Regional, individual and political determinants of FOMC members' key macroeconomic forecasts

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Abstract:

We study FOMC members' individual forecasts of inflation and unemployment in the period 1992 to 2004. Our results imply that Governors and Bank presidents forecast differently with Governors submitting lower inflation and higher unemployment rate forecasts than Bank presidents. What is more, we find robust evidence of a regional bias in the formulation of regional Bank presidents' individual forecasts of inflation and unemployment. Further results indicate that Bank presidents' regional bias is more pronounced during the year prior to their elections or for non-voting Bank presidents. Career backgrounds or political affiliations do also explain individual forecast behavior. (*JEL*: E37, E52, E58)

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I.   INTRODUCTION

We analyze the forecast determinants of Federal Open Market Committee (FOMC) members. Individual forecasts of key macroeconomic factors (such as unemployment and inflation rates) are crucial indicators for determining optimal monetary policy when a forward-looking policy rule is considered.[1] Since the FOMC is a committee consisting of twelve voting members (seven members of the Board of Governors[2] and five voting regional Federal Reserve Bank presidents) disagreement about the optimal monetary policy stance (as shown in many studies) does not only lead to dissenting votes in the FOMC but may also lead to dispersion of forecasts among FOMC members. Thus, analyzing the determinants of real time inflation and unemployment rate forecasts promises insides about the differences in the monetary policy preferences among FOMC members.

This paper aims to analyze the determinants of FOMC members' individual inflation and unemployment rate forecasts in the period 1992-2004. We add to the existing literature not only by considering a broadest set of potential regional, individual, and political characteristics, but also by testing determinants (such as career backgrounds, electoral cycles, political affiliation) not considered in the FOMC forecasting literature before. Our results indicate considerable differences in the economic forecasts between Governors and Bank presidents. Moreover, forecasts of Bank presidents FOMC members are influenced by the unemployment rate in their district suggesting a regional bias. FOMC members' career backgrounds also affect their individual forecasts. For example, FOMC members with career backgrounds in the government

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[1] Haldane and Batini (1999) as well as Rudebusch and Svensson (1999) compare monetary policy rules and conclude that forward-looking rules including forecasts of inflation instead of actual values can improve monetary policy performance relative to a simple benchmark rule (such as proposed in Taylor 1993). Clarida et al. (1998) find that so called G3 central banks (Germany, Japan, US) implicitly followed a type of inflation targeting regime since 1979, and, thus, all three central banks indirectly applied a forward-looking framework. Orphanides (2002) find periods – such as during the 1970's or mid-90's – when a forecast-based rule did even a better job in describing FOMC's monetary policy. Orphanides and Wieland (2008) use a forecast-based Taylor rule framework and conclude that interest rate decisions in the FOMC are driven by their own projections rather than realized outcomes.

[2] When we use the terms Governors or Board members we refer to members of the Board of Governors throughout the paper.

sector (Non-governmental organizations – NGOs) tend to forecast lower (higher) inflation. FOMC members appear to show some degree of politically biased and opportunistic behavior when making their forecasts. For example, Bank presidents' forecasts are more responsive to economic conditions in their district during the year prior to their elections relative to non- or post-election years. Moreover, the regional bias in Bank presidents' inflation forecasts is more pronounced when they do not vote in the FOMC (relative to periods when they have voting right in the FOMC). Governors appointed by a Democratic U.S. President tend to forecast higher unemployment rates than Governors appointed by a Republican U.S. President.

By analyzing the determinants of forecast determination in the FOMC, we consider several characteristics found to shape monetary policy preferences as measured by FOMC members' dissenting interest rate votes in the FOMC as discussed in the following. Several interesting studies have found a regional bias in FOMC voting. For example, FOMC members representing Federal Reserve districts with a favorable economic environment (such as low unemployment rates and high house prices) typically favor higher interest rates while those representing economically less successful districts would vote for lower interest rates in the FOMC (see, e.g., Meade and Sheets, 2005, Eichler and Lähner, 2014b, Chappel et al. 2008). Board members and Bank presidents do also show different voting patterns with Board members generally pursuing a "dovish" and Bank presidents a "hawkish" monetary policy stance when dissenting in FOMC meetings (Meade and Sheets, 2005, Eichler and Lähner, 2014b).

Further strands of the literature link individual career concerns or political aspects to specific voting behavior in the FOMC or in the MPC (Monetary Policy Committee). For instance, Harris et al. (2011) show that members with career backgrounds in the Bank of England or industry tend to favor higher interest rates whereas the opposite is true for members having worked in NGOs. In the case of the FOMC, preference for an easier monetary policy

stance is found for members with a career in the governmental sector (Gildea 1990; Havrilesky and Schweitzer 1990; Havrilesky and Gildea 1991; Chappell et al. 1995) or with a career in the Board's staff (Havrilesky and Gildea 1991; Chappell et al. 1995). On the contrary, members with a career in regional Federal Reserve Banks or academia are found to have a preference for tighter monetary policy (Havrilesky and Gildea 1991). Finally, Eichler and Lähner (2014a) find that committee members with a career in the finance branch or in regional Fed banks tend to focus on inflation stabilization whereas members with a career in government, industry, academia and NGOs tend to focus on output stabilization.

Literature on voting behavior also show that political aspects play a role when shaping individual monetary policy preferences. For the MPC, Harris and Spencer (2009) and Harris et al. (2011) find evidence that external members have a tendency to prefer easier monetary policy than internals. In the case of the FOMC, some studies conclude that committee members with a "Republican" affiliation tend to vote in favor of a tighter monetary policy stance as opposed to members with a "Democratic" affiliation who show a tendency of favoring an easier monetary policy stance (e.g., Havrilesky and Gildea 1992, 1995; Chappell et al. 1993, 1995; Tootell 1996). Chappell et al. 1993 has found a similar case for the incumbent administration. Members serving under Democratic administrations tend to prefer lower interest rates than members serving under Republican administrations. Keeping all these different channels of possible influences in mind, the formation of different beliefs about the "true" future path of the economy may lead not only to dissenting votes in FOMC meetings but also to the occurrence of forecast dispersion among FOMC members which is the focus of our study.

We base our study on individual forecast data provided by the Federal Reserve Bank of Philadelphia in the period of 1992 to 2004. This dataset was firstly introduced by Romer (2010) and subsequently utilized in several interesting works. Several studies find that differences in economic forecasts among FOMC members helps explaining their different views about the

appropriate monetary policy rate. For instance, Banternghansa and McCracken (2010) present descriptive evidence of higher forecast disagreement for FOMC members casting dissenting votes. Fendel and Rülke (2012) show that the dispersion in individual forecasts among FOMC members well explains preferred interest rate votes in the FOMC when individual Taylor rules are considered. Eichler and Lähner (2014a) find that dissenting votes of FOMC members are determined by their own projections of inflation and unemployment with Bank presidents' votes being more responsive to individual inflation forecasts and Board members' votes being more responsive to individual unemployment forecasts.

Another strand of papers focuses on the determinants of FOMC members' forecasts. Ellis and Liu (2013) find that Bank presidents submit higher real GDP (Gross Domestic Product) growth and inflation forecasts and lower unemployment rate forecasts than Governors. Sheng (2015) finds weak evidence for a regional bias in real GDP growth forecasts of FOMC members. Additionally, he concludes that non-voting Bank presidents do not differ from their voting counterparts, as opposed to Tillmann (2011) who find that non-voting FOMC members tend to submit extreme inflation forecasts to influence policy. What is more, particular non-voting FOMC members show a tendency of anti-herding when submitting inflation forecasts, i.e. they place them more away from consensus (Rülke and Tillmann, 2011). McCracken (2009) argues that FOMC members have an incentive to forecast strategically, i.e. they submit forecasts in line with their preferences of being either an inflation hawk (higher desired interest rates) – possibly leading to higher individual inflation forecasts – or an inflation "dove" (lower desired interest rates) – possibly leading to lower individual inflation forecasts regardless of the stance of the economy. Pierdzoch et al. (2013) find an asymmetric loss function among FOMC members derived from individual forecasts. However, they conclude that individual forecasts remain biased even when controlling for a specific functional form. Tillmann (2010) finds that FOMC members reveal an implicit trade-off between inflation and unemployment in the short run when submitting individual forecasts, however the slope of the so called Phillips curve

changes over the sample period. El-Shagi and Jung (2015) use the forecast data to derive individual reaction functions of FOMC members. They conclude that regional Bank presidents' reaction functions did not systematically differ from the reaction function of the Chairman.

The papers mentioned above focus on a distinct but rather narrow set of potential determinants of forecast dispersion in the FOMC. We aim to contribute to the literature by considering a broadest set of potential regional, individual, and political characteristics used in the FOMC voting literature in order to explain forecast dispersion among FOMC members. In this way, we are not only able to better explain differences in individual forecasts in the FOMC but also test for determinants (such as career backgrounds, electoral cycles, and political affiliation) not considered in the FOMC forecasting literature before. We are able to detect systematic differences between FOMC members' individual forecasts attributed to regional conditions, career and/or political considerations.

Using random effects panel models, we find that Board members and Bank presidents behave differently with Board members submitting lower inflation and higher unemployment rate forecasts than Bank presidents. This result supports the finding of "hawkish" Bank presidents and "dovish" Governors established in other strands in the FOMC literature. Moreover, we present robust evidence that individual forecasts of inflation and unemployment of *de facto* regionally affiliated Bank presidents are driven by regional macroeconomic conditions – such as the regional unemployment rate. This result is much weaker for Governors whose regional affiliation is more on a *de jure* basis.[3] When the district's unemployment rate increases Bank presidents' forecasts of inflation (unemployment) decrease (increase), and vice versa. Individual career backgrounds, political considerations and institutional factors do also

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[3] By law, Governors are appointed by the U.S. President whereas district Bank presidents are elected by their regional Bank's Board of Directors. What is more, since Governors are located in Washington D.C. their regional affiliation in the FOMC is assumed to be limited. Bank presidents, though, live and work in the district they represent and are supposed to have a higher regional affiliation through frequent contacts to local workers and businessmen.

add value in explaining forecast dispersion. In more detail, by applying interaction models, we show that Bank presidents' regional bias is more pronounced during the year prior to their elections. Moreover, taking their voting status into account, we find that the regional bias in Bank presidents' inflation forecasts is more pronounced during a non-voting status (relative to periods when they have voting right in the FOMC).

FOMC members' career backgrounds also appear to influence the formation of their forecasts. Committee members with a career in the government sector (NGOs) tend to forecast lower (higher) inflation. Bank presidents and Governors with a career background in regional Federal Reserve banks show significant lower unemployment rate forecasts. While Reserve bank presidents with a career in the Board staff and academia tend to forecast lower unemployment rates the opposite is true for Governors with a Board staff and academia background. Finally, Governors appointed by a Democratic administration tend to forecast higher unemployment rates than Governors appointed by a Republican administration.

The remainder of this paper is as follows: Section 2 gives a brief summary of the data used and derives some hypotheses on forecast determinants. Section 3 presents the results of baseline and interaction models. Section 4 concludes.

II.   DATA AND HYPOTHESES

Semi-annual data of FOMC members' inflation, nominal/real GDP growth, and unemployment rate forecasts is provided by the Federal Reserve Bank of Philadelphia.[4] This dataset includes projections of Governors as well as voting and non-voting Bank presidents. In the period we investigated, FOMC members' forecasts were prepared prior to the February and July meetings of the FOMC in conjunction with the semi-annual Monetary Policy Report to Congress.[5]

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[4] Since these forecast data is made available to the public only with a ten year lag (and only updated annually), latest forecasts included in the dataset refer to 2004.

[5] Forecast frequency was changed to four forecasts a year by November 2007.

February forecasts include projections of annual fourth-quarter-to-fourth-quarter growth of (nominal and real) GDP and inflation rate[6], as well as the fourth quarter forecast of the unemployment rate for the current year, and July forecasts include both forecasts for the current and the following calendar year. In this study, we focus on forecasts made for the same year within a given year – i.e. (three-quarter-ahead) February and (one-quarter-ahead) July projections. Hence, our panel data set consists of 440 individual forecasts of inflation and unemployment rate in the period of 1992 – 2004 covering the entire period currently available to the public.[7]

<Insert Figures 1-4 around here>

Figures 1 to 4 illustrate the dispersion of inflation and unemployment rate forecasts among Bank presidents and Board members, respectively. Generally, Bank presidents tend to submit higher inflation forecasts than Board members. Additionally, Bank presidents show a wider range of inflation forecasts with a standard deviation of 0.227 (which compares to a standard deviation of inflation forecasts of 0.180 for Board members). Figures 3 and 4 illustrate that Board members generally forecast higher unemployment rates than Bank presidents. Moreover, the standard deviation of unemployment rate forecasts for the Board members (0.144) is higher than for the Bank presidents (0.119). A sensible ad hoc explanation for these results may be the differences in the monetary policy preferences discussed in the literature with "hawkish" Bank presidents being more focused on inflation stabilization and "dovish" Board members being more focused on output stabilization.

In order to study the determinants of FOMC members' inflation and unemployment rate forecasts, we largely borrow from the literature on dissenting votes in the FOMC. Several

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[6] From 2000 onwards, FOMC members' projections of inflation include growth rates of the Personal Consumption Expenditures (PCE) index rather than Consumer Price Index (CPI) used before.

[7] As mentioned before, FOMC members do also forecast nominal and real GDP growth but we find no regional bias in Bank president's real GDP growth forecasts. In order to save space, we excluded those results.

papers find a regional bias in FOMC voting behavior where a higher (lower) regional unemployment rate – relative to the national level – makes dissents in favor of monetary easing more (less) likely. Therefore, we assume that a committee member facing high levels of unemployment in his/her district will forecast lower inflation rates and higher unemployment rates for the future. Similarly, we test the effect of regional housing prices on forecasts. We assume that FOMC members representing districts with booming house prices will forecast higher inflation rates and lower unemployment rates.

Voting literature generally links Governors to a more dovish and Bank presidents to a more hawkish monetary policy stance. Based on this, we predict lower inflation and higher unemployment rate forecasts for Governors than for Bank presidents in order to justify a more expansionary monetary policy in the future.

Career backgrounds may also shape monetary policy preferences of FOMC members. We count the number of years an FOMC member has worked in a full time position in academia, government, industry, finance, NGO, Board of Governors, or Federal Reserve Bank before becoming Federal Reserve Bank president or Board member. For instance, FOMC members with a career in the Government sector may more likely put emphasis on fighting unemployment, while members with a career background in a Federal Reserve Bank may more likely focus on fighting inflation. Given such differences in the monetary policy stabilization goals, it seems reasonable to expect high unemployment rate forecasts for FOMC members with career backgrounds in Government and high inflation forecasts for FOMC members with career backgrounds in a Federal Reserve Bank.

Individual forecast behavior may also be biased by political considerations. We incorporate a dummy indicating the political affiliation of the current administration (1 = Democratic; 0 = Republican). Moreover, we include a dummy representing the political affiliation of Governors

(= 1 if Governor was appointed by Democratic president; 0 otherwise).[8] Based on Chappell et al. (1993) who finds that partisan influence links Democratic (Republican) administrations to lower (higher) preferred interest rates of FOMC members, we predict that forecasts of FOMC members may be biased by political considerations as well. Therefore, under Democratic (Republican) presidencies FOMC members might forecast lower (higher) inflation and higher (lower) unemployment rates. This prediction should be the case particularly for Governors appointed by a Democratic US President.

Forecast behavior of FOMC members may also follow an electoral cycle. Firstly, to win elections it is quite preferable for the current administration to publish data signaling a well-functioning and sound macroeconomic environment. Therefore, assuming (implicit) political pressure of the incumbent administration, FOMC members may have an incentive to submit lower unemployment and inflation forecasts in the pre-election year. In order to control for this possible opportunistic behavior we include a dummy indicating the pre-election year of the U.S. President (coded as 1; 0 otherwise). Another type of electoral cycle may stem from the election dates of Federal Reserve Bank presidents. Bank presidents are elected for a five year term by the Board of Directors of their district's Federal Reserve Bank. During the pre-election year, Bank presidents may therefore have an incentive to align their forecasting behavior with the monetary policy needs of their district in order to increase their re-election probability.

Our dataset contains a dummy whether a regional Bank president is a current voting member (coded as 1) or not (coded as 0). Voting and non-voting Bank presidents attend all FOMC meetings – though only five out of twelve Bank presidents have a voting right where the New York Fed president is a constant voting member whereas the remaining four seats rotate annually. From this perspective, some studies find different forecast patterns related to the

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[8] Members of the Board of Governors are appointed by the U.S. President and confirmed by Senate. Literature of Political Monetary Cycles find that "Democratic Governors" may favor easier monetary policy.

voting status. For strategic reasons, non-voting Bank presidents' inflation forecasts are scattered more away from consensus (Rülke and Tillmann 2011). What is more, non-voting Bank presidents also show a tendency of submitting more extreme inflation forecasts (Tillmann 2011). Hence, we predict higher inflation forecasts submitted by non-voting Bank presidents.

The regressions also account for the number of years being a member of the FOMC (Committee experience). A possible hypothesis may be that committee members with longer experience feel less pressure to converge to the committee consensus and thus submit more extreme forecasts.

To control for the stance of the U.S. economy, the forecast horizon adjusted Greenbook unemployment rate and inflation rate forecasts, as well as the Federal Funds rate are included.

III.   RESULTS

Our dataset consists of 440 individual forecasts of inflation (or unemployment rate) as the dependent variable regressed on regional and national macro factors as well as individual and political characteristics using a random effects model:

$$(1) \qquad\qquad X_{i,j,t}^h - \overline{X_t^h} = \alpha_i + \beta y'_{j,t-1} + \gamma x'_{i,t} + \sigma z'_{t-1} + \varepsilon_{i,t} \quad,$$

where $X_{i,j,t}^h - \overline{X_t^h}$ represents either the February ($h = 3Q$ ahead) or July ($h = 1Q$ ahead) forecast of member i ($= 1,..,39$) representing Federal Reserve district j ($= 1,..,12$) relative to the committee mean. t ($= 1,..,26$) denotes the semi-annual time index. y and z represent vectors of (one month) lagged regional macroeconomic conditions (including regional unemployment rates and house prices) and national macroeconomic conditions (including Greenbook forecasts of inflation and unemployment as well as the Federal Funds rate), and x is the vector of individual and political characteristics. Appendix provides descriptive statistics in Tables A1-A3 as well as sources and definitions of variables in Table A5.

<Insert Tables 1-3 around here>

The results for the full sample, Bank presidents sample and Governors sample are presented in Tables 1, 2, and 3, respectively. In each table, columns I and II show the results for inflation forecasts, columns III and IV represent the results for unemployment rate forecasts.

We find that FOMC members' forecasts of inflation and unemployment differ significantly between regional Bank presidents and Governors. Generally, Governors do forecast significantly lower inflation and higher unemployment rates than Bank presidents. This result suggests that Governors' preferences for easier monetary policy (frequently found in the literature on voting in the FOMC) also shapes their forecasting behavior. For example, controlling for other factors, Governors submit, on average, 0.1 to 0.15 percentage points (pp) lower inflation forecasts than Bank presidents, which is economically significant given that the standard deviation of inflation forecasts of the full sample is around 0.218 pp.

Similar to the FOMC voting literature, we find that Federal Reserve Bank presidents' individual forecasts of inflation and unemployment are significantly driven by their district's unemployment rate. Such a regional bias is however not detected for Board members with their presumably lesser regional affiliation. Precisely, a one standard deviation increase in the regional unemployment rate, being 0.732, decreases (increases) the Fed Bank president's individual forecast of inflation (unemployment) relative to the committee mean by 0.070 pp percentage points (0.022 pp). Taking the standard deviation of inflation and unemployment rate forecasts being 0.227 and 0.119 pp into account this result suggest that a good share of Bank presidents' forecast dispersion can be explained by the regional unemployment rate.

The regional bias of Bank presidents' macroeconomic forecasts as well as the non-existing regional bias of Governors can be explained by several institutional reasons. First, Bank presidents are assumed to have a more intense regional affiliation as opposed to Governors whose regional affiliation is more on a de jure basis. Bank presidents spend considerable shares

of their working hours in the district they represent, while the Board of Governors is based in Washington D.C. Bank presidents may therefore be more aware of (or biased by) regional conditions which may explain the sensitivity of their macroeconomic forecasts to regional economic conditions. Second, Bank presidents are elected by the Board of their district's Federal Reserve Bank, while Governors are appointed by the U.S. President. For opportunistic reasons, Bank presidents may therefore perceive an incentive to align their forecasting behavior with the stability needs of their district, while Governors may put more weight on national-wide information to form their forecasts of inflation and unemployment.

As one of the key innovations of this study, we consider several member-specific characteristics of FOMC members which have not been tested as determinants of forecast behavior in the previous literature. We find that FOMC members' forecasting behavior is significantly affected by career backgrounds in the Government sector and in non-governmental organizations (NGOs). For instance, ten years of career experience in the government sector decreases an FOMC member's inflation forecast by 0.12 pp. Bank presidents and Governors with a career background in regional Reserve banks show significant lower unemployment rate forecasts. While Reserve bank presidents with a career in the Board staff or in academia tend to forecast lower unemployment rates, the opposite is true for Governors with a Board staff or academia background. Thus, career experience appears to shape monetary policy preferences of FOMC members, which, in turn, influences their forecasting behavior.

As opposed to Tillmann (2011), we find that voting Bank presidents show higher individual inflation forecasts as compared to their non-voting peers. We interpret this result as underscoring the "natural" hawkish monetary policy stance of voting Bank presidents to the public.

Political variables are largely found to be insignificant. A notable exception is Governors appointed by a Democratic administration who tend to forecast higher unemployment rates than Governors appointed by a Republican administration.

We performed several sensitivity checks to assess the robustness of our results. Firstly, we also estimated the model using fixed effects. However, such a fixed effects model would not enable us to include several individual characteristics such as career backgrounds or political affiliations since they are invariant in time. Secondly, we included the deviation of individual characteristics from the committee mean instead of time invariant individual characteristics. Moreover, we considered additional regional macroeconomic conditions such as the regional coincident and leading indexes. Thirdly, we also considered the five-quarter-ahead July forecast instead of the one-quarter-ahead July forecast. Altogether, the results remain fairly robust.

<Insert Table 4 around here>

Baseline regressions have shown that regional Bank presidents tend to take regional unemployment rates into account when forming individual forecasts of inflation and unemployment. In order to check whether such a regional bias is even stronger in the year preceding Fed Bank presidents' election year or for voting/non-voting Bank presidents we use interaction models. Thereby we interact the regional unemployment rate with the Election year of Bank presidents dummy (or Voting status Bank president dummy) in order to detect some conditional effects which may shape individual forecasts of inflation and unemployment in the FOMC.

(2) $$X_{i,j,t}^h - \overline{X_t^h} = \alpha_i + \beta y_{j,t-1}' + \gamma x_{i,t}' + \sigma z_{t-1}' + \delta y_{j,t-1} * x_{i,t} + \varepsilon_{i,t},$$

with $\delta y_{j,t-1} * x_{i,t}$ as interaction term, and

(3) $$\partial (X_{i,j,t}^h - \overline{X_t^h})/\partial (y_{j,t-1}) = \beta + \delta x_{i,t},$$

representing the marginal effect of a one unit change in the regional unemployment rate on the individual forecast (relative to the committee mean) conditional on the value of either the Election year of Bank president (Table 4) or Voting status Bank president dummy (Table 5).

Tables 4 and 5 show the results of the averaged marginal effects calculated from the interaction models. The upper panel shows the results for the individual inflation forecasts; the lower panel shows the results for the unemployment rate forecasts. The results indicate that in the year prior to elections of Bank presidents regional unemployment rates play a bigger role when forming individual forecasts of inflation and unemployment than in the remaining years (see Table 4). This is particularly true for the individual unemployment rate forecasts of Bank presidents where the marginal effect for the pre-election year is around three times bigger than for non-election years. Our results suggest that Bank presidents lobby for their re-election by putting higher weight on macroeconomic conditions in their district when forming individual forecasts.

<Insert Table 5 around here>

Table 5 presents the results for differences in the voting status. Existing literature suggests significant differences of individual macroeconomic forecasts among voting and non-voting Bank presidents with non-voters submitting extreme inflation forecasts for strategic reasons (see, e.g., Rülke and Tillmann 2011; Tillmann, 2011). These differences in the voting status among Bank presidents may also explain their different intensities of the regional bias when forming macroeconomic forecasts. The baseline models revealed that Bank presidents use regional unemployment rates to forecast inflation and unemployment. However, since non-voting Bank presidents' main task is to contribute to monetary policy deliberations in FOMC meetings by providing additional (regional) information they might have a stronger tendency to incorporate regional unemployment rates when forecasting inflation and unemployment to signal their regional awareness. In order to analyze this hypothesis, we interact the regional

unemployment rate with the Voting status Bank president dummy. The results for the marginal effects of the regional unemployment rate of inflation and unemployment rate forecasts for voting vs. non-voting Bank presidents are presented in Table 5. Our results indicate that the regional bias of non-voting Bank presidents' inflation forecasts is much more pronounced than the regional bias of voting Bank presidents' inflation forecasts. Non-voting Bank presidents tend to submit higher (lower) inflation forecasts than voting Bank presidents when the regional unemployment rate decreases (increases) resulting in a much higher marginal effect for non-voters. However, we see no such clear evidence for the individual unemployment rate forecasts. The marginal effects are around the same for voters and non-voters, though the marginal effect for voters is estimated much less precisely (with a p-value of 0.065) than the marginal effect for non-voters (with a p-value of 0.018).

IV.   CONCLUSIONS

We use semiannual panel data in the period of 1992 to 2004 to test whether FOMC members' inflation and unemployment rate forecasts are systematically biased by regional economic conditions or individual background characteristics. To the best of our knowledge, we are the first to consider a broadest possible set of potential regional, individual and political characteristics to explain the sizable forecast dispersion among members in the FOMC. We find that Governors and Bank presidents forecast differently with Governors submitting lower inflation and higher unemployment rate forecasts than Bank presidents. As hypothesized, we find clear evidence of a regional bias in the formulation of regional Bank presidents' individual forecasts of inflation and unemployment. When the district's unemployment rate increases, Bank presidents' forecasts of inflation (unemployment) decrease (increase), and vice versa. By applying interaction models, we have shown that Bank presidents' regional bias is more pronounced during the year prior to their elections or for non-voting Bank presidents. Our results indicate that the career background of FOMC members matter for their formation of

forecasts. For example, committee members with a career in the government sector (NGOs) tend to forecast lower (higher) inflation. What is more, we find evidence for politically biased forecasts with Governors appointed by a Democratic administration forecasting higher unemployment rates than Governors appointed by a Republican administration.

Overall, our results suggest that regional macroeconomic conditions as well as individual and political characteristics shape the forecasting behavior of FOMC members. These systematic differences in the forecast patterns add explanatory value for understanding the formation of monetary policy preferences of FOMC members and their voting behavior.

ABBREVIATIONS

BoG: Board of Governors
CPI: Consumer Price Index
FOMC: Federal Open Market Committee
GDP: Gross Domestic Product
MPC: Monetary Policy Committee
NGO: Non-governmental organization
PCE: Personal Consumption Expenditures

TABLE 1
Random effects regressions of the full sample

Dependent variables	Individual inflation forecasts		Individual unemployment forecasts	
	I	II	III	IV
Governor dummy	-0.098 ***	-0.146 ***	0.039 ***	0.034 *
	(0.03)	(0.04)	(0.01)	(0.02)
Regional unemployment	-0.043 **	-0.055 **	0.006	0.006
	(0.02)	(0.02)	(0.01)	(0.01)
Regional house price	-0.014	-0.016	0.012	0.010
	(0.01)	(0.01)	(0.01)	(0.01)
Greenbook unemployment forecast	-0.001	-0.003	0.005	0.003
	(0.01)	(0.01)	(0.01)	(0.01)
Greenbook inflation forecast	-0.003	-0.006	0.001	0.000
	(0.03)	(0.03)	(0.01)	(0.01)
Federal funds rate	0.000	-0.002	0.002	0.001
	(0.01)	(0.01)	(0.01)	(0.01)
Career background in Academia		0.001		-0.001
		(0.00)		(0.00)
Career background in Government		-0.012 **		-0.002
		(0.01)		(0.00)
Career background in Industry		0.005		-0.001
		(0.00)		(0.00)
Career background in Finance		0.001		-0.001
		(0.00)		(0.00)
Career background in NGO		0.007 ***		-0.001
		(0.00)		(0.00)
Career background in BoG		-0.001		-0.002
		(0.00)		(0.00)
Career background in Federal Reserve Bank		-0.002		-0.002
		(0.00)		(0.00)
Committee experience		-0.003		0.002
		(0.00)		(0.00)
Number of obs.	440	440	440	440
Overall R²	0.063	0.092	0.025	0.034

Notes: Dependent variables: individual inflation forecast (columns I and II), and individual unemployment forecasts (columns III and IV); member clustered standard errors in parentheses; constant included but not reported; *, **, *** show significance at the 10%, 5% and 1% level, respectively

TABLE 2
Random effects regressions of the Bank presidents sample

Dependent variables	Individual inflation forecasts				Individual unemployment forecasts			
	I		II		III		IV	
Regional unemployment	-0.095	***	-0.097	***	0.030	**	0.029	**
	(0.03)		(0.03)		(0.01)		(0.01)	
Regional house price	-0.018		-0.023		0.011		0.009	
	(0.01)		(0.02)		(0.01)		(0.01)	
Greenbook unemployment forecast	0.004		-0.003		-0.002		-0.001	
	(0.02)		(0.02)		(0.01)		(0.01)	
Greenbook inflation forecast	-0.011		-0.011		0.002		-0.003	
	(0.04)		(0.03)		(0.01)		(0.01)	
Federal funds rate	0.001		-0.001		-0.005		-0.003	
	(0.01)		(0.02)		(0.01)		(0.01)	
Career background in Academia	0.001		0.000		-0.005	***	-0.005	***
	(0.00)		(0.00)		(0.00)		(0.00)	
Career background in Government	-0.016		-0.019	*	-0.010	**	-0.011	**
	(0.01)		(0.01)		(0.00)		(0.00)	
Career background in Industry	0.011		0.012		0.002		0.003	
	(0.01)		(0.01)		(0.00)		(0.00)	
Career background in Finance	0.002		0.002		-0.004	**	-0.004	**
	(0.00)		(0.00)		(0.00)		(0.00)	
Career background in NGO	0.058	**	0.057	**	0.005		0.005	
	(0.03)		(0.02)		(0.01)		(0.01)	
Career background in BoG	0.015		0.015		-0.004		-0.004	
	(0.01)		(0.01)		(0.00)		(0.00)	
Career background in Federal Reserve Bank	0.000		-0.001		-0.005	***	-0.005	***
	(0.00)		(0.00)		(0.00)		(0.00)	
Committee experience	-0.002		-0.003		-0.003		-0.003	
	(0.00)		(0.00)		(0.00)		(0.00)	
Voting status Bank president			0.035	**			0.003	
			(0.02)				(0.01)	
Democratic US President			-0.015				-0.008	
			(0.05)				(0.03)	
Election year of Bank president			0.027				0.000	
			(0.03)				(0.02)	
Election year of US president			0.009				0.015	
			(0.03)				(0.02)	
Number of obs.	311		311		311		311	
Overall R²	0.114		0.121		0.051		0.055	

Notes: Dependent variables: individual inflation forecast (columns I and II), and individual unemployment forecasts (columns III and IV); member clustered standard errors in parentheses; constant included but not reported; *, **, *** show significance at the 10%, 5% and 1% level, respectively

TABLE 3
Random effects regressions of the Board member sample

Dependent variables	Individual inflation forecasts		Individual unemployment forecasts	
	I	II	III	IV
Regional unemployment	0.025	0.045	-0.040	-0.047
	(0.04)	(0.04)	(0.03)	(0.03)
Regional house price	-0.028	-0.023	0.015	0.013
	(0.03)	(0.03)	(0.02)	(0.02)
Greenbook unemployment forecast	-0.018	-0.016	0.011	0.015
	(0.03)	(0.03)	(0.03)	(0.04)
Greenbook inflation forecast	-0.015	-0.035	-0.023	-0.004
	(0.03)	(0.04)	(0.04)	(0.05)
Federal funds rate	-0.015	-0.013	0.017	0.010
	(0.01)	(0.01)	(0.02)	(0.02)
Career background in Academia	-0.002	-0.003	0.004 ***	0.005 ***
	(0.00)	(0.00)	(0.00)	(0.00)
Career background in Government	-0.019 **	-0.027 ***	0.004	0.011 ***
	(0.01)	(0.01)	(0.00)	(0.00)
Career background in Industry	-0.002	-0.005	0.002	0.004 *
	(0.00)	(0.00)	(0.00)	(0.00)
Career background in Finance	-0.003	-0.003	0.004 ***	0.005 ***
	(0.00)	(0.00)	(0.00)	(0.00)
Career background in NGO	0.004	0.007 *	0.000	-0.002
	(0.00)	(0.00)	(0.00)	(0.00)
Career background in BoG	-0.003	-0.003	0.011 ***	0.010 ***
	(0.01)	(0.01)	(0.00)	(0.00)
Career background in Federal Reserve bank	-0.020	-0.036	-0.060 ***	-0.036 ***
	(0.05)	(0.05)	(0.02)	(0.01)
Committee experience	0.003	-0.001		0.008
	(0.01)	(0.01)		(0.00)
Democratic Governor		-0.076		0.065 *
		(0.05)		(0.03)
Democratic US President		0.019		0.017
		(0.05)		(0.05)
Election year of US president		0.023		-0.030
		(0.05)		(0.04)
Number of obs.	129	129	129	129
Overall R²	0.082	0.095	0.125	0.148

Notes: Dependent variables: individual inflation forecast (columns I and II), and individual unemployment forecasts (columns III and IV); member clustered standard errors in parentheses; constant included but not reported; *, **, *** show significance at the 10%, 5% and 1% level, respectively

TABLE 4

Marginal effect of regional unemployment on Bank presidents' forecasts during pre-election years and other years

	Year prior to elections of Bank presidents	All other years
Marginal effect on inflation forecast	-0.108 *** (0.04)	-0.101 *** (0.03)
Marginal effect on unemployment rate forecast	0.069 ** (0.03)	0.022 ** (0.01)

Notes: Results derived from interaction model presented in Table A4. Dependent variables: individual inflation forecast (upper panel), individual unemployment forecasts (lower panel); delta-method standard errors in parentheses. **, *** show significance at the 5% and 1% level, respectively.

TABLE 5

Marginal effect of regional unemployment on voting vs. non-voting Bank presidents' forecasts

	Voting Bank president	Non-voting Bank president
Marginal effect on inflation forecast	-0.089 *** (0.04)	-0.118 *** (0.03)
Marginal effect on unemployment rate forecast	0.031 * (0.02)	0.027 ** (0.01)

Note: Results derived from interaction model presented in Table A4. Dependent variables: individual inflation forecast (upper panel), individual unemployment forecasts (lower panel); delta-method standard errors in parentheses. *, **, *** show significance at the 10%, 5% and 1% level, respectively.
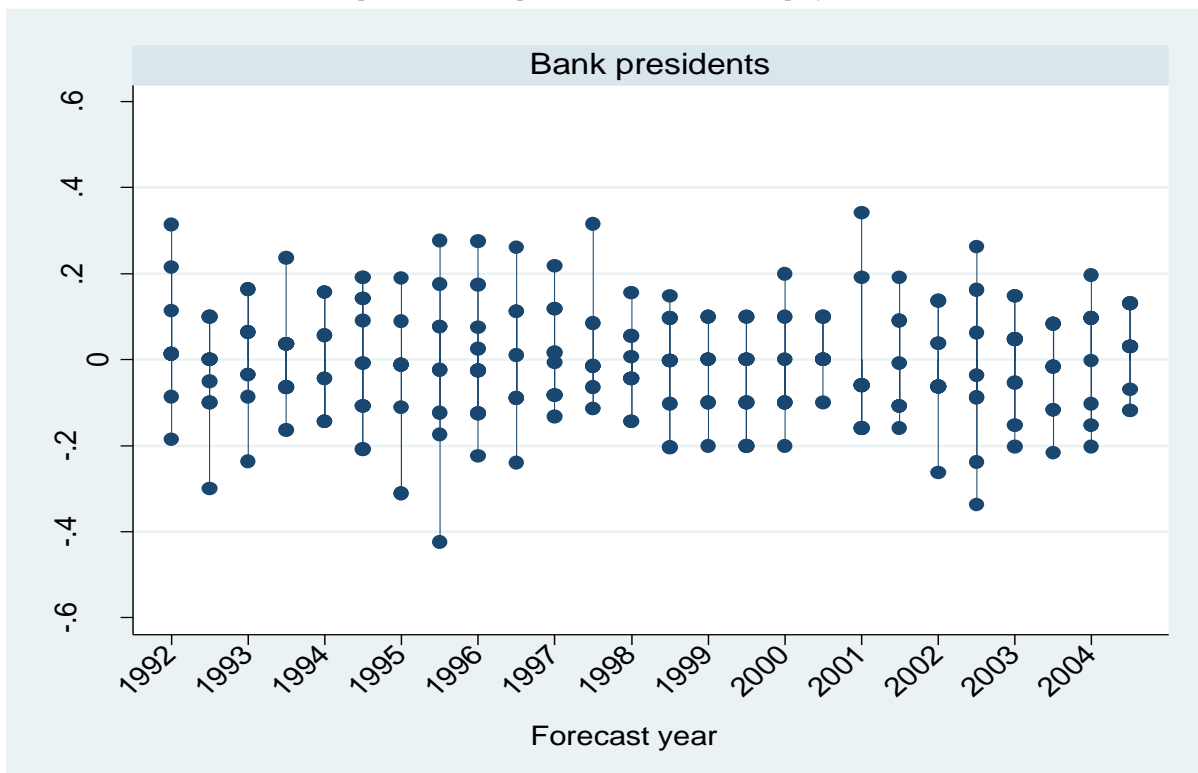
FIGURE 1

Forecast dispersion of Bank presidents' individual inflation forecast
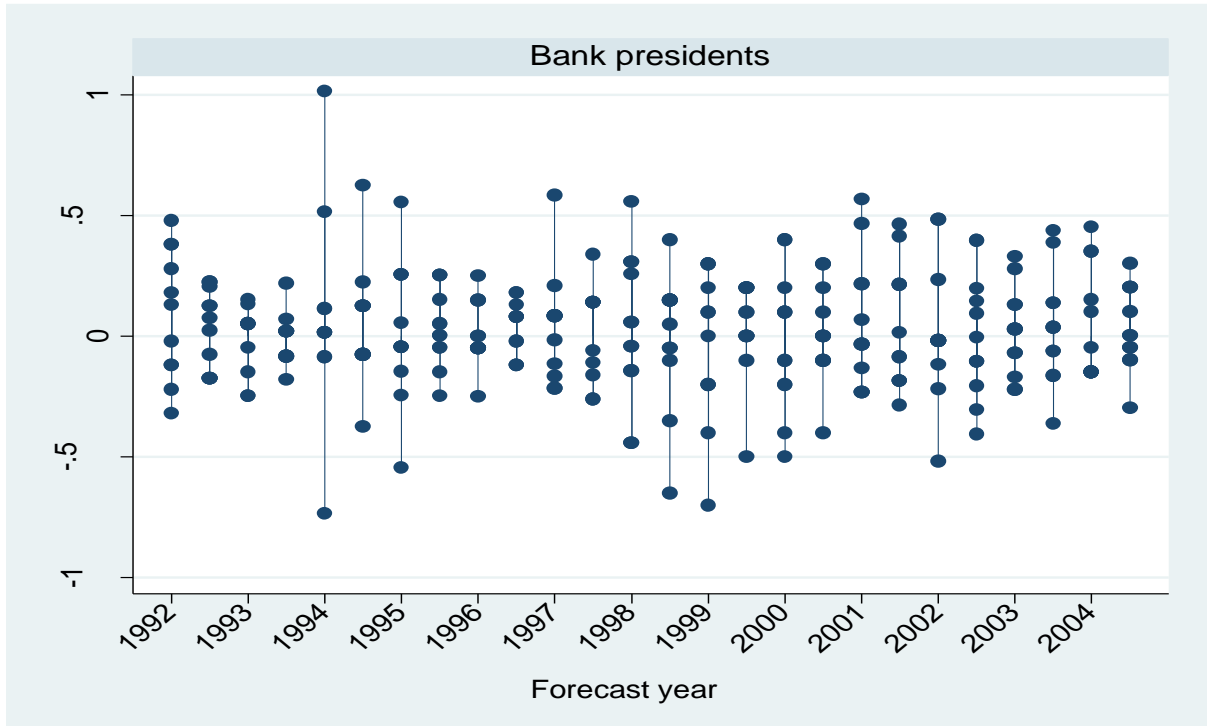
FIGURE 2

Forecast dispersion of Board members' individual inflation forecast
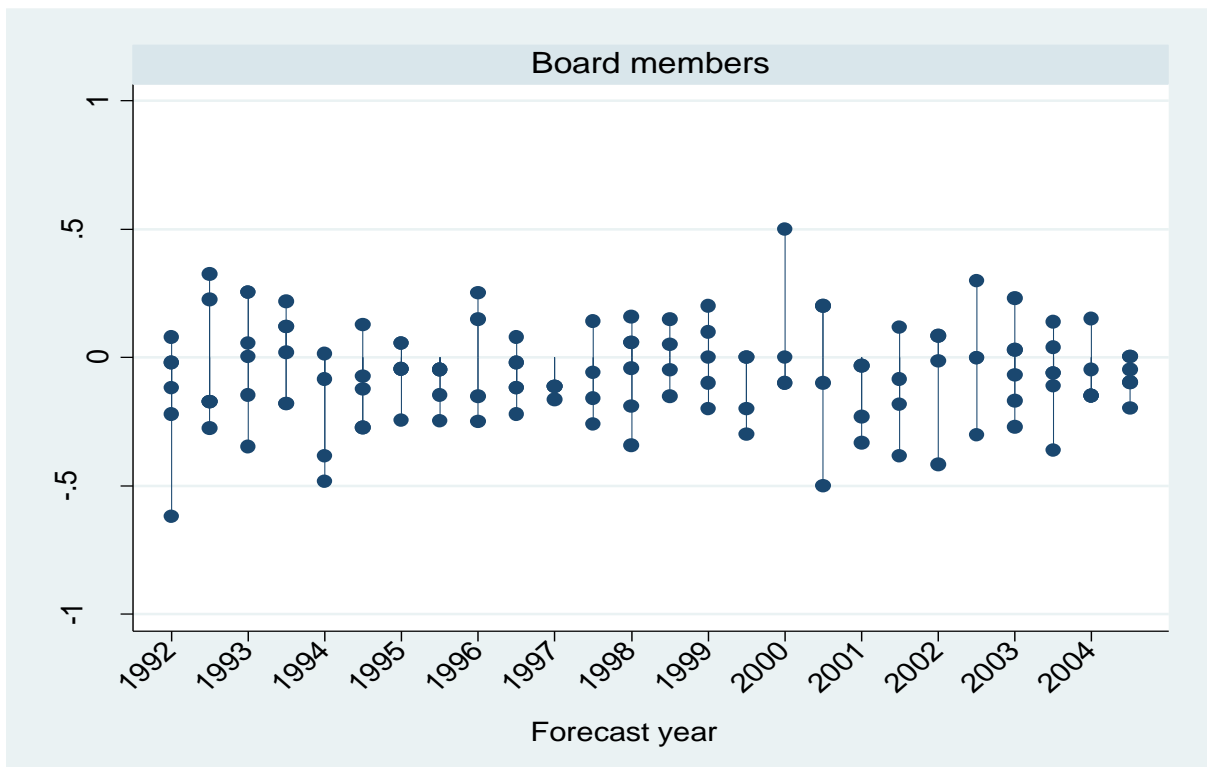
FIGURE 3
Forecast dispersion of Bank presidents' individual unemployment forecast

FIGURE 4
Forecast dispersion of Board members' individual unemployment forecast
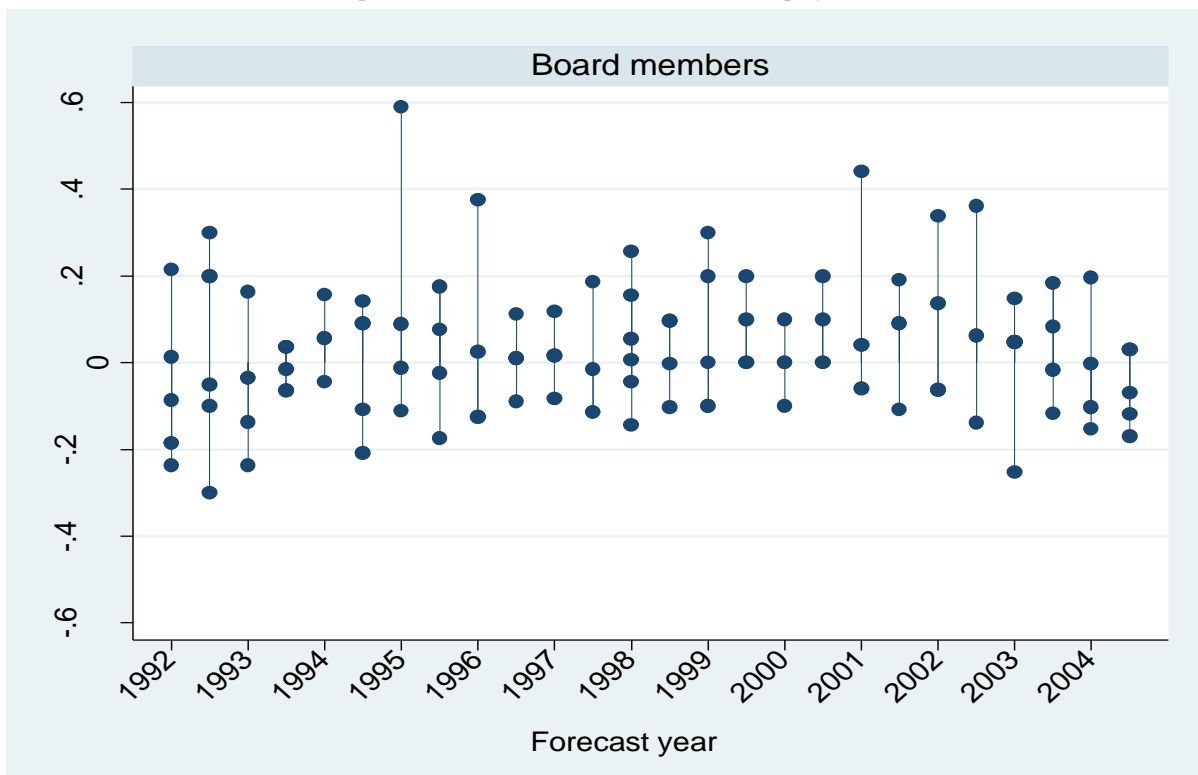
Notes: Figures 1-4 show forecast dispersion of FOMC members' individual inflation forecasts (Figures 1-2) and unemployment forecasts (Figures 3-4) between 1992 and 2004. Number of dots may differ from real sample size through similar forecasts made by different members.

TABLE A1
Descriptive statistics of the full sample

Variable	Obs.	Mean	Std. dev.	Min	Max
Individual inflation forecast	440	-0.001	0.218	-0.734	1.016
Individual unemployment forecast	440	-0.000	0.128	-0.424	0.589
Governor dummy	440	0.293	0.455	0	1
Regional unemployment rate	440	-0.241	0.713	-2.475	1.543
Regional house price	440	1.252	0.973	-1.326	7.855
Greenbook unemployment forecast	440	5.572	0.972	3.9	7.2
Greenbook inflation forecast	440	2.337	0.742	1	3.5
Federal funds rate	440	4.025	1.775	1	6.53
Career background in *Academia*	440	4.873	8.907	0	30
Career background in *Government*	440	1.447	2.990	0	12
Career background in *Industry*	440	2.050	5.368	0	22
Career background in *Finance*	440	5.214	8.520	0	35
Career background in *NGO*	440	0.591	3.000	0	25
Career background in *BoG*	440	1.020	3.225	0	29
Career background in *Federal Reserve Bank*	440	8.561	10.347	0	32
Committee experience	440	5.927	4.715	0	19
Democratic US President	440	0.607	0.489	0	1
Election year of US president	440	0.311	0.464	0	1

TABLE A2
Descriptive statistics of the Bank presidents sample

Variable	Obs.	Mean	Std. dev.	Min	Max
Individual inflation forecast	311	0.026	0.227	-0.734	1.016
Individual unemployment forecast	311	-0.012	0.119	-0.424	0.341
Regional unemployment rate	311	-0.210	0.732	-2.475	1.543
Regional house price	311	1.272	0.986	-1.326	7.855
Greenbook unemployment forecast	311	5.545	0.972	3.9	7.2
Greenbook inflation forecast	311	2.331	0.734	1	3.5
Federal funds rate	311	4.063	1.768	1	6.53
Career background in *Academia*	311	2.926	7.515	0	30
Career background in *Government*	311	1.447	2.990	0	12
Career background in *Industry*	311	1.344	3.599	0	14
Career background in *Finance*	311	4.749	7.986	0	27
Career background in *NGO*	311	0.219	0.829	0	7
Career background in *BoG*	311	0.833	1.876	0	6
Career background in *Federal Reserve Bank*	311	12.100	10.515	0	32
Committee experience	311	7.026	4.813	0	19
Democratic US President	311	0.617	0.487	0	1
Election year of US president	311	0.305	0.461	0	1
Voting status Bank president	311	0.415	0.493	0	1
Election year of Bank president	311	0.154	0.362	0	1
Democratic Governor	311	0.403	0.492	0	1

TABLE A3
Descriptive statistics of the Board members sample

Variable	Obs.	Mean	Std. dev.	Min	Max
Individual inflation forecast	129	-0.064	0.180	-0.619	0.500
Individual unemployment forecast	129	0.026	0.144	-0.300	0.589
Regional unemployment rate	129	-0.318	0.662	-2.180	1.455
Regional house price	129	1.201	0.944	-0.986	4.694
Greenbook unemployment forecast	129	5.639	0.973	3.9	7.2
Greenbook inflation forecast	129	2.351	0.764	1	3.5
Federal funds rate	129	3.933	1.794	1	6.53
Career background in *Academia*	129	9.566	10.194	0	27
Career background in *Government*	129	3.752	7.958	0	22
Career background in *Industry*	129	2.050	5.368	0	22
Career background in *Finance*	129	6.333	9.805	0	35
Career background in *NGO*	129	1.488	5.296	0	25
Career background in *BoG*	129	0.248	0.952	0	5
Career background in *Federal Reserve Bank*	129	12.100	10.5157	0	32
Committee experience	129	3.279	3.184	0	14
Democratic US President	129	0.581	0.495	0	1
Election year of US president	129	0.326	0.470	0	1
Democratic Governor	129	0.403	0.492	0	1

TABLE A4
Coefficients of interactions models

Dependent variable	Individual inflation forecasts				Individual unemployment forecasts			
Regional unemployment	-0.101	***	-0.118	***	0.022	**	0.027	**
	(0.03)		(0.03)		(0.01)		(0.01)	
Regional unemployment * Election year of Bank president	-0.006				0.047	*		
	(0.04)				(0.03)			
Regional unemployment * Voting status Bank president			0.029				0.004	
			(0.04)				(0.02)	
Regional house price	-0.023		-0.023		0.008		0.010	
	(0.02)		(0.02)		(0.01)		(0.01)	
Greenbook unemployment forecast	0.003		-0.003		-0.000		-0.001	
	(0.02)		(0.02)		(0.01)		(0.01)	
Greenbook inflation forecast	-0.011		-0.012		-0.005		-0.003	
	(0.03)		(0.03)		(0.01)		(0.01)	
Federal funds rate	-0.001		-0.001		-0.003		-0.003	
	(0.02)		(0.02)		(0.01)		(0.01)	
Career background in Academia	0.000		0.000		-0.005	***	-0.005	***
	(0.00)		(0.00)		(0.00)		(0.00)	
Career background in Government	-0.020		-0.021	*	-0.011	**	-0.011	**
	(0.01)		(0.01)		(0.00)		(0.00)	
Career background in Industry	0.014		0.015		0.002		0.003	
	(0.01)		(0.01)		(0.00)		(0.00)	
Career background in Finance	0.002		0.003		-0.004	**	-0.004	**
	(0.00)		(0.00)		(0.00)		(0.00)	
Career background in NGO	0.061	**	0.062	**	0.004		0.005	
	(0.03)		(0.03)		(0.01)		(0.01)	
Career background in BoG	0.016		0.017	*	-0.005		-0.004	
	(0.01)		(0.01)		(0.01)		(0.00)	
Career background in Federal Reserve bank	-0.000		0.000		-0.005	***	-0.005	***
	(0.00)		(0.00)		(0.00)		(0.00)	
Committee experience	-0.003		-0.003		-0.003		-0.003	
	(0.23)		(0.00)		(0.00)		(0.00)	
Voting status Bank president	0.035	**	0.043	**	0.003		0.004	
	(0.02)		(0.02)		(0.02)		(0.01)	
Democratic US President	-0.015		-0.018		-0.008		-0.009	
	(0.05)		(0.05)		(0.03)		(0.03)	
Election year of Bank president	0.026		0.028		0.012		0.000	
	(0.04)		(0.04)		(0.03)		(0.03)	
Election year of US president	0.010		0.009		0.016		0.015	
	(0.03)		(0.04)		(0.02)		(0.02)	
Number of obs.	311		311		311		311	
Overall R²	0.122		0.124		0.065		0.055	

Notes: Dependent variables: individual inflation forecast (columns I and II), and individual unemployment forecasts (columns III and IV); member clustered standard errors in parentheses; constant included but not reported; *, **, *** show significance at the 10%, 5% and 1% level, respectively

TABLE A5
Variable definition and sources

Variable	Definition	Data sources
Dependent Variable		
Individual forecasts of inflation and unemployment rate	FOMC members' individual forecasts of inflation and unemployment rate minus mean forecast	Federal Reserve bank of Philadelphia
Regional unemployment rate	Difference between unemployment rate in *i*'s district and national unemployment rate District unemployment rate is the weighted average of state-specific unemployment rates (district boundaries are taken from Chappell et al. (2008)), population shares are used as the weighting scheme	National and state unemployment rate: Bureau of Labor Statistics Resident population: Census Bureau
Regional house price	Month-over-month percentage change in regional house price	House price index for U.S. states: Federal Housing Finance Agency
Greenbook unemployment and inflation forecast	Greenbook unemployment and inflation forecast	Federal Reserve bank of Philadelphia
Federal funds rate	Federal funds rate of the last day of January/June	Federal Funds Rate: Board of Governors
Career background in Academia, Government, Industry, Finance, NGO, Board of Governors, Federal Reserve Bank	Number of years FOMC member has worked in a full time position in the respective sector before becoming Federal Reserve Bank president or Board member	Own calculations
Committee experience	Number of years FOMC member has worked as committee member	Own calculations
Democratic US President	Dummy variable equals 1 if current President of the United States is Democratic; 0 otherwise	Own calculations
Election year of US president	Dummy variable equals 1 if committee votes in the year prior to U.S. President elections; 0 otherwise	Own calculations
Voting status Bank president	Dummy variable equals 1 if Bank president is a current voting member; 0 otherwise	Own calculations
Election year of Bank president	Dummy variable equals 1 if Bank president votes in a year prior to regional Bank presidents' elections, 0 otherwise	Own calculations
Democratic Governor	Dummy variable equals 1 if Federal Reserve Board member was appointed by Democratic president; 0 otherwise	Own calculations

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