ELLEN E. MEADE
D. NATHAN SHEETS

Regional Influences on FOMC Voting Patterns

This paper looks at the monetary policy decisions of the U.S. Federal Reserve and asks whether observed voting patterns have been driven entirely by national concerns, or whether regional factors have also played a role. We find that Fed policymakers take into account developments in regional unemployment when casting votes on monetary policy. These results are robust to different specifications of the voting equation. This research is relevant for the Fed, and it may also be relevant for Europe's fledgling central bank in Frankfurt in light of regional differences within the euro area.

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Convenience and efficiency in coin and currency distribution and in check-processing may be the least of the benefits flowing from this far-flung network of offices, stretching from Seattle to San Antonio and from Buffalo to Birmingham. Our System's broad geographic reach also ensures that we who have the privilege of serving as policymakers—the presidents of the regional Banks and the Board members in Washington—receive a clear sense of the economic and business life beyond the Beltway, which encircles the nation's capital. As keen observers of local economies, the directors here and elsewhere contribute vitally to the formulation of monetary policy by offering important insights absent, by definition, from even the most careful analysis of aggregate data. Often they know what is happening in the various regions of the country well before the hard data are collected by national statistical agencies. Most importantly, this singular

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ELLEN E. MEADE *is a Senior Research Fellow at the Centre for Economic Performance, London School of Economics* (*E-mail*: e.e.meade@lse.ac.uk). D. NATHAN SHEETS *is an Assistant Director at the Federal Reserve Board* (*E-mail*: nathan.sheets@frb.gov).

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> system of broad and diverse representation, nurtured by close contacts at the regional and local levels, fosters a long-term perspective and a continuity.
> —Alan Greenspan (2000)

THE FEDERAL RESERVE System is a hybrid institution, designed to represent and respond to national and regional concerns. Consistent with this observation, all of the Federal Reserve's monetary policymakers have some regional identity, i.e., either their positions explicitly carry some regional affiliation or their region of origin is a factor that must be considered in the selection process. In this paper, we seek to determine whether there is any systematic evidence that policymakers have cast their votes according to economic developments in their regions rather than focusing exclusively on the performance of the national economy. That is, once economy-wide data have been taken into account, do votes of policymakers appear to have been influenced by regional developments? For instance, were policymakers from California more sensitive to that state's sluggish economic performance following the defense cutbacks and base closures in the early 1990s?

To preview our results, we find that Fed policymakers do take into account developments in regional unemployment when voting on monetary policy, and that these regional developments are—if anything—more important for Board members than for Reserve Bank presidents. These findings are robust to a variety of specifications of the voting equation. The implications of this research are relevant for the Fed, and may also be relevant for Europe's fledgling central bank in Frankfurt. Given the domestic political pressures, ECB policymakers would seem to have incentives to cast votes based on economic developments in their home countries. Moreover, since country-level data remain the major source of information in the euro area, it is quite straightforward to judge economic performance on a country-by-country basis (much easier, for example, than to assess regional developments in the U.S.).

The remainder of this paper is organized as follows. The next section reviews the literature on monetary policy voting in the U.S.; Section 2 lays out a simple framework for analyzing our question; Section 3 discusses the Federal Reserve's policymaking structure, our sample of monetary policy votes, and correlations among those votes and regional unemployment; Section 4 details our estimation results; and Section 5 offers some conclusions.

1. LITERATURE REVIEW

The literature on Federal Reserve monetary policy voting can be grouped into two strands: first, articles that take inspiration from the partisan theory of politics, and second, articles that take inspiration from monetary policy reaction functions.

The partisan theory of politics is rooted in Hibbs (1977) and refined in Alesina (1987) and Alesina and Sachs (1988). In this literature, Democrats and Republicans are seen as occupying different points on the trade-off between unemployment and inflation, with Democrats viewed as less attentive to inflation and more attentive to

unemployment than Republicans. Numerous prior studies of Federal Reserve voting have examined monetary policy votes cast by Board members, Reserve Bank presidents, or both (e.g., Belden, 1989, Havrilesky and Schweitzer, 1990, Havrilesky and Gildea, 1991, 1992, 1995, Gildea, 1990, 1992). These studies have generally focused on the background characteristics and political affiliations of central bankers and whether those characteristics or affiliations can be used to predict votes cast in monetary policy decisions. Of relevance for our study, Gildea (1992) finds limited evidence that regional developments influence the votes of Bank presidents.

Turning to the second strand, the literature on monetary policy reaction functions generally focuses on changes in the central bank's interest rate target. However, Tootell (1991a, 1991b) takes a somewhat different approach, using a panel of policymakers' votes to estimate an "intended" monetary policy reaction function. In his framework, votes in agreement with the majority as well as dissents are classified as votes for tighter, unchanged, or easier policy and explained in terms of forecasts for real output growth and price inflation. Tootell (1991b) finds no evidence of a systematic difference between Board members and Bank presidents, contrary to the findings in the partisan strand of the literature. His result is based on a likelihood ratio test of different sensitivities for Board members and Bank presidents to expected output and inflation, rather than the simple dissent frequencies used in the partisan literature. Moreover, Tootell (1991a) finds no statistical support for the hypothesis that votes cast by Bank presidents have been influenced by regional information. Chappell and McGregor (2000) estimate a Fed reaction function based on macroeconomic data and attempt to rank 95 individual Fed policymakers by preference for monetary ease; the results of their exercise are consistent with observed voting patterns.

Our paper adds to the work in both strands of the voting literature. The first strand has been subject to criticism owing to the truncation of the voting sample (first noted by Havrilesky and Gildea 1991). By ignoring votes cast in agreement, Belden (1989) and Havrilesky and Schweitzer (1990) are unable to analyze the factors that determine voting behavior in general. Subsequent articles have attempted to correct for truncation bias by looking at split-decision outcomes. As split decisions constitute only about half of all meetings, these studies implicitly assume that there is no additional information provided by unanimous votes. These papers have also been criticized for potential omitted variable problems, since they do not consider the role of macroeconomic variables in determining voting decisions. Tootell (1991a, 1991b) corrects this by using votes from all meetings and by adding macroeconomic factors as independent variables in his empirical work. Like Tootell, we use all votes and include macroeconomic determinants; unlike him, we examine the determinants of voting behavior (specifically, the decision to dissent or to agree) and the role played by regional variables, rather than estimate a monetary policy reaction function.

2. A SIMPLE FRAMEWORK

An intuitive theoretical framework motivates the empirical approach used in this study. If i indexes voters on the monetary policy committee and t indexes time, we can represent voter i's desired or "target" short-term interest rate ST_{it} as[1]

1. Chappell and McGregor (2000) develop a framework that is broadly similar.

$$ST_{it} = F_i(R_{it}, N_t) , \tag{1}$$

where R_{it} is a vector of variables describing developments at time t in voter i's region of origin, and N_t is a vector of national variables at time t. We term Equation (1) an individual reaction function. A specific example of such a function might be the following linear relationship:

$$ST_{it} = \alpha_i R_{it} + \beta_i N_t + \varepsilon_{it} , \tag{2}$$

where ε_{it} is a white-noise error term. Equations (1) and (2) suggest that individual voters may have systematically different views regarding the appropriate short-term interest rate for three reasons: first, regional information (R_{it}) may vary;[2] second, responsiveness to regional information (α_i) may vary; third, responsiveness to national information (β_i) may vary (for example, some committee members may want to respond more aggressively than others during periods when output is above trend).

The Federal Reserve makes public the majority decision of the FOMC[3] and, in the case of a dissent, whether the dissenting voter preferred a tighter or easier policy than the majority. Given Equation (1), it follows that the decision of the majority of members, ST_t^c, is a function of regional and national variables as described by a policy reaction function

$$ST_t^c = G(R_{1t}, \ldots R_{nt}, N_t) \text{ where } i = 1, \ldots,12 . \tag{3}$$

Equation (3) resembles a conventional monetary policy reaction function, where the majority decision is taken as the realized short-term interest rate. In this framework, Equation (2) might be seen as describing the mode of voter i's preferences regarding ST in period t. The rate chosen by the committee, ST_t^c, would then be equal to preferences of the median voter, abstracting from agenda control and the effects of the interactions among members of the FOMC.

We now define functions $h_{it}(Z_{it})$ and $d_{it}(Z_{it})$ as threshold deviations from the committee decision ST_t^c for voter i at time t, where $h_{it}(\cdot) > 0$ and $d_{it}(\cdot) < 0$ for all i, t. Voter i will dissent from the committee decision when his desired short-term interest rate is sufficiently above or below the rate chosen by the majority. When

$$ST_{it} - ST_t^c \geq h_{it}(Z_{it}) , \tag{4}$$

then voter i will favor a higher rate (i.e., a more hawkish policy) than the majority, and when

$$ST_{it} - ST_t^c \leq d_{it}(Z_{it}) , \tag{5}$$

then voter i will favor a lower rate (i.e., a more dovish policy) than the majority.

In principle (as indicated by the subscripts), the $h(\cdot)$ and $d(\cdot)$ threshold functions may vary across time and across individual voters, and may be determined by

2. A voter may be influenced by regional variables not only because he attaches greater value to the welfare of the region but also because he may be more attuned to developments in that region.

3. Since August 1997, the Fed's monetary policy committee has made public its target for the short-term interest rate.

characteristics such as whether the voter is a Board member or a Bank president, the ability of the committee Chairman to forge consensus, or the political affiliation of the voter.

Following from Equations (3), (4), and (5), we define a limited dependent variable VL_{it} that takes values of (+1, 0, −1) as follows:[4]

$$\begin{aligned} ST_{it} - ST_t^c \geq h_{it} \qquad & VL_{it} = +1\,, \\ d_{it} < ST_{it} - ST_t^c < h_{it} \quad & VL_{it} = 0\,, \\ ST_{it} - ST_t^c \leq d_{it} \qquad & VL_{it} = -1\,. \end{aligned} \tag{6}$$

3. THE U.S. FEDERAL RESERVE

3.1 Monetary Policy Votes

To conduct our empirical examination, we constructed a data set of FOMC votes that includes 214 meetings conducted face-to-face and via conference call from 1978 to 2000.[5] Summary information from this voting sample is displayed in Table 1. Votes by FOMC member are recorded in the minutes for each meeting. Currently, the Federal Reserve publishes the minutes for each meeting with a lag of about six weeks. In general, FOMC dissents represented a little over 8% of total votes cast during the 1978–2000 period, with Board members and Bank presidents dissenting at rates of 7.7% and 8.9%, respectively. However, if votes cast by the Chairman are excluded (the Chairman sets the FOMC's agenda, frames the policy proposal, and thus never dissents), the dissent rate for Board members rises to 9.2%, *above* that for Bank presidents. This result contrasts with the findings of previous studies.

For a dissenting voter, meeting minutes generally indicate the reasons for the dissent, from which it is possible to discern the dissenter's desired policy stance relative to the majority. Of the 198 dissents registered in our sample (out of 2403

4. In this framework, the dependent variable will not capture the relative movements of the short-term interest rate target over time because the majority vote is mapped into the value of 0 for every t. This characteristic of our framework is not a concern, as our objective is to understand what factors explain voting behavior. In contrast, the dependent variable used by Tootell (1991a, 1991b) does track changes in the Fed's interest rate target over time, since it classifies dissents in favor of tighter (easier) policy identically to majority decisions for tightening (easing).

5. The annual number of meetings, face-to-face and via conference call, varies over the sample. In 1978 (and in earlier years), face-to-face meetings numbered 12 per year. A formal change reduced the annual number to eight in 1981. Conference calls at which votes were recorded have been rare since 1982. Between 1978 and 1982, such calls were important in the policy process. (Conference calls at which votes were not recorded are excluded from our analysis.) Data frequency is shown in the table below:

	Face-to-face	Calls		Face-to-face	Calls
1978	12	8	1988	8	1
1979	9	4	1989–97 (avg)	8	0
1980	11	6	1998	8	1
1981	8	2	1999–2000 (avg)	8	0
1982–87 (avg)	8	0	Total	192	22

votes cast),[6] exactly two-thirds or 132 votes were dissents for tighter monetary policy while one-third or 66 votes were dissents for easier monetary policy. Notably, dissenting votes cast by Board members were split about evenly between dissents in favor of easing and dissents in favor of tightening. Bank presidents dissented for tighter policy six times more frequently than they dissented for easier policy.

Table 1 provides information on voting patterns by Federal Reserve region, taking into account the affiliations of both Board members and Bank presidents. Over the sample period studied, Bank presidents from Cleveland, Richmond, and St. Louis registered dissent rates near 20% of votes cast (the number of dissenting votes was 20, 17, and 14, respectively). Bank presidents from Dallas and Minneapolis dissented more than 10% of the time (dissents totaled 8 and 10, respectively). Among Board members, dissent rates were nearly 18% for those hailing from the regions of Boston and Chicago. Interestingly enough, all of the 31 dissents cast by the Boston member of the Board were in favor of tighter monetary policy, while all of the 31 dissents cast by the Chicago member were in favor of easier policy.[7]

In other studies of FOMC voting, the regional identity of Board members has been ignored. Many of the studies assume that Board members retain no regional loyalty, but rather represent the federal bureaucracy in Washington or maintain an affiliation with the political party of the President who appointed them. By including the regional identities of Board members in our work, we are able to assess this assumption directly.[8]

3.2 Votes and Regional Unemployment

Our statistical analysis suggests that FOMC voting patterns are not insensitive to labor market conditions in Federal Reserve regions. We constructed monthly unemployment rates for each Federal Reserve district by weighting state unemployment rates by population shares in each region.[9] We examined the difference between the regional and national unemployment rate for each month of an FOMC vote. Table 2 provides a frequency distribution of this difference in unemployment rates sorted by vote (votes with the majority, dissents in favor of easier policy, and dissents in favor of tighter policy). The next three paragraphs discuss these striking results in some detail.

6. The number of total votes cast in our sample (2403) is slightly less than the potential number of votes (214 meetings and calls × 12 FOMC members = 2568) owing primarily to absences of Board members or vacancies on the Board. (When a Reserve Bank president is unable to vote at an FOMC meeting, an alternate typically votes in his or her place.)

7. Over the 1978–2000 period, the Boston seat was occupied by Henry Wallich, John LaWare, and Roger Ferguson, while the Chicago seat was filled by Nancy Teeters, Martha Seger, and Susan Phillips.

8. The 1913 Federal Reserve Act requires that Board members come from different districts, apparently reflecting fears that regional interests–those of Main Street or Wall Street–could come to dominate monetary policy. This requirement has occasionally been cited in public debate regarding Board nominations in recent years, including 1996 when the Clinton Administration reportedly considered nominating Felix Rohatyn (see Woodward 2000) and 1991 during the Senate hearings for Lawrence Lindsey's nomination.

9. Monthly unemployment data for all U.S. states except California begin in 1978; data for California are available from 1980. Population shares for each state in a Federal Reserve region were constructed at the county level using data from the 1990 census. (The unemployment rate for the San Francisco region in 1978–79 was calculated by renormalizing the population weights to exclude California for these two years.)

TABLE 1

VOTES OF FOMC MEMBERS, 1978–2000

		Federal Reserve region[a]											
Total		1	2	3	4	5	6	7	8	9	10	11	12
Votes	2403	243	401	203	111	267	116	273	135	77	183	221	173
Votes per meeting	11.2	1.1	1.9	1.0	0.5	1.3	0.5	1.3	0.6	0.4	0.9	1.0	0.8
Board	6.2	0.8	0.9	0.6	0.0	0.9	0.2	0.8	0.3	0.1	0.5	0.7	0.5
Bank	5.0	0.3	1.0	0.3	0.5	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3
Dissents as share of votes cast	8.2	13.9	2.5	0.5	18.0	10.5	6.0	11.4	10.4	14.3	9.3	7.2	5.2
Board	7.7	17.7	2.7	0.0	0.0	5.6	0.0	17.9	0.0	50.0	9.7	5.5	4.9
Bank	8.9	4.4	2.4	1.4	18.0	23.6	9.9	0.0	20.9	13.3	8.7	10.5	5.7
						Excluding Chairman							
Dissents as share of votes cast	9.0	13.9	3.5	0.8	18.0	10.5	6.0	11.4	10.4	14.3	9.3	7.2	6.1
Board	9.2	17.7	6.5	0.0	0.0	5.6	0.0	17.9	0.0	50.0	9.7	5.5	6.4
Bank	8.9	4.4	2.4	1.4	18.0	23.6	9.9	0.0	20.9	13.3	8.7	10.5	5.7
Dissents in favor of (as share of total dissents)													
Tightening	67.0	94.0	40.0	0.0	90.0	68.0	100.0	0.0	79.0	91.0	88.0	81.0	33.0
Easing	33.0	6.0	60.0	100.0	10.0	32.0	0.0	100.0	21.0	9.0	12.0	19.0	67.0

NOTES: [a]Federal Reserve regions as follows: 1 = Boston; 2 = New York; 3 = Philadelphia; 4 = Cleveland; 5 = Richmond; 6 = Atlanta; 7 = Chicago; 8 = St. Louis; 9 = Minneapolis; 10 = Kansas City; 11 = Dallas; 12 = San Francisco.

TABLE 2
UNEMPLOYMENT DIFFERENCE AND FOMC VOTES, 1978–2000

Regional unemployment rate minus U.S. unemployment rate (D)	Agree with majority	Dissent easier policy	Dissent tighter policy	Total votes
Total	2205	66	132	2403
$D > 2.5$	14	1	0	15
$2.0 < D \leq 2.5$	40	10	0	50
$1.5 < D \leq 2.0$	73	3	0	76
$1.0 < D \leq 1.5$	158	6	12	176
$0.5 < D \leq 1.0$	302	13	6	321
$0.0 < D \leq 0.5$	435	12	16	463
$-0.5 < D \leq 0.0$	400	9	23	432
$-1.0 < D \leq -0.5$	369	6	20	395
$-1.5 < D \leq -1.0$	206	3	32	241
$-2.0 < D \leq -1.5$	116	1	15	132
$-2.5 < D \leq -2.0$	43	1	1	45
$D \leq -2.5$	49	1	7	57
Mean value of D	−0.1	0.5	−0.7	−0.1
t-Value	0.54	4.41**	5.89**	

NOTES: **Significant at the 1% level. t-Test compares the mean value of D in relevant column with mean value of D for total votes.

Over the 1978–2000 period, FOMC voters, on average, had regional unemployment rates that were a touch below (0.1percentage point) the national average.

FOMC voters dissenting in favor of easier monetary policy had regional unemployment that was above the national rate by an average 0.5 percentage point. A t-test strongly rejects the null hypothesis that the mean difference in regional and national unemployment rates for these voters is equal to the mean difference for all votes cast. Notably, when the unemployment rate in a member's region was more than 1.5 percentage points below the national average, the member dissented for easier policy just 1.3% of the time. In contrast, when the unemployment rate in a member's region was more than 1.5 percentage points above the national average, the member dissented for monetary easing 9.9% of the time.

FOMC voters dissenting in favor of tighter policy had lower regional (relative to national) unemployment rates; the mean difference was −0.7 percentage point. A t-test strongly rejects the null hypothesis that the mean difference in unemployment rates for these voters is equal to the mean difference for all votes cast. The details of these results are roughly symmetric to those discussed in the previous paragraph. In those instances when the unemployment rate in a member's region was below the national average, the member dissented in favor of tightening 7.5% of the time but dissented in favor of easier policy only 1.6% of the time. Conversely, no member dissented in favor of tighter policy when his region's unemployment rate was more than 1.5 percentage points above the national average. However, when the unemployment rate in a member's region was more than 1.5 percentage points below the national average, he dissented in favor of tighter policy 9.8% of the time.

TABLE 3
VARIABLE DEFINITIONS

Variables	Lags[a]	Definition
		Dependent Variable
VL*i* or VOTE	0	Equal to 1 when voter from region *i* dissents for tighter monetary policy; equal to 0 when voter from region *i* agrees with the majority; equal to -1 when voter from region *i* dissents for easier monetary policy
		Characteristic Dummy Variables
BOARD	0	Equal to 1 if vote cast by Board member, 0 otherwise
MTG	0	Equal to 1 if vote cast at face-to-face meeting, 0 otherwise
MILLER	0	Equal to 1 from March 1978 through July 1979, 0 otherwise
VOLCKER	0	Equal to 1 from August 1979 through July 1987, 0 otherwise
TAPE[b]	0	Equal to 1 from November 1993 through the end of sample, 0 otherwise
		Regional Variables
UNDIFF*i*	1	Unemployment rate in voter *i*'s region minus national unemployment rate, monthly
GRVUND*i*	1	Gravity unemployment differential for voter *i*'s region calculated as the weighted-average of the unemployment differentials (UNDIFF) in the other 11 Federal Reserve regions, where the weights are inversely proportional to the distance in miles between the other 11 banks and bank *i*
TAILH*i*	1	Equal to 1 when the value of UNDIFF*i* is greater than 1.5; 0 otherwise
TAILL*i*	1	Equal to 1 when the value of UNDIFF*i* is less than -1.5; 0 otherwise
		National Variables
IP	1	One-month change in monthly industrial production
GAP	1	Output gap, monthly[c]
UN	1	Unemployment rate, monthly
CPI	1	One-month change in monthly consumer price index
FFUND	1	Fed funds rate, weekly (Wednesdays)
STANCE	1	Equal to 1 when the FOMC majority tightens monetary policy; equal to 0 when the FOMC majority leaves monetary policy unchanged; equal to -1 when the FOMC majority eases monetary policy

NOTES: [a]Column shows lags included in initial specification. Contemporaneous data are lag 0. [b]Intended to capture any change in voting behavior following the announcement that FOMC meetings were being taped and the decision to release transcripts of FOMC meetings to the public after a lag of five years. [c]Computed as the difference between actual real GDP and potential real GDP, quarterly, where potential GDP was calculated using a Hodrick–Prescott filter; monthly data were interpolated using capacity utilization.

4. ESTIMATION AND RESULTS

The sample of FOMC votes from 1978 to 2000 was used to define a limited dependent variable VL as in Equation (6) above. Ordered logit was used to estimate the voting equation. We deemed this empirical technique more appropriate for addressing our problem than multinomial logit, commonly used in other studies of FOMC voting. Ordered logit takes advantage of the information provided by the implicit ordering of the dependent variable (where, at a particular meeting, votes in the -1 category reflect a preference for easier monetary policy than votes in the 0 category, and votes in the $+1$ category reflect a preference for tighter monetary policy than votes in the 0 category) to produce a single set of coefficient estimates and standard errors along with estimated threshold parameters or break points for each category.

Our initial specification of the ordered logit equation included a large set of independent variables, with characteristic, regional, and national variables as listed in Table 3.

The regional and national variables were lagged one month relative to the date of the FOMC meeting.[10]

Characteristic binary variables were used to detect differences in voting behavior between officials from the main office and the regional offices (BOARD), between face-to-face meetings and conference calls (MTG), under different Federal Reserve Chairmen during the sample period (MILLER and VOLCKER), and following the revelation that meetings were being tape-recorded (TAPE).

Regional economic developments were represented in the initial specification by the difference between the unemployment rate in the FOMC voter's region and the national rate (UNDIFF). In addition, we tested a regional "gravity" unemployment rate (GRVUND) for each region that was a distance-weighted average of the unemployment differentials for the 11 other regions. The gravity unemployment variable was intended to detect whether votes were sensitive to developments in regions that were close neighbors to the home region of the voter. Finally, we added two variables designed to pick up nonlinear effects in extreme cases: TAILH, a dummy set equal to one for values of UNDIFF greater than or equal to 1.5 percentage points; and TAILL, a dummy set equal to one for values of UNDIFF less than or equal to -1.5 percentage points.

National variables measured the change in and the level of real economic activity (growth in industrial production, IP; output gap, GAP; and unemployment rate, UN) and inflationary pressures (change in consumer prices, CPI) in the month prior to the FOMC vote. In addition, we included variables to test the sensitivity of dissents to the level and change of monetary stimulus in the economy: the market Fed funds rate the week prior to the FOMC vote (FFUND), and a discrete variable that indicated whether monetary policy had been tightened, eased, or left unchanged at the previous FOMC vote (STANCE).

4.1 Coefficient Estimates

Initial estimation results are shown in Table 4. Our estimation strategy was as follows: from the initial specification, we first eliminated all characteristic and regional variables that were not significant at the 10% level; we then dropped insignificant national variables one-by-one from the equation (also based on a 10% level of significance). Notably, few of the explanatory variables included initially survive in the preferred specification. Of the national variables, only lagged inflation and the Fed funds rate appear to explain dissents from the FOMC majority. Higher lagged inflation (CPI) raises the likelihood that voters will dissent for tighter policy and reduces the likelihood of a dissent for easier policy. A higher level of short-term interest rates (FFUND) in the week prior to an FOMC meeting is associated with a reduction in the probability

10. For the most part, the time series variables are released with a one-month lag. Availability at the time of an FOMC meeting depends on when during a particular month a meeting occurred, but we deemed a one-month lag to be a reasonable approximation to the information set available to policymakers.

TABLE 4
COEFFICIENT ESTIMATES (SAMPLE PERIOD: 1978–2000)

	Initial specification		Final equation	
Dependent variable: VOTE	Estimate	*t* Ratio	Estimate	*t* Ratio
BOARD	−0.956	−5.88	−0.944	−5.85
MTG	0.749	2.57	0.641	2.24
MILLER	0.536	1.47		
VOLCKER	−0.050	−0.15		
TAPE	0.218	0.59		
UNDIFF (-1)	−0.550	−4.83	−0.579	−8.08
GRVUND (-1)	0.456	1.57		
TAILH (-1)	−0.479	−1.24		
TAILL (-1)	−0.127	−0.41		
IP (-1)	0.084	0.77		
GAP (-1)	0.018	0.18		
UN (-1)	0.099	0.51		
CPI (-1)	0.052	1.87	0.064	2.74
FFUND (-1)	−0.041	−1.06	−0.055	−2.01
STANCE (-1)	0.035	0.22		
THRESHOLD1	−3.138	−2.39	−3.861	−10.15
THRESHOLD2	3.922	2.98	3.133	8.49

of a tightening dissent (and an increase in the probability of an easing dissent).[11] Other national variables may be critical in setting the overall stance of monetary policy, but they do little to explain the tighter or easier policy preferred by dissenters.

The estimated coefficient on the regional variable UNDIFF is negative and highly statistically significant. This result indicates that a rise in the regional unemployment rate of the voter (for a given national rate) raises the likelihood of an easing dissent and reduces the likelihood of a tightening dissent.[12] The significant, negative coefficient on the BOARD variable indicates that Board members are more likely than Bank presidents to dissent for easier policy and less likely than Bank presidents to dissent for tighter policy. This result is consistent with the general finding in the FOMC voting literature that Bank presidents tend to be more hawkish than Board members. Meetings conducted face-to-face are associated with a significantly greater likelihood of a dissent for tighter policy than meetings held via conference call. (Monetary policy is tightened in roughly half of all the conference calls but in just 20% of face-to-face meetings. Thus, the coefficient on MTG captures the fact that on occasions when the FOMC tightens policy, dissents for (even) tighter policy are relatively infrequent.)

Table 5 displays estimation results for seven alternative specifications of the preferred equation. We discuss each alternative specification before turning to the estimated marginal effects. In the first alternative specification, the Chairman's votes are dropped from the sample. The Fed Chairman plays a unique role in FOMC meetings,

11. Taking the estimated coefficients on CPI and FFUND together, the results suggest that a higher *real* Fed funds rate is associated with a reduced likelihood of a tightening dissent and an increased likelihood of an easing dissent.

12. This coefficient remains highly significant even when Martha Seger, who dissented frequently and who often referred to developments in her home district, is dropped from the sample.

TABLE 5
COEFFICIENT ESTIMATES, ALTERNATIVE SPECIFICATIONS

Dependent variable: VOTE	1. Drop votes cast by FOMC Chairman		2. Drop votes cast by Bank presidents		3. Drop votes cast by Board members	
	Estimate	*t* Ratio	Estimate	*t* Ratio	Estimate	*t* Ratio
BOARD	–0.919	–5.69				
MTG	0.639	2.23	0.451	1.13	0.805	1.84
UNDIFF (–1)	–0.566	–7.99	–0.893	–8.97	–0.219	–2.13
CPI (–1)	0.064	2.74	0.084	2.58	0.039	1.16
FFUND (–1)	–0.055	–1.99	–0.093	–2.51	–0.003	–0.08

Dependent variable: VOTE	4. Add political indicator to alternative specification 2		5. Replace UNDIFF with cyclical and structural		6. Add regional dummies for board and bank[a]	
	Estimate	*t* Ratio	Estimate	*t* Ratio	Estimate	*t* Ratio
BOARD			–0.949	–5.87		
DEMOCRAT	–0.360	–1.47				
MTG	0.437	1.10	0.639	2.25	0.669	2.29
UNDIFF (–1)	–0.871	–8.68			–0.356	–4.01
STRUC (–1)			–0.639	–7.87		
CYC (–1)			–0.234	–1.02		
CPI (–1)	0.079	2.46	0.064	2.74	0.055	2.31
FFUND (–1)	–0.073	–1.87	–0.058	–2.09	–0.035	–1.23

Dependent variable: VOTE	7. Replace UNDIFF and add regional dummies[a]	
	Estimate	*t* Ratio
MTG	0.673	2.30
STRUC (–1)	–0.332	–3.07
CYC (–1)	–0.439	–1.83
CPI (–1)	0.055	2.30
FFUND (–1)	–0.034	–1.19

NOTES: [a]Regional dummy variables for Board members and Bank presidents included but not reported.

by making the policy proposal on which other members vote; thus, essentially by construction, the Chairman never dissents.[13] The coefficients and *t*-ratios estimated when the Chairman's votes are excluded are nearly identical to the empirical results obtained using the entire voting sample.

The second and third alternative specifications split the sample into votes cast by Board members and votes cast by Bank presidents. The coefficient on the UNDIFF variable is much larger for Board members (alternative 2) than for Bank presidents (alternative 3), although both the voting samples yield a significant, negative parameter estimate. These results suggest, somewhat surprisingly, that it is officials in the central bank's main office, rather than those in its regional offices, who have tended to demonstrate greater sensitivity to regional developments. Notably, other variables in the regression for the Bank presidents also fall in significance relative to the final equation,

13. Blinder et al. (2001, p. 39) discuss the powerful role of the Fed's Chairman as follows: "The Fed's FOMC does vote in a formal sense, but it is widely known that individual members often do not vote their true preference. Instead, each committee member decides whether to support or oppose the Chairman's policy recommendation, which is almost always made first. And Fed traditions dictate that a member should 'dissent' only if they find the majority's (that is, the Chairman's) opinion unacceptable."

suggesting that dissents by Bank presidents may be more idiosyncratic (or at least more difficult to model) than those by Board members.

In the fourth alternative specification, we added a political indicator to the equation for Board members (alternative specification 2). The political dummy (DEMOCRAT) was set equal to unity when the President who appointed the Board member was a Democrat, and zero otherwise. The estimated coefficient on UNDIFF remained negative and highly significant when political effects were included. Contrary to the findings in other studies, the parameter on DEMOCRAT was statistically insignificant, although it was negative—in accordance with the view that Democrats are more likely to dissent for lower interest rates. (However, if UNDIFF is excluded from the regression, DEMOCRAT becomes statistically significant, suggesting that the political variables used in prior studies may have proxied for missing regional economic information.)

In the fifth alternative, we assessed whether dissenting votes have been driven more by cyclical deviations or by longer-term differences in regional and national labor-market conditions. To address this issue, we decomposed UNDIFF into two components representing its longer-run average (STRUC) and its shorter-term deviation (CYC), as follows: STRUC was defined as the difference between the 60-month centered moving average means of the regional unemployment rate and the national unemployment rate;[14] CYC was defined as the difference between the demeaned regional and national unemployment rates.[15] In the resulting regression, the parameter estimate for STRUC is negative and highly significant. The coefficient on CYC is of the anticipated sign, but is smaller in magnitude and is not statistically significant (t-value of -1.0). This result suggests that policymakers tend to respond to longer-term movements in the unemployment differential. That being said, we also tested an equation in which CYC was included but STRUC was omitted; in that case, the coefficient on CYC was negative and significant.

In the sixth alternative specification, we added dummy variables to control for the regional identities of both Board members and Bank presidents.[16] The estimated coefficient on UNDIFF remains negative and highly significant in this alternative, although the magnitude of the coefficient on UNDIFF declines considerably. In the seventh alternative specification, we combined the UNDIFF decomposition with the regional dummy variables. The coefficient on STRUC remains negative and highly significant, but the magnitude of the coefficient is about halved relative to the fifth alternative specification. In contrast, the coefficient on CYC increases in magnitude and its t-value rises markedly relative to the fifth specification.

14. Regional monthly unemployment rates prior to 1978 were constructed by interpolating annual data for the states.

15. Algebraically, this may be seen as follows:

$$\text{UNDIFF}_{it} = u_{it} - u_{Nt} = [(u_{it} - \bar{u}_i) - (u_{Nt} - \bar{u}_N)] + (\bar{u}_i - \bar{u}_N),$$

where u_{it} is unemployment in region i at time t, u_{Nt} is national unemployment at time t, and a bar over a variable represents its 60-month moving average mean. The term in brackets, CYC, represents the cyclical position of region i relative to the cyclical position of the country as a whole. The final term, STRUC, captures longer-term differences in labor-market performance.

16. In the case of Board members, there were not enough observations from Cleveland and Minneapolis to estimate dummy variables for these districts.

Our testing demonstrates that the importance of the unemployment differential is robust to a variety of specifications. The unemployment differential has a negative, statistically significant effect on voting behavior. Although the estimated impact of this differential diminishes if regional dummy variables are included in the estimation, the resilience of the result is striking.

In hopes of broadening the set of regional variables, we gathered monthly FDIC data on bank failures at the county level for number of failed institutions, value of assets at failed institutions, and value of deposits at failed institutions; from these county-level data, we constructed corresponding series for each Federal Reserve district. We estimated many equations allowing the bank failure variables to enter in a variety of ways, but these variables never proved to be statistically important in explaining voting behavior.

4.2 Marginal Effects

Table 6 displays marginal effects for our final equation and the seven alternative specifications. The marginal effects give the change in the likelihood of each voting category for a small change in an explanatory variable.

For the final equation, membership on the Fed's Board reduces the probability of dissenting for tighter monetary policy by 4.2 percentage points and increases the likelihood of agreement with the majority or dissenting for easier policy by 2.4 and 1.8 percentage points, respectively. At a face-to-face meeting of the FOMC, members are much more likely to register a tightening dissent and much less likely to register an easing dissent (2.1 and 1.6 percentage points, respectively) than during a conference call. An increase of one percentage point in a region's unemployment rate relative to the national rate reduces the probability that a voter from that region will dissent for tightening by 2.4 percentage points. The effects for CPI and FFUND are smaller but still economically meaningful. An increase of one percentage point in consumer price inflation in the month prior to the monetary policy vote raises the probability of a tightening dissent by 0.2 percentage points (and reduces the likelihood of an easing dissent or agreement with the majority by a similar amount). The results for the Fed funds rate are exactly equal in magnitude to those for inflation but with the opposite sign, again pointing to an important role for the real Fed funds rate in influencing FOMC dissents. The calculated marginal effects of the explanatory variables are very similar for the first alternative specification, in which the votes of the Chairman are dropped from the sample.

For alternatives two and three, a one percentage point increase in a region's unemployment rate (for a given national rate) reduces the probability that Board members and Bank presidents will dissent for tightening, but the reduction in probability for the former is larger (2.2 versus 1.5 percentage points, respectively). Moreover, for Board members, the reduced probability of a tightening dissent in the face of higher regional unemployment is entirely reflected in a higher probability of an easing dissent, while for Bank presidents it mainly raises the likelihood of agreement with the FOMC majority. Both Board members and Bank presidents are more likely to dissent for tighter policy when inflation is high.

TABLE 6
MARGINAL EFFECTS[a] (PERCENTAGE POINTS)

	Final equation			1. Drop votes cast by FOMC Chairman		
Dependent variable: VOTE	Pr[VL= –1]	Pr[VL = 0]	Pr[VL = 1]	Pr[VL = –1]	Pr[VL = 0]	Pr[VL = 1]
BOARD	1.8	2.4	–4.2	2.0	2.4	–4.4
MTG	–1.6	–0.5	2.1	–1.8	–0.6	2.4
UNDIFF (–1)	1.1	1.3	–2.4	1.2	1.4	–2.6
CPI (–1)	–0.1	–0.1	0.2	–0.1	–0.2	0.3
FFUND (–1)	0.1	0.1	–0.2	0.1	0.1	–0.2
	2. Drop votes cast by Bank presidents			3. Drop votes cast by Board members		
Dependent variable: VOTE	Pr[VL = –1]	Pr[VL = 0]	Pr[VL = 1]	Pr[VL = –1]	Pr[VL = 0]	Pr[VL = 1]
BOARD						
MTG	–1.3	0.3	0.9	–1.2	–3.1	4.3
UNDIFF (–1)	2.2	0.0	–2.2	0.2	1.3	–1.5
CPI (–1)	–0.2	–0.0	0.2	–0.0	–0.2	0.2
FFUND (–1)	0.2	0.0	–0.2	0.0	0.0	–0.0
	4. Add political indicator to alternative specification 2			5. Replace UNDIFF with cyclical and structural		
Dependent variable: VOTE	Pr[VL = –1]	Pr[VL = 0]	Pr[VL = 1]	Pr[VL = –1]	Pr[VL = 0]	Pr[VL = 1]
BOARD				1.8	2.4	–4.2
DEMOCRAT	0.9	–0.1	–0.8			
MTG	–1.2	0.3	0.9	–1.6	–0.5	2.1
UNDIFF (–1)	2.1	0.1	–2.2			
STRUC (–1)				1.2	1.4	–2.6
CYC (–1)				0.5	0.5	–1.0
CPI (–1)	–0.2	–0.0	0.2	–0.1	–0.1	0.2
FFUND (–1)	0.2	0.0	–0.2	0.1	0.1	–0.2
	6. Add regional dummies for Board and Bank[b]			7. Replace UNDIFF and add regional dummies[b]		
Dependent variable: VOTE	Pr[VL = –1]	Pr[VL = 0]	Pr[VL = 1]	Pr[VL = –1]	Pr[VL = 0]	Pr[VL = 1]
MTG	–0.8	–0.4	1.2	–0.8	–0.4	1.2
UNDIFF (–1)	0.3	0.5	–0.8			
STRUC (–1)				0.3	0.5	–0.8
CYC (–1)				0.4	0.6	–1.0
CPI (–1)	–0.0	–0.1	0.1	–0.0	–0.1	0.1
FFUND (–1)	0.0	0.1	–0.1	0.0	0.1	–0.1

NOTES: [a]By definition, the marginal effects sum to zero across categories. [b]Regional dummy variables for Board members and Bank presidents included but not reported.

Alternative specification four shows that Board members appointed by Democrats dissent for easier policy 0.9 percentage point more frequently than other Board members and dissent for tightening 0.8 percentage point less frequently. In alternative specification five, when UNDIFF is replaced with its structural and cyclical components, the marginal effects for STRUC are very similar to those for UNDIFF in the final equation. When regional dummy variables are included in the regression in alternatives six and seven, the marginal effects associated with the relevant regional unemployment variable (UNDIFF in alternative six and STRUC in alternative seven) diminish somewhat, as do those for the CPI.

5. SUMMARY AND CONCLUSIONS

We have shown that the evolution of regional unemployment rates has a statistically significant effect on the voting patterns of Federal Reserve policymakers. Our "final" specification indicates that, holding everything else equal, an FOMC member who hails from a district in which unemployment is one percentage point above the national average will dissent for tighter policy 2.4 percentage points less frequently than would an FOMC member from a district where unemployment is at the national average. Given that tightening dissents were about 5.5% of all votes cast during our sample period, such an FOMC member would dissent for tighter policy just over 3% of the time. These results shed new light on the determinants of FOMC voting patterns and also appear to have important implications for other central banks—such as the ECB—where regional affiliations may be more strongly held than is the case for the Federal Reserve.

An important remaining question is whether the regional influences that we identify have had any systematic implications for the level of U.S. interest rates. We conjecture that this likely has not been the case. First, these regional effects operate symmetrically in the following sense. Members with regional unemployment rates above the national average dissent for tighter policy less frequently than do others, but members with regional unemployment rates below the national average dissent for tighter policy more frequently. Thus, regional considerations appear to affect individual members' decisions to dissent but should have little systematic effect on the total number of dissents, given our result that unemployment in the districts of FOMC voters was on average about equal to the national average (see Table 4). Second, as noted above, the Chairman of the FOMC holds enormous power to set the agenda for the committee and influence policy. Given a strong presumption that the Chairman's preferences reflect national concerns, it seems unlikely that regional considerations have significantly biased U.S. monetary policy. More likely, FOMC dissents reflect a desire to demonstrate sensitivity to developments in the home region in a way that does not antagonize the Chairman or bias the overall stance of monetary policy.

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