Bank presidents was not biasing the results. It is often argued that certain Reserve Banks tend to be consistently more conservative than others; the constancy of Bank behavior is explained by the nomination process for Bank presidents. The resulting institutional memory allows one to examine the Bank rather than the individual.[11] Yet institutional memory can produce difficulties in qualitative data estimation as the individual Bank effects must be accounted for in order to efficiently estimate the coefficients. Since each Bank has at least 80 observations, District Bank dummies are used to capture possible fixed effects. Adding the Bank dummies to equation 2 of Table 1 produces the estimates in Table 2.

Only the St. Louis Bank dummy for tightening is significant. A log likelihood test of whether the bank dummies were insignificant could not be rejected at even the 10 percent level. In fact, when all but the St. Louis dummy are dropped, the St. Louis dummy itself becomes insignificant. District Bank behavior may vary, but it is spread along a very narrow spectrum. The inclusion of all the Bank dummies allows enough differentiation to distinguish St. Louis;

Table 2
Dummies for the District Banks

	(1) Bank		(1) Bank
Tightening		Loosening	
C	−2.50	C	.274
	(6.18)		(.70)
$\dot{Q}^E$	.118	$\dot{Q}^E$	−.23
	(4.66)		(8.15)
$\dot{P}^E$	.13	$\dot{P}^E$	−.20
	(3.95)		(4.32)
DBos	.74	DBos	.54
	(1.72)		(1.22)
DNew	.55	DNew	−.44
	(1.47)		(1.88)
DPhil	.56	DPhil	−.04
	(1.31)		(.08)
DClev	.76	DClev	.33
	(1.86)		(.82)
DRich	.52	DRich	.09
	(1.18)		(.22)
DAtl	.73	DAtl	.01
	(1.71)		(.35)
DChi	.42	DChi	−.14
	(1.04)		(.02)
DSt.L	1.14	DSt.L	−.01
	(2.60)		(.33)
DMin	.72	DMin	.21
	(1.57)		(.39)
DKan	.72	DKan	.14
	(1.75)		(.33)
DDal	.73	DDal	−.39
	(1.73)		(.82)
Log Likelihood	−1008.12		
Likelihood Ratio	19.42		

Note: D Bank are the bank dummies. The Federal Reserve Bank of San Francisco is the omitted dummy variable so all Banks are measured in comparison to it. The likelihood ratio is a χ^2 with 24 restrictions, and it cannot reject that all banks share the same constants at even the 75 percent level. (T-statistics in parentheses.)

[10] This approach differs slightly from Belden's test: it is a joint test on the similarity of the probability of tightening and loosening between Bank presidents and Board members. However, both votes must be examined as a Bank could have significantly more dissents for both tightening and loosening. Such a Bank clearly cannot be labeled as more "conservative," even by the dissent literature's own criterion.

[11] The Fed could also derive benefits from and promote the diversity within the System in order to encourage debate. In any event, all the studies that compare presidents and governors implicitly assume that District Banks, not individual presidents, differ from Board governors.

once all the other banks are averaged together, however, the St. Louis Bank cannot be differentiated from the rest. This evidence suggests that no fixed individual effects are biasing the results when all the Banks are combined; individual Bank differences do not appear to produce serious problems for efficient estimation. Therefore, the aggregation of all the Banks does not appear to be an empirical problem.

Simply comparing the estimates of all the coefficients of the Banks separately is another way to examine potential Bank differences. To ensure that certain Banks are not dominating the sample, a log likelihood test was performed when one Bank was estimated apart from the pooled sample of the remaining Banks. This procedure assures that one loose or tight Bank is not biasing the comparison of the two groups, a serious problem when merely analyzing frequencies of dissent. The hypothesis of constant coefficients across all Banks could not be rejected for any Bank. The equality of the coefficients between Banks could not be rejected even when a group of reputed "conservative" Banks was separated out. Both the Bank dummies and the logits on subgroups of the Banks failed to find any Bank heterogeneity biasing the rejection of Board governor and Bank president dissimilarity, thus reinforcing the conclusion that no differences exist between these two groups.

Table 3
Subsample Stability

	(1) 1965–79	(2) 1980–85	(3) 1965–79	(4) 1980–85
Tightening				
C	−2.228	−2.455	−2.083	−2.364
	(11.14)	(7.38)	(11.41)	(7.59)
$\dot{Q}^E$	.131	.127		
	(6.76)	(3.57)		
$\dot{P}^E$	.176	.157		
	(6.52)	(3.88)		
$\dot{P}^E \cdot \dot{Q}^E$			.141	.139
			(7.68)	(4.33)
Loosening				
C	.320	−.485	.560	−.295
	(1.56)	(1.21)	(3.52)	(1.02)
$\dot{Q}^E$	−.231	−.159		
	(11.18)	(4.07)		
$\dot{P}^E$	−.178	−.125		
	(5.42)	(2.06)		
$\dot{P}^E \cdot \dot{Q}^E$			−.227	−.157
			(11.12)	(3.98)
Log Likelihood	−1858.87	−470.117	−1861.58	−470.554
Likelihood Ratio	18.626		5.42	.874

Note: $\dot{P}^E \cdot \dot{Q}^E$ is the Green Book forecast of nominal GNP growth. The first χ^2 has 6 restrictions and strongly rejects subsample stability at the 1 percent level. The next two statistics have 2 restrictions and the 1965–79 sample rejects nominal GNP targeting at the 10 percent level although not at the 5 percent level. The 1980–85 sample cannot reject nominal GNP targeting. (T-statistics in parentheses.)

What Does the FOMC Target?

Since the tests in the previous section conclude that the FOMC is the relevant unit to examine, it is appropriate to attempt to explore exactly what the FOMC was targeting over the sample period. In equation 1 of Table 1, the coefficients for real GNP growth and inflation are very close to identical, suggesting that the FOMC does not differentiate between inflation and output growth when it sets policy. It seems the Fed was, in effect, targeting nominal GNP from 1965 to 1985. In fact, a log likelihood test cannot reject that the Fed was targeting nominal GNP.[12] The Green Book evidence, therefore, suggests the Fed was targeting a nominal variable over the sample, providing an anchor for inflation.

The stability of these FOMC goals over time can also be tested. It is possible the Fed's objectives, or its weights on these objectives, changed with the dominant economic models of the day. For example, the Fed could have switched to targeting nominal GNP in the later part of the 1970s. Assuming that the change in Fed operating procedures signaled an alteration in the Fed's model of the economy, the sample period is broken at October 1979. Equations 1 and 2 of Table 3 provide the results of a log likelihood test of within-sample coefficient stability, and it is strongly rejected. To test whether a move to targeting nominal GNP in the late 1970s caused the instability, equations 3 and 4 give the nominal GNP targeting equations over each subsample. A likelihood ratio test for the equality of the coefficients on real GNP growth and inflation was performed for the two subsamples. The results indicate that the instability over the sample could be caused by a shift to targeting nominal variables in the late 1970s.[13]

[12] The log likelihood value of 2.94, with a chi-squared with two restrictions, cannot reject at the 10 percent level the hypothesis that the coefficients on expected real GNP and expected inflation are the same.

[13] In the early period, with a likelihood ratio of 5.42, targeting nominal GNP cannot be rejected at the 5 percent level but can at the 10 percent level. In the post-1979 period, however, a likelihood ratio of 0.874 cannot reject nominal GNP targeting.

In short, including business cycle objectives in the FOMC voting functions reverses the conclusion that Bank presidents and Board governors are significantly different; no evidence was found that the District Bank presidents are any more "conservative" than the members of the Board. Furthermore, aggregation over different members of the FOMC does not appear to be a significant problem. And although some subsample instability exists, its possible causes could be explained by shifts in the Fed's relative concern for the two independent variables.

III. Other Models of FOMC Voting

The voting function in the previous section may still be misspecified. Perhaps a more fully specified function would reverse the rejection of significant differences between Bank presidents and Board governors. More complicated reaction functions have been used in most of the literature in this area, for example McNees (1986), Havrilesky (1987), and Alesina and Sachs (1988). Many alternatives to this model were discussed in Tootell (1991). Table 4 contains the main results from that search. Equation 1 is for the FOMC as a whole. Included in the voting function along with the expectations for inflation and real growth are the growth in the money supply and the lagged change in the federal funds rate. Money growth is included because it is traditionally hypothesized as an intermediate Fed target. The lagged change in the federal funds rate is often included to pick up the Fed's concern for stability in the capital markets. As seen in Table 4, the coefficient on money is extremely small, yet correctly signed and statistically significant. The coefficient on the lagged change in the federal funds rate is large and positive. This variable is apparently capturing the fact that the Fed moves gradually, and thus, with positive serial correlation.[14]

This new equation cannot reject the hypothesis that governors and presidents are the same. Equations 2 and 3 of Table 4 break the logit estimation into Bank and Board equations. The likelihood test with ten restrictions cannot reject the hypothesis that the two groups are identical, even at the 10 percent level. Furthermore, the inability to reject the hypothesis that these two groups are identical is not dependent on using only forward-looking variables. The same tests were performed using the lags of actual real GNP growth and inflation. These logits were estimated on quarterly data, as the frequency of the actual real GNP figures is quarterly. Using this regression, the hypothesis that the two groups are different is still strongly rejected.[15] Finally, when the latest known values of inflation and real growth, also contained in the Green Book, were added to the equations in Table 4, the coefficients and significance

Table 4
Alternative Model of FOMC Voting

	(1) FOMC	(2) Bank	(3) Board
Tightening			
C	−2.535	−2.350	−2.709
	(12.66)	(7.99)	(9.87)
$\dot{Q}^E$	.132	.118	.145
	(7.29)	(4.44)	(5.83)
$\dot{P}^E$	.110	.086	.132
	(4.40)	(2.32)	(3.86)
$\dot{M}$	.060	.077	.047
	(6.06)	(5.16)	(3.51)
LDFF	.921	1.032	.840
	(8.82)	(6.55)	(5.99)
Loosening			
C	.329	.347	.319
	(1.68)	(1.13)	(1.25)
$\dot{Q}^E$	−.150	−.162	−.142
	(7.90)	(5.44)	(5.76)
$\dot{P}^E$	−.179	−.203	−.163
	(6.01)	(4.33)	(4.20)
$\dot{M}$	−.063	−.060	−.065
	(5.43)	(3.28)	(4.37)
LDFF	−1.213	−1.282	−1.174
	(10.51)	(7.05)	(7.84)
Log Likelihood	−2201.91	−948.775	−1245.92
Likelihood Ratio	14.43		

Note: $\dot{M}$ is the money growth rate, and LDFF is the lagged change in the federal funds rate. The likelihood ratio test is a χ^2 with 10 restrictions. A χ^2_{10} over 16.0 rejects that the 2 groups are the same at the 10 percent level. (T-statistics in parentheses.)

[14] In fact, when lagged FOMC votes were included in the logit estimation, the coefficients for and significance of the lagged change in the federal funds rate fell to zero. Because of the apparent collinearity between lagged votes and lagged changes in the federal funds rate, a test for differences in Bank and Board voting functions was performed with equations including each of these two variables separately and one including both. None of these logit equations rejected the similarity of the two groups.

[15] The chi-squared statistic with six restrictions for the likelihood ratio test that the two groups are identical was 7.65, well below even the 25 percent level for rejection.

levels of the expectational variables were unaffected, while the backward-looking variables were significant only for the probability of tightening. In this broader equation, equivalence of the coefficients could not be rejected at even the 25 percent level. It is clear that the failure to reject the identity of these two groups of agents is robust to a variety of different models, frequencies, and specifications.

These more comprehensive voting specifications, however, uncover another important issue in this debate. Given the many different dimensions along which the FOMC members can act, if one could distinguish between members' behavior, how would one define "conservative"? Is it one who targets money growth, nominal GNP, or one who has a great distaste for inflation? Monetarists can advocate loose money and people who target real or nominal GNP can have very low or very high targets. The dissent literature defines a conservative as one averse to inflation, but does not examine the reaction of District presidents and Board governors to inflation. To examine the effect of appointment procedures on the behavior of members of the FOMC requires analysis of a voting function that allows tests of a concrete definition of what is "conservative."

Finally, an examination of these coefficients can help to determine whether FOMC policy is either too tight or too loose. Measuring an agent's policy predilections should depend on its responses to conditions in the economy, not on its votes relative to the FOMC majority, as is done in the dissent literature. Quantifying the relative probability of voting for looser or tighter policy, given output growth and inflation, is achieved by substituting values for the independent variables in the estimated equations. At that given point, usually chosen as the mean of the independent variables, one can derive the effect on the probabilities of an increase or decrease in output or inflation. Figures 1 and 2 graph the probabilities of voting for looser, tighter, or no change in policy, as estimated in equation 1 of Table 1, when either expected real GNP or inflation varies; whether the Fed's response to its target variables conforms to society's desired response can be measured in this way. Scrutinizing dissents gives no information about FOMC action relative to the optimal social policy.

IV. Conclusion

Previous examinations of the frequencies of dissent in FOMC votes, as in Belden (1989) and Puckett (1984), have concluded that District Bank presidents

Figure 1

FOMC Voting Probabilities with Expected Inflation Rate at Its Mean (5.47%)

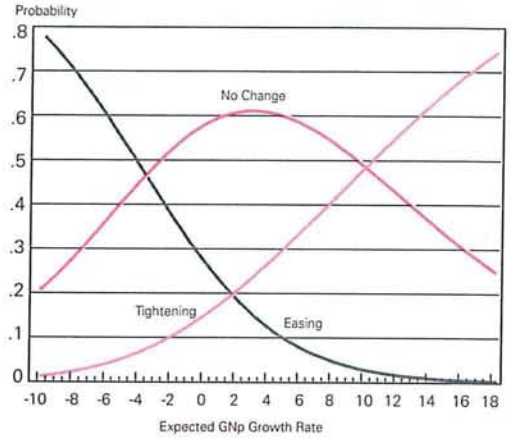
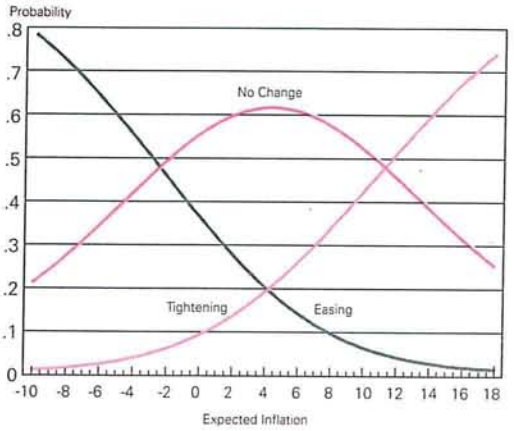


Figure 2

FOMC Voting Probabilities with Expected GNP Growth at Its Mean (2.94%)



are more conservative than Board members. Potential explanations for this difference are explored in Tootell (1991). This conclusion has been interpreted by some as proof that Board policy is too loose and by others that District Bank policy is too tight. Proposed solutions to this "problem" have, thus, been either to depoliticize the Federal Reserve System, and in particular the Board of Governors, or to increase political control over the District Bank presidents. These policy prescriptions seem to have far outrun any evi-

dence that a problem even exists. This study examines the evidence from FOMC voting patterns. Qualitative response analysis reveals that the FOMC voting data do not support the conclusion that District Bank presidents and Board members vote differently. Policy prescriptions based on such an assessment are, therefore, unfounded.

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