Divided Committees and Strategic Vagueness

Nicole Rae Baerg
Bank of England & University of Essex
*nicole.baerg@bankofengland.co.uk
and
Colin Krainin
Department of Politics, Princeton University
colinkrainin@gmail.com

*Forthcoming at *European Journal of Political Economy* https://doi.org/10.1016/j.ejpoleco.2022.102240

Abstract

Recent research has found that central bank communications affect outcomes, for example, by moving financial markets and shaping inflation expectations. Missing from the literature is an understanding of why the content of communications varies in the first place. We present an agenda setting model of a monetary policy committee (MPC) with committee members who bargain over the degree of vagueness in central bank communications. We generate hypotheses about the types of MPCs that are expected to produce more or less vague communications. We test our propositions empirically using data from the U.S. Federal Open Market Committee (FOMC) during Arthur Burns's tenure (1970–1978) and find evidence that the FOMC uses vaguer language when the committee chair and median committee member have aligned preferences than when their biases are opposed. Our results show that the institutional design of the MPC matters for the level of vagueness committees communicate to outside actors.

Introduction

Recent research has shown that central bank communications affect expectations and behaviors, for example, by moving financial markets and changing households' inflation expectations (Hansen, McMahon, and Prat, 2017; Binder, 2017). Not all communications are the same, however; recent literature has shown that shorter and/or clearer communications have stronger effects (Jensen, 2002; Bholat et al., 2019; Baerg, Duell, and Lowe, 2021). Missing from this literature is a theoretical explanation for why central bank communications vary in the first place. If there is a premium on central banks releasing clear information, why would central bank communications ever be vague?

To solve this puzzle, we present a simple model of a monetary policy committee (MPC) comprising committee members who bargain over the level of vagueness in central bank communications. Following from previous literature, we focus on different types of institutional features of MPCs including committee size, members' roles, and the preference composition of committee members (Riboni and Ruge-Murcia, 2010). We generate hypotheses about the types of MPCs that are expected to produce more or less *strategic vagueness*. There are many examples of MPCs deploying language with strategic vagueness. For example, in 1974, Federal Reserve chair Arthur Burns felt it necessary to communicate that high nominal interest rates would need to continue "for a time" (cited in Nelson, 2021). A more precise (less vague) message is one that provides a more concrete time horizon. Yet, to our knowledge, researchers have only recently started to examine vagueness in the context of MPCs (Baerg, 2020, e.g.). Fortunately, the political science literature has produced a large body of research on this topic, from which we draw. For example, Owens and Wedeking (2011) finds that court justices sitting on a court where judges have divided opinions have incentives to increase the level of strategic vagueness in their rulings to appease conflicting views on the court. In this article, we examine whether central bankers on MPCs behave similarly.

To theorize whether and how MPCs institutional design matters, we examine committee size, structure, and composition and their possible associations with strategic vagueness. We develop a simple bargaining model that depicts group members bargaining over how precisely (or how vaguely) to transmit information to an external audience. Following from the literature, we refer to vagueness of the *strategic vagueness* kind. This kind of vagueness is produced as a result of accommodating (or not) other members in the group, in a strategic game, rather than by a lack of understanding or information. Strategic vagueness is thus similar to what Caillaud and Tirole (2007) call strategic ambiguity. The model we develop is in the tradition of an agenda setting model by Romer and Rosenthal (1978) and Romer and Rosenthal (1979) and extended by Baerg (2020). Different from Romer and Rosenthal (1978) and Romer and Rosenthal (1979) is that instead of bargaining directly over policy, committee members' negotiations focus on the level of distortion in communications.[1] Different from Baerg (2020), we consider a committee of unlimited size, including a committee of one (a "Dictator"), and we rank order different types of committees based on their levels of vagueness, thus speaking to the literature on optimal design.

We find that delegating to a committee where the chair and the median committee member have opposing preferences is associated with lower levels of strategic vagueness compared to committees with either no chair or members with aligned preferences. Another important finding is that appointing committee members with less extreme preferences results in lower strategic vagueness. For example, appointing a very "Dovish" or "Hawkish" central bank governor will result in vaguer communications compared to appointing a moderate. Knowing this, those appointing central bankers can protect against vagueness by appointing oppositely biased committee members. We also show that a member acting alone (a Dictator) has the greatest ability to be vague. Therefore, we also contribute the finding that one

[1]See, for instance, the models of gatekeeping in Denzau and Mackay (1983) and Crombez, Groseclose, and Krehbiel (2006).

benefit of delegating policy making to a committee is a reduction in strategic vagueness. To our knowledge, these conjectures are new to the literature on central bank communications.

Our model also generates important predictions that can be evaluated empirically. In this article, we test the idea that opposing and aligned committees are systematically associated with communicated vagueness using textual data from the Federal Open Market Committee (FOMC), the U.S. central bank, during the tenure of Arthur Burns (1970–1978). The empirical results show a consistent positive correlation between an opposing bias (of the chair and median member) and the share of words that convey certainty (*certainty words*) to those that convey uncertainty (*uncertainty words*) in central bank communications. Although our empirical investigation examines only one specific time frame and only one central bank, our findings are broad enough to speak to a larger set of institutions that govern by committees, as well as to other time periods. Furthermore, our other conjectures provide opportunities for future research.

Previous Literature

Previous literature on the strategic determinants of vagueness broadly identifies three key reasons for vagueness (for an excellent review of the literature, see Bräuninger and Giger (2016)). The first reason is that vagueness can help lubricate disagreements across different people with different preferences (Ulmer, 1971). Given a committee of differently minded actors, committee members can use vagueness opportunistically to ensure compromise among disagreeing factions. Second, in a principal agent setting, vagueness may be positively related to compliance. Committee members can use vagueness to garner support from outside actors, or use it because committee members lack expertise (Staton and Vanberg, 2008). For example, a court lacking detailed information about a specific topic may be purposely vague in its ruling to ensure compliance. Third, in a dynamic context, where policy making happens with repeated action, vagueness may be used to increase policy makers' flexibility in the future (Aragones and Neeman, 2000; Alesina and Cukierman, 1990; Meirowitz, 2005). By using vaguer language today, policy makers can try to negotiate a better deal tomorrow.

The empirical findings from this literature are mixed, however, with different models and subject areas yielding different predictions. The party politics literature has found that political parties make strategic choices based both on policy and on the level of ambiguity in their party platforms (Bräuninger and Giger, 2016). Brüninger and Giger show that vagueness matters in addition to policy and independently of parties' policy choices. Other research has found that vagueness relates to how political parties are constrained by coalition members (Fortunato, 2019) and party activities when campaigning for election (Eichorst and Lin, 2019). In the study of judicial politics, Staton and Vanberg (2008) found that judges are more or less vague to manage the court's relationship with outside audiences, such as the mass public and government. Internally, Owens and Wedeking (2011) have shown that committee members' preferences also matter for vagueness when they are working in a group to form a collective decision. In findings consistent with Ulmer (1971), Owens and Wedeking (2011) found that ideological cohesion (what we call *preference alignment*) on the court limits the need for appeasement and therefore reduces incentives for court justices to be vague. Alternatively, however, recent research in computer science has shown that ideologically polarized teams with diverse editors produce articles that are less vague compared to those produced by more homogeneous groups (Shi et al., 2019).

Variations in vagueness also generate real-world behavioral changes. In the central bank communications literature, scholars show that central bank clarity affects media uptake (Munday and Brookes, 2021) and public engagement (Ferrara and Angino, 2021). Testimony and tone in press releases affects financial markets, especially stock market prices (Parle, 2022). Experimental work shows that central bank clarity affects individuals' inflation expectations (Baerg, 2020) and is especially effective for those with favorable opinions of the bank (Baerg, Duell, and Lowe, 2021). Finally, clarity can also help the public better understand monetary policy as well as increase central bank trust (Bholat et al., 2019).

Distinct from the literature on vagueness, the literature on delegation identifies two key advantages for delegating authority to committees versus to single individuals.[2] First, committees act as a forum to aggregate private information and represent the preferences of their members (Gilligan and Krehbiel, 1987; Ladha, 1992; Ali et al., 2008; Chen and Eraslan, 2014). Committees can therefore be more representative. Second, group decision-making, and particularly the various voting rules they employ, can tailor the trade-off between a commitment to future policy and the flexibility to react to new circumstances (Dal Bo, 2006; Riboni and Ruge-Murcia, 2010). Committee are therefore more adept. Third, committees can pool members' expertise and knowledge, creating more efficient decision-making (Blinder, 2007; Berger, Nitsch, and Lybek, 2008). Committees are therefore more expert as a group than members are on their own.

We synthesize the preceding literature and study the relationship between committee size, roles, and composition and the strategic use of vagueness. The incentive for committee members to be vague in our model derives from a desire to affect the actions of external, non–committee members. In the case of monetary policy making, central bank communications have multiple outside audiences, including government officials, markets, firms, and households (e.g. Ehrmann and Fratzscher, 2013; Binder, 2017; Van Der Cruijsen and Demertzis, 2007; Hansen, McMahon, and Tong, 2019; Haldane and McMahon, 2018; Meade and Stasavage, 2008). We contribute to the literature by identifying motivations for strategic vagueness that are distinct from the motivations on which previous literature has focused, such as appeasement, compliance, and flexibility. Instead, we uncover how strategic vagueness on a MPC depends on committee size, members' roles, and the internal composition of

[2]Holmstrom (1978) and Holmstrom (1982) are classic references in the delegation literature. Alonso and Matouschek (2008) offer more recent examples.

the group.

We show that a committee with a sole decision maker (a Dictator) produces more strategic vagueness than committees with a larger number of members. Interestingly, we also find that the median member of a committee without an agenda setting chair transmits higher levels of vague information. Furthermore, we find that a committee with an agenda setting chair is more constrained in its ability to be vague and that a heterogeneous committee is particularly effective, especially when a positively (negatively) biased chair is paired with a negatively (positively) biased median committee member—which we term a committee with *opposing biases*. In summary, if we rank our findings in terms of the level of strategic vagueness expected according to committee structure and composition, we find, first, that committees with *opposing biases* deliver the lowest levels of strategic vagueness; that committees with chairs produce a median amount; and that committees without chairs or those with a single expert produce the highest level of strategic vagueness. In sum, whereas much of the previous literature has highlighted the role of committees in pooling information or quelling disagreements, this research presents a new finding that some types of MPCs produce less vagueness than others.

Model

We develop a simple bargaining model to investigate how committee structure and composition affect the level of strategic vagueness agreed upon by the committee. In general, the model summarizes members' bargaining over vagueness in a single-dimensional space over which they have preferences. The outcome that results is a function of the true state of the world (θ) and the setting of expectations by an outside actor, whom we denote as P. This outside actor might be investors and firms, government officials in oversight committees, or members of the public. We study a committee comprising $N \geq 1$ members. One of these members is the committee chair, labeled C. Delegation to a single person (a Dictator) is covered by the $N = 1$ case. In this case, the single member, C, has total power to transmit communications. When $N > 1$, committee decisions are passed by majority rule.[3] For simplicity, we assume that N is odd.[4] In our model, C has proposer power. The other committee members can vote either to accept or to reject the chair's proposal. Either the chair's proposal is accepted by a majority or it is voted down. If it is voted down, a default option, called the *status quo*, is enacted.

The committee is assumed to have privileged access to information compared to P, which is why P cares about what the committee communicates. For example, if we assume that P is the government, then we assume that the members on the MPC have private information, for example, their future policy plans, to which the government does not have access. For simplicity, we assume that the information is verifiable some time in the future. To keep the model simple, we also assume sufficient reputation costs to make lying by committee members prohibitively expensive. Such an assumption requires the outside actor to repeatedly receive information from the MPC, including any amount of strategic vagueness, and to continue to condition their expectations based on this information. For example, consider the case of courts: If a court writes an opinion that has a high degree of vagueness, law enforcement must still condition its enforcement behavior on the court's ruling. Similarly, if a MPC releases information to an oversight committee that contains a high degree of vagueness, lawmakers still update their beliefs based on the provided information.

All else being equal, we assume that the chair and committee members have a small, unmodeled aversion to vagueness; if two potential equilibria give identical utility to the chair, we assume that the chair acts to bring about the less vague equilibrium. This assumption

[3]In the case of the FOMC, official voting is by majority rule.

[4]This assumption does not substantively affect our results if we incorporate an appropriate tie-breaking rule when N is even.

might reflect a preference for clarity, for example, because members presume that clearer communications are more effective (Jensen, 2002; Bholat et al., 2019; Baerg, Duell, and Lowe, 2021).

Although information that the committee sends to P is truthful, the committee can produce different levels of distortion. All committee members receive the same private information, represented by $\theta \in [0, 1]$. They then must decide how precisely to convey θ to P. A perfect transmission of information would simply pass on θ to P or, in other words, publicize all the private information. Returning to the Burns example from the introduction, this may be Burns using the phrase "until the next meeting" rather than "for a time." Vague transmissions imply a range of values, $\left[\underline{\theta}, \overline{\theta}\right]$, that are truthful and therefore contain θ. We call a statement's *degree of vagueness*, v, the size of the range implied, or $v = \overline{\theta} - \underline{\theta}$.

Our key assumption is that by making vague statements, a committee is able to affect P's expectations of θ. Whatever actions P takes as a consequence, she must incorporate expectations over θ that are based on information the committee has transmitted. We call the absolute difference between the true θ and P's expectations θ^e the *degree of distortion*, or d. As an example, consider the following: If the true value is $\theta = 0.81$ and the committee sends a message that effectively communicates that "θ is distributed with uniform probability between 0.8 and 0.9," then the public sets expectations at $\theta^e = 0.85$. Consequently, the degree of distortion is $d = |\theta^e - \theta| = |0.85 - 0.81| = 0.04$. Meanwhile, the degree of vagueness is $v = \overline{\theta} - \underline{\theta} = 0.9 - 0.8 = 0.1$. For simplicity, we will assume throughout that statements must be of the form "θ is distributed with uniform probability between $\underline{\theta}$ and $\overline{\theta}$." However, this can be generalized considerably. ,[5] We say a statement is biased upward or to the right if $\theta^e > \theta$, biased downward or to the left if $\theta^e < \theta$, and unbiased if $\theta^e = \theta$.

[5]For example, a message might imply that "θ is distributed with uniform probability between 0.8 and 0.9 with a mass of 0.5 probability on 0.9." In this case, $\theta^e = 0.5\,(0.85) + 0.5\,(0.9) = 0.875$. In cases where the message is distributed with nonuniform probability, message variance may be used to determine the degree of vagueness.

For a particular θ, a distortion, y, is *feasible* if $y \in \left[\frac{-\theta}{2}, \frac{1-\theta}{2}\right]$. The limitations on the feasibility of a distortion are partially a function of assuming that $\theta \in [0, 1]$ and that messages must specify a range with a uniform distribution. Although these assumptions have implications for feasibility, they are not critical to the substantive conclusions we draw. The distortion y is just the degree of distortion as well as its direction (positive or negative). We assume a sufficient flexibility of language such that any feasible distortion is possible.

Because the committee can transmit information that produces any feasible level of distortion, we allow the committee to bargain directly over the distortion y in the committee meeting. However, we also assume that there is a default distortion, x, that results if the committee fails to agree on a bargain; x is feasible if $x \in \left[\frac{-\theta}{2}, \frac{1-\theta}{2}\right]$, that is, only if it is a feasible distortion for the committee.

The default distortion can be thought of in at least four ways, which we outline here because the various interpretations illustrate the benefits of using such a simple model. First, x can represent a status quo level of distortion that will be implemented in the case that the committee disagrees with the chair. In the case of central bank communications, this may be repeating the level of distortion produced at the previous meeting. Second, x can be thought of as the result of an unmodeled continuation game where the degree of distortion is the result of central bank communications after editing an official policy statement. If we assume that the end result of this game is known at the time of initial bargaining through backward induction, then x is the crafted communication after members deliberate explicitly over policy communications.[6] Third, x can be thought of as the equilibrium outcome of an unmodeled cheap talk game where the chair and committee members do not coordinate their speech into a unified message. In this case, P attempts to infer information from multiple committee members who make separate, uncoordinated transmissions. If we assume

[6]See Baerg (2020), who accepts this interpretation and then empirically examines changes to the official policy statements by FOMC committee members from 2014 to 2018.

that committee members can predict the end result of this cheap talk game at the time of initial bargaining through backward induction, then x can be interpreted this way as well.[7] Finally, x can be interpreted as movement from the chair's position. Deviations from x map the benefits of policy making by a particular committee compared to only the chair deciding. Deviations from x therefore also directly quantify the benefits of policy making by a committee compared to a chair acting alone.[8]

Finally, committee member i is assumed to possess a known (to other committee members) bias or preference, b_i. We assume that preferences are known to other committee members, as members meet regularly. This bias may be interpreted as policy preferences over a particular policy, for example, Dove versus Hawk inflation preferences or interest rate preferences, or it may reflect different interpretations of objective information, θ, about the true state of the world and therefore different "expertise" members bring to the meeting. We assume that each committee member derives utility from the degree to which P forms expectations in line with the true state of the world and the committee member's bias. It is important to note that in our model, a committee member's ideal point is dependent both on the true state of the world and on the member's bias. Thus, member i has the ideal point $\theta + b_i$. The fact that the truth matters in the utility function of the committee member is what makes the committee member an "expert." If all committee members have exactly the same bias, then this is covered by the $N = 1$ case. For simplicity, we model a member's utility with a quadratic loss function, meaning that the distortion interval is symmetric:

$$u_i = -\left(\theta^e - (\theta + b_i)\right)^2 .$$

[7] For this interpretation, see Moschella and Diodati (2019).

[8] We thank an anonymous reviewer this interpretation.

Alternatively, we can write this in terms of the level of distortion:

$$u_i = -\left(y - b_i\right)^2 .$$

The timing of the game is as follows:

1. The chair and committee members observe θ.
2. The chair proposes y to the committee.
3. The committee votes simultaneously to accept or to reject the chair's proposal.
4. If the committee accepts, y is transmitted to P, and P forms expectations θ_y^e. If the committee rejects, x is transmitted to P, and P forms expectations θ_x^e.

We assume that the committee can only make credible threats about rejecting a proposal, hence we restrict attention to subgame perfect equilibria (SPE).

Equilibrium Cases

We are interested primarily in uncovering the level of strategic vagueness, v, transmitted to P in equilibrium. As mentioned earlier, P may be interpreted as any external, non–committee member who has an interest in incorporating messages from the committee. We focus on finding messages that are what we call *minimally vague messages*. Minimally vague messages produce a distortion y while minimizing v. Let $\underline{v}\left(y, \theta\right)$ be the degree of vagueness associated with a minimally vague message. Because we assume, all else being equal, that the chair and committee members prefer lower levels of strategic vagueness, any equilibrium message will be minimally vague. The rest of this theoretical section examines the two features that we care about and their effects on vagueness. First, we examine the effects of committee size and committee roles on vagueness; then, we examine the effects of committee composition on vagueness.

Committee Design and Strategic Vagueness

In this section, we focus on how a committee with an agenda setting chair provides institutional constraints on strategic vagueness versus an individual or a committee without an agenda setting chair. Proposition 1 presents our main result. Without loss of generality, we assume that the chair's bias is $b_C \geq 0$. Denote the degree of vagueness and distortion that results when the chair is the sole (Dictator) committee member (i.e., $N = 1$) as v_C and y_C, respectively. Let M be a committee member with the median amount of bias b_M. Let v_M and y_M, respectively, be the amount of vagueness and the amount of distortion that would result if M were the sole committee member.[9,10]

Proposition 1

Let $N > 1$, and assume that x is feasible so that $\frac{\theta}{2} \leq \theta + x \leq \frac{1+\theta}{2}$. The following statements characterize equilibrium message vagueness, v^*:

1. *If $b_C = b_M$, then $v^* = v_C = v_M$. We call this the* median chair *case.*
2. *If $b_C < |b_M|$, then $v_M \geq v^* \geq v_C$. We call this the* constrained committee *case.*
3. *If $b_C > |b_M|$ and either (a) $x \geq b_C$ or (b) $x \leq 2b_M - b_C$, then $v^* = v_C > v_M$. We call this the* dominant chair *case.*
4. *If $b_C > |b_M|$ and $b_C > x > 2b_M - b_C$, then $v_C > v^* \geq v_M$. We call this the* constrained chair *case.*

Proposition 1 highlights the way chair–committee structure constrains the vagueness that would result if messages were alternatively made by a single agent or a committee on which the median member was unconstrained by a chair with proposer power. Importantly, we find

[9]We suppress in our notation the dependence of v_C and v_M on θ, for brevity.

[10]This is also the level of vagueness that would result if a perfectly patient committee were to vote up or down on all possible vagueness levels [without a strategic proposer] until one passed.

that while ex post, external actors will always prefer either the chair acting alone as a single agent or a committee without an agenda setting chair, whichever has bias closer to zero, ex ante, the institutional structure of a committee with an agenda setting chair can work to reduce distortionary vagueness, acting like insurance against chairs or median committees with high bias levels. Intuitively, the chair and median committee member represent two distinct sources of power. This separation of power potentially reduces vagueness because both players must agree to coordinate their message or the default option (status quo, x) is implemented. Another way to think about the committee's role in our model is that the committee functions as a collective veto player in relation to the chair's proposal. If we were to reverse the model and give the committee proposal power, then we would get symmetric results as if the chair were imbued with veto power. It is also possible to imagine multiple veto players. For instance, the chair might have proposer power, but two committee factions must pass the proposal separately.

When a separation of power between the chair and median member does not exist, the chair–committee structure fails to reduce strategic vagueness. This is highlighted by the situation where the chair is also the median member. In this case, the committee provides no additional constraints on the chair. In the other cases, either the chair or the median committee member prefers more strategic vagueness. For example, when the median committee member has a higher bias than the chair, adding an agenda setting chair to the committee works to constrain the committee and reduce strategic vagueness.

Now consider when the chair is more biased than the committee. This can also be thought of as comparing delegating to a single agent to delegating to a chair who must receive approval from the committee. When the default option is not so bad, the committee can effectively constrain the level of vagueness preferred by the chair, leading to the constrained chair case. When the default option is very bad for the committee, the committee fails to constrain the chair, leading to the dominant chair case. The effect of committee design on the level of strategic vagueness is shown graphically in Figures 1 and 2, and proofs of Proposition 1 as well as worked examples are given in the online appendix. As these figures show, the level of strategic vagueness produced by a MPC depends on the number of committee members (whether a single individual or a committee) and on whether the committee (chair) acts as a counterbalance to the chair (committee).

Committee Composition and Strategic Vagueness

The previous section focused on how a committee's size and the roles members play constrain strategic vagueness. However, vagueness also depends on the *composition* of the committee members in terms of their preferences. The most obvious way this happens is that, all else equal, lowering the magnitude of bias for C and M lowers the level of strategic vagueness in equilibrium. This means that committees with more moderate members are also those that are less vague. In certain cases, we can go further than this to show a less intuitive but potentially powerful result.

In many applications, it is interesting to consider the possibility of a small status quo or default level of strategic vagueness. For instance, if the committee cannot agree on a level of vagueness, individual members may transmit information independently (see, e.g., Moschella and Diodati, 2019; Ferrara, 2019). Because all transmissions are truthful by assumption, their intersection may be quite small. Proposition 2 demonstrates how a small status quo impacts equilibrium vagueness. It then looks at the implications for this when the chair and median committee member have similar or dissimilar preferences.

Proposition 2

If $\min\left[|b_C|, |b_M|\right] > 0$ *and* x *is feasible and small in the sense that* $|x| < \min\left[|b_C|, |b_M|\right]$*, then (a) if the chair and median committee member are oppositely biased, then* $v^* = v_x$*, and (b) if the chair and median committee member are like biased, then* $v^* > v_x$*.*

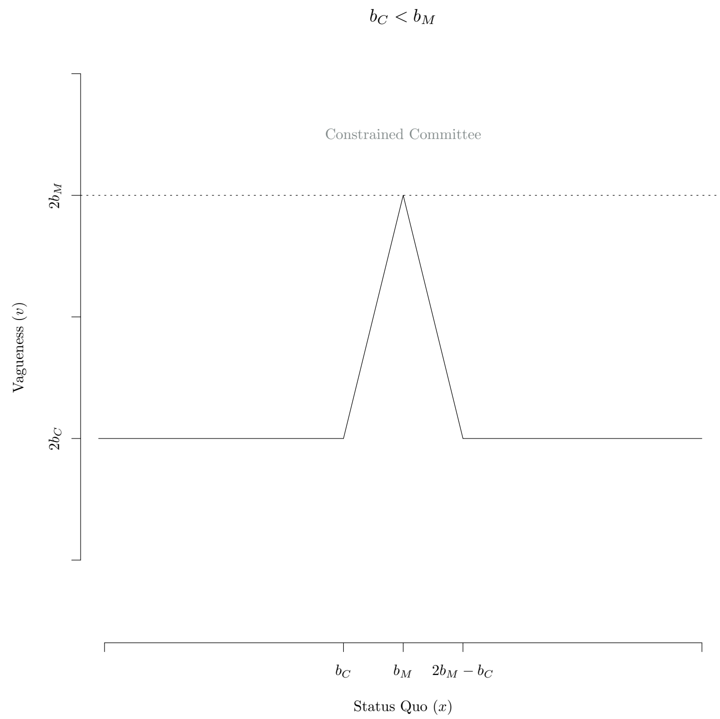

Figure 1: Constrained Chair

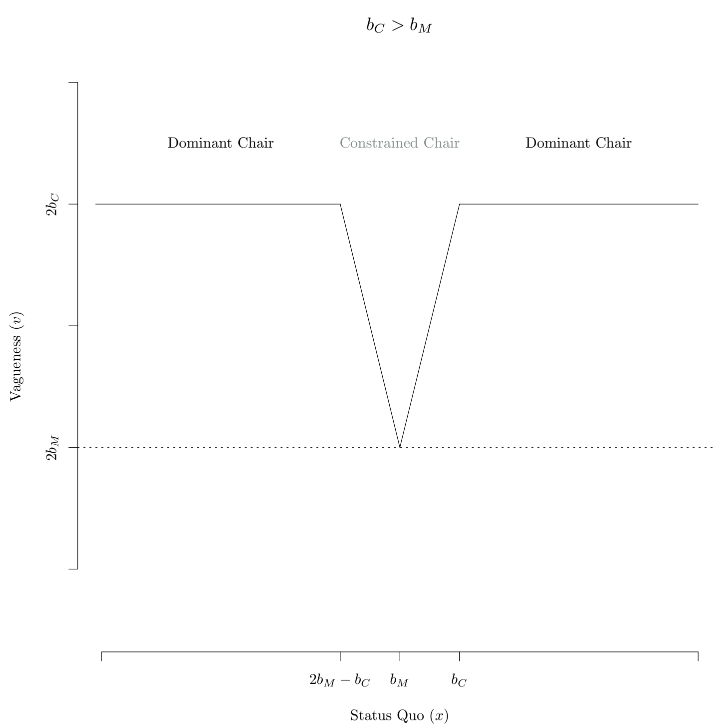

Figure 2: Dominant Chair

Proposition 2 predicts that vagueness will be higher when the chair is biased in the same direction as the median committee member than when they are oppositely biased. Strikingly, as $x \to 0$, $v^* \to 0$ when the chair and median committee member are oppositely biased. When both have nonzero biases and they are like biased, then v^* remains bounded away from 0 as $x \to 0$.

Intuitively, Proposition 2 implies that opposing committees are less vague. If the level of vagueness in x is small, then Proposition 2 implies that communicated precision will be higher when committee members are from different factions.[11] This implies that central bank communications will be more precise (less vague) the more the committee is divided. We explore this proposition empirically in the next section.

> H_1: *Committees that are divided communicate with lower levels of strategic vagueness than committees that are aligned.*

Vagueness on the FOMC

To test our theoretical expectations, we need a measure of strategic vagueness. Measures from other domains include variation in roll call votes, survey responses, and communications. Following Bräuninger and Giger (2016) who measure ambiguity in political speeches, we choose a method of measuring strategic vagueness using textual data from the FOMC.

The FOMC is the decision-making body for monetary policy in the United States. Today 8 and historically 12 times a year, FOMC committee members come together and decide on interest rates for the U.S. economy. Importantly for our purposes, FOMC meetings are recorded, and these recordings and corresponding reports are made publicly available. Such reports include meeting transcripts, policy statements, public statements regarding the FOMC's policy decisions, Memoranda of Discussions (1967–1976), and Records of Policy

[11] This is true up to the qualifier that $\forall\theta$ and $\forall\theta_{b_C,b_M}$ such that y_C, y_M is feasible given θ.

Actions and Minutes of Actions (1976–1992). The empirical analyses use the Records of Policy Actions and Minutes of Actions textual documents to provide an empirical test of our theory.[12]

The sample that we cover is the period under Arthur Burns's tenure (more later). From February 1970 to March 1978, our primary documents are the FOMC's Memoranda of Discussion, which summarize each FOMC meeting.[13] Starting in 1970, FOMC meetings were tape-recorded to help prepare the minutes. Unknown to committee members, committee meetings were transcribed and stored in an archive. The tape recordings were subsequently released during Greenspan's tenure. Both Meade and Stasavage (2008) and Hansen, McMahon, and Prat (2017) used the publication of the historical meeting transcripts, in 1993, as a discontinuity, analyzing the effect of publicity on members' behaviors before and after members knew they were being recorded. In doing so, Meade and Stasavage (2008) found that committee members behaved differently before and after this date; knowledge that the meetings are recorded make committee members less likely to voice dissent.

In this analysis, we leverage the fact that the FOMC transcripts before 1993 provide an accurate account of committee members' *private discussions.* Because committee members did not know and did not expect that their meetings would be made publicly available, we can isolate the effects of committee bargaining on strategic vagueness without worrying about external publicity and its effects on members' behaviors. This is important, as research by Riboni and Ruge-Murcia (2010) found that the modern FOMC behaves as if it is governed by consensus, even though, officially, policy making is based on majority voting. As Meade and Stasavage (2008) have shown, before 1993, members did not hide their disagreements and

[12]See https://www.federalreserve.gov/monetarypolicy/fomc_historical.htm for transcripts and other historical materials.

[13]The Records of Policy Actions and Minutes of Actions were released after 90 days until 1976, and then expedited. In March 1975, the release was changed from 90 days to 45 days, and it was changed again in May 1976 to a few days after the next scheduled meeting. Despite the variation in the publication records, for the duration of the sample period, there was always a short delay in publication.

dissented more freely. Therefore, the meetings offer researchers much richer and sympathetic reporting of members' preferences on policy as well as internal debates.

In addition to the rich set of documents and transcripts that we use for analysis, the FOMC has a number of interesting institutional features that make it a good test subject of our theory. First, the FOMC committee chair during this period is a strong agenda setter, usually speaking first. For example, during Burns's tenure, Chappell, McGregor, and Vermilyea (2004) and Riboni and Ruge-Murcia (2020) estimate that Chairman Burns accounted for 40–50 percent of the committee voting weight on interest rate decisions. Similarly, Burns–member differences in stated interest rates are lower when Burns makes recommendations early in the meeting rather than later in the meeting, which is consistent with the hypothesis that the chairman is an agenda setter (Chappell, McGregor, and Vermilyea, 2007). We also leverage this information to check whether when Burns makes a proposal matters for our findings.

Second, committee members are appointed by different channels, either through private member banks in their districts, Bank Presidents, or through presidential appointments to the Board of Governors (Chang, 2001). Variation in the appointment mechanism and appointment timing provides an exogenous source of variation in committee composition, which also bolsters the research design.

For example, in the case of those directly appointed by the president, both Republicans and Democrats tend to appoint members with more similar preferences to their own, conditional on confirmation by the Senate, and appointments are staggered across presidential terms (Gandrud and Grafström, 2015; Chang, 2001). Interestingly, however, by the end of Burns's tenure, although almost all appointed FOMC members had some loyalty to the Republican Party, there were also a large number of "swingers" on the FOMC, which makes different configurations of the chair and the median likely during this period (Istrefi, 2019; Bordo and Istrefi, 2018).

Committee members from bank districts or Bank Presidents, by contrast, are also more likely to represent their districts' local conditions, especially their unemployment levels (Baerg and Lowe, 2018; Chappell, McGregor, and Vermilyea, 2004). Appointment differences, therefore, ensure that members have different policy preferences and that these preferences are independent of the preferences members have over the level of strategic vagueness in committee deliberations.

There are two obvious challenges with using textual data for a measure of strategic vagueness. First, using textual data, we can only measure what is recorded in meetings. In other words, our measure does not count either words that go unsaid when members stay silent or statements made off the record. Given that we are not interested in a particular topic (for example inflation), which might make people more hesitant to speak, and given the members do not think the meetings are recorded, we think that this is not relevant. Second, we may also underestimate strategic vagueness if FOMC members use a "mixed- strategy" when communicating, for instance, by using language that expresses both certainty and uncertainty language at the same time. So as to account for this, we test our hypothesis with different measures including absolute counts and the share of expressed uncertainty (more below).

In the next section, we examine whether FOMC committee composition, and especially variation in the configuration of the chair and the median member's preferences, is related to the level of strategic vagueness in FOMC reports between 1970 and 1978. We find that when the median FOMC voting member and the chair have opposing preferences, meetings contain more certainty language than when the median and chair have like preferences. We find a similar positive and statistically significant relationship when we consider the absolute difference between the chair's and the median member's preferences as well. Taken together, we find some empirical support for our model.

The Burns Years

The time period for our first empirical test is 1970–1978, covering a total of 99 FOMC meetings. This period encompasses meetings presided over by FOMC chairman Arthur Burns, who took the helm of the FOMC in 1970 and retired in March 1978. Burns's tenure as chairman of the FOMC was remarkable in that it coincided with a number of momentous political and economic events. During his tenure, the United States experienced a deep recession that was associated with rising rather than falling inflation. Following the recession, the economy was subjected to price controls, international financial shocks, and domestic political turmoil due to the Vietnam War.

Importantly, during this time period, there is also large variation in whether the committee chair proposes an interest rate close to or far from the median member's and mean member's target policy rates. Indeed, and as reported in Chappell, McGregor, and Vermilyea (2004, pp. 415–416), in the March 1975 meeting, the adopted funds rate was exactly equal to the median of the desired rates of the committee's members, and the median was also close to the mean. In May 1973, however, the chosen target of 7.56 percent was less than both the median and the mean. The target rate was instead set equal to the rate advocated by Chairman Burns, whose preferred rate was lower than the preferred rates of all other voting members. Figure 5 plots the over-time preferences of Burns and the mean and median of FOMC voting members. If our theory is correct, there will be a systematic association between strategically vague language in the meetings and changes in the alignment of committee members' preferences.

The FOMC committee rotation system enables only a subset of all bank presidents to vote at any given meeting. A maximum of 12 out of a possible 19 members vote. Importantly, members cannot self-select into the official voting calendar; official voting is determined by a preset schedule. Following Baerg and Lowe (2018) and Baerg (2020), we calculate the median member and mean member under two assumptions: one sample computes the median and mean committee members from only those members with voting rights at any given meeting, and a second sample computes the median and mean preferences from all committee members, irrespective of whether they are on rotation to vote.

Dependent Variable

Our main dependent variable is *strategic vagueness.* To create this measure, we first downloaded the Memoranda of Discussion (1967–1976) and Records of Policy Actions and Minutes of Actions (1976–1978) from the Fed's historical archives.[14] We selected all FOMC meetings between January 1970 and February 1978, for a total of 99 meetings, which completely covers Burns's tenure at the Fed.

We transform these public records into a document frequency matrix using standard textual analysis techniques with the R package *quanteda* (Benoit et al., 2018). We then apply an off-the-shelf certainty and uncertainty dictionary and keep only those words that are dictionary keys and their associated counts. The dictionary terms that we keep are from the Linguistic Inquiry and Word Count (LIWC) dictionary (Pennebaker, Francis, and Booth, 2001), and we use the vocabulary from the dimensions "certainty" and "uncertainty." We use this measure because we want to use measures that are used in previous literature for measuring strategic vagueness, but in other domains. For example, Owens and Wedeking (2011) found that committee heterogeneity is positively associated with vagueness, whereas our theory predicts the opposite. They empirically evaluated their model using LIWC, and so by also using LIWC, we can see whether central bankers behave similarly. In the party politics literature, Eichorst and Lin (2019) also use LIWC. While other measures of certainty and uncertainty are possible, by using a well-known, off-the-shelf measure, we are more confident in making comparisons of monetary policy with past research findings. Another benefit of using this dictionary is that it focuses on language associated with *psychological uncertainty*

[14] https://www.federalreserve.gov/monetarypolicy/fomc_historical.htm.

rather than *economic uncertainty*. A final benefit is that, given that the dictionary is off-the-shelf and generic, it is not overfitted to the data.

In applying the LIWC dictionary to our corpus, we find significant variation in the number of certainty and uncertainty words used across FOMC meetings over this period. This is shown in Figures 3 and 4. The maximum number of uncertainty words used in any given meeting is 80, and the maximum number of certainty words used in any given meeting is 13. To construct our main dependent variable, we transform these certainty and uncertainty word counts into a proportional response variable. Our main dependent variable, therefore, measures the share of certainty over uncertainty words for any given meeting in our sample. Figures 3 and 4 show the counts of uncertainty words and the share of certainty to uncertainty words in the Fed documents over time, respectively. Although we can see that there is a positive over-time trend in the number of uncertainty words used in the documents, once we transform the counts into a proportional response, we find less evidence of this trend. Because we are modeling the ratio of certainty to uncertainty word counts, the statistical model that we use is a GLMM binomial model.[15]

Independent Variables

Opposing Biases

Our main independent variable is the preference alignment of the chair and median member on the FOMC. To measure committee members' preferences, we use the preferred interest rate for the chair, median member, and mean member as estimated by Chappell, McGregor, and Vermilyea (2004). To compute members' preferences, Chapell et al. examined the FOMC transcripts and, employing human coders, code individual members' announced target rates across meetings. The authors succeeded in using the transcript data for 80 percent

[15]In the appendix, we report results using a Poisson model with either counts of uncertainty or counts of certainty and find similar results.

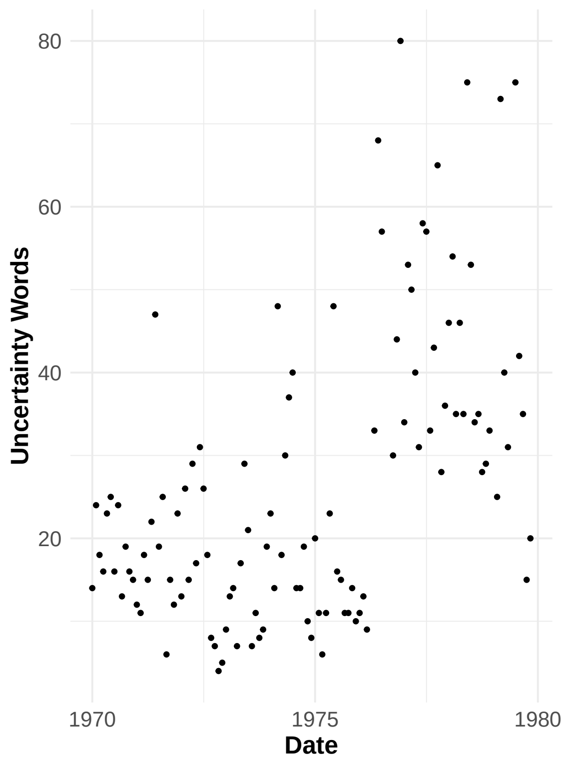

Figure 3: Number of Uncertainty Words

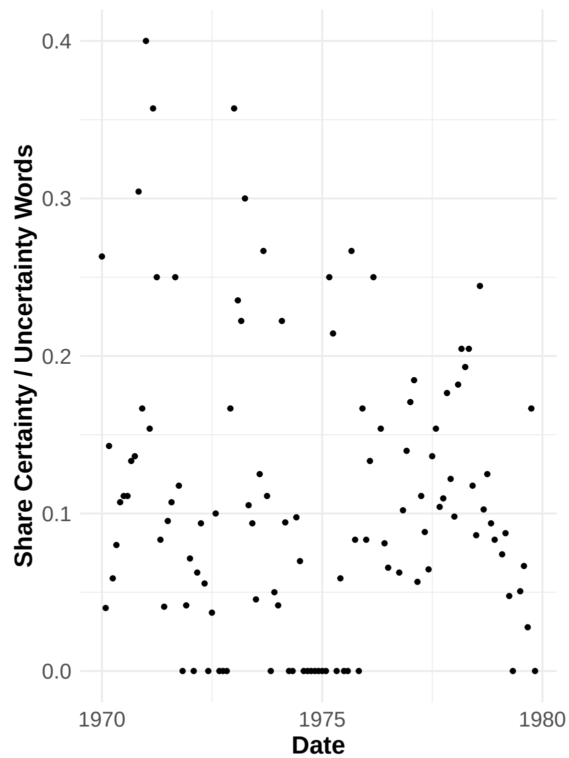

Figure 4: Share of Certainty Words

of all cases. For the remaining 20 percent of cases, the authors used a statistical model to interpolate a member's preferred policy target rate. Rather than being interested in the preferences of all members, we are interested in the alignment of the chair and the median member. We therefore generate a new variable, *opposing biases*, to capture this.

We first code *opposing biases* as 1 when the mean FOMC member is spatially located between the chair and the median member such that the median member is further away from the chair than the mean member. We code *opposing biases* as 0 when the median is located between the mean and the chair. In those cases where the median and the mean have the same preference, we also code this as 1. In the sample of voting members, *opposing biases* yields 73 cases where the median and chair have aligned preferences and 26 cases where the median and chair have opposing preferences. For robustness, we repeat the coding procedure a second time; however, now we use the median from the different voting samples, those both on and not on schedule to vote in the roll call. As before, we code *opposing biases* as 1 when the committee median is further from the chair than the mean, and 0 otherwise.

As an alternative measure of the independent variable, we also measure the absolute distance between the chair's and the median's preferred interest rates and call this *absolute distance*. As earlier, we also repeat the coding procedure a second time, taking into consideration those both on and not on schedule to vote in the roll call.

Control Variables

In addition to preferences and voting status, we want to account for important characteristics about the U.S. economy. To do this, we control for the *target interest rate* at any given meeting. By including the policy interest rate, we account for meeting-to-meeting variation in economic conditions.

Second, we account for fundamental economic uncertainty using the Economic Policy Uncertainty Index (EPUI) by Baker, Bloom, and Davis (2016). These authors construct

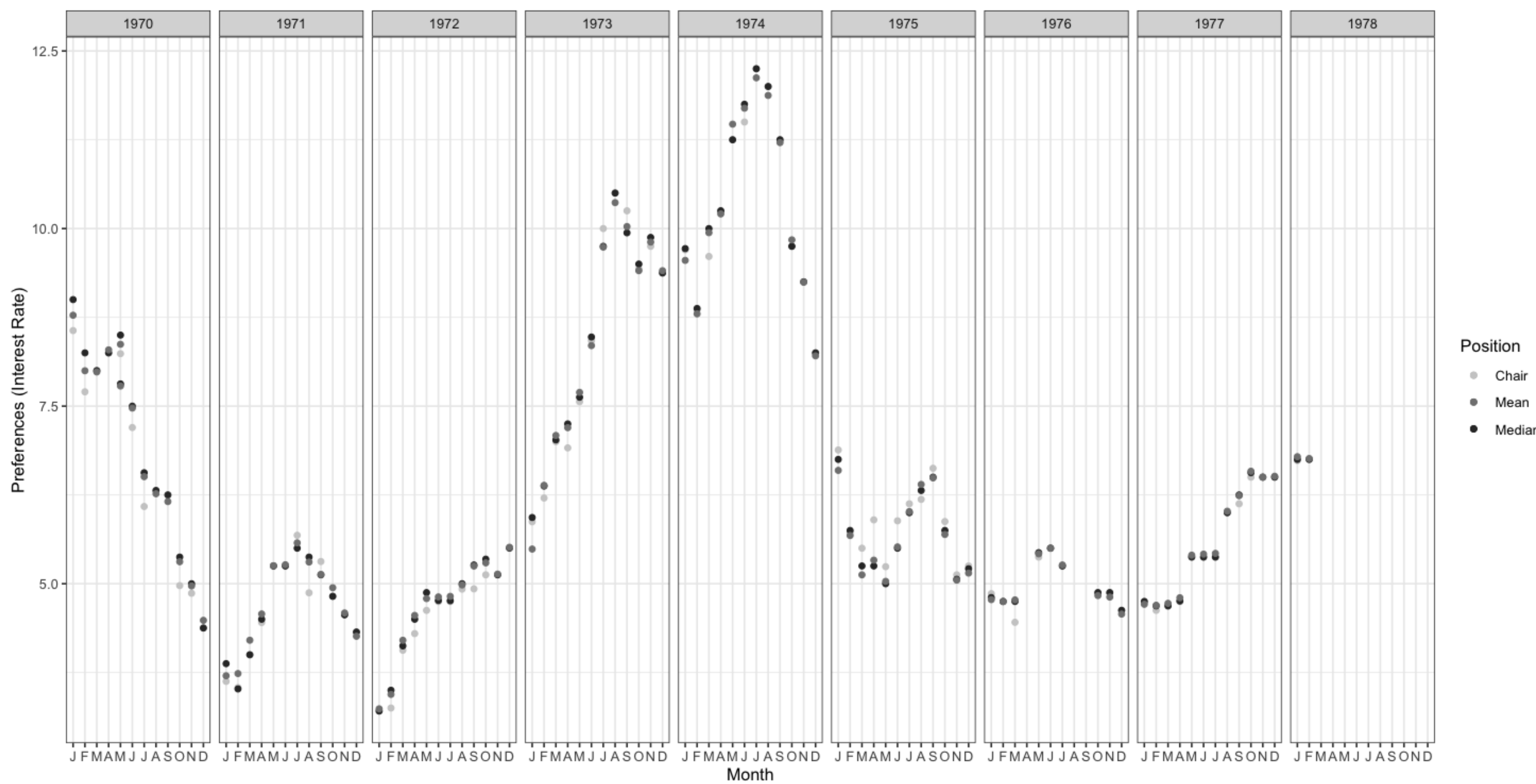

Figure 5: Interest Rate Preferences by Position

this measure by combining news coverage, tax code expiration data, and economic forecaster disagreement. These data are available monthly for the United States and cover the entire period.

Additionally, we account for year random effects. By accounting for year characteristics, we can be sure that variation in preferences is associated with members' intercommittee behavior rather than with economic conditions. Because the committee chair stays the same throughout the period, we do not include chair effects. In a separate analysis (not reported here), we also included the share of Republican candidates on the FOMC as calculated by Chappell, McGregor, and Vermilyea (2004); we found no appreciably different results.

Statistical Results

The statistical results are presented in Table 1. As mentioned earlier, the dependent variable is the share of certainty to uncertainty words in a given meeting transcription. We examine the effects of opposing bias, the target interest rate, and economic policy uncertainty. We find some evidence that moving from an aligned to an opposing median committee member is associated with an increase in the share of certainty words in a meeting. Interestingly, we find that this is true irrespective of whether we calculate the median from the pool of members on schedule to vote or off schedule to vote, though the effect size is larger for the sample that calculates the median from voting members.

Using the alternative measure absolute distance, we also find a positive relationship. An increase in the (absolute) distance in preferred interest rates is associated with an increase in the share of certainty words. As with opposing bias, we find that this relationship is stronger in the sample of voting members compared to the sample with all FOMC members, including those not on the roll call.

In terms of our controls, we find a negative relationship between interest rates and the share of certainty words. Interestingly, we find no relationship between the economic policy index metric and the share of certainty words in the meeting. It may be that the target interest rate is capturing much of the variation in the economy. The correlation between the interest rate and the EPUI measure is 0.376. The correlation between the share of certainty words and the EPUI measure is −0.141.

Table 1: Regression Results for Proportion of Certainty/Uncertainty Words and FOMC Opposing Biases

	Share of certainty to uncertainty words (dependant variable)			
	Median voters	Median all members	Median voters	Median all members
Opposing bias	0.501^{***}			
	(0.187, 0.815)			
Opposing bias		0.295^{*}		
		(−0.029, 0.620)		
Absolute distance			1.100^{**}	
			(0.115, 2.086)	
Absolute distance				0.898^{*}
				(−0.107, 1.904)
Interest rate	-0.204^{***}	-0.178^{***}	-0.192^{***}	-0.186^{***}
	(−0.339, −0.069)	(−0.307, −0.050)	(−0.327, −0.058)	(−0.320, −0.051)
Economic policy uncertainty	0.001	−0.0001	0.001	0.0003
	(−0.006, 0.008)	(−0.007, 0.007)	(−0.006, 0.008)	(−0.007, 0.007)
Constant	-1.167^{**}	-1.107^{**}	-1.138^{**}	-1.135^{**}
	(−2.255, −0.078)	(−2.150, −0.064)	(−2.225, −0.051)	(−2.214, −0.055)
Observations	99	97	99	97
Log likelihood	−185.215	−186.950	−187.616	−187.006
Akaike inf. crit.	380.430	383.900	385.233	384.012
Bayesian inf. crit.	393.406	396.774	398.208	396.886

Note. GLMM binomial model.
$^{*}p < 0.1$. $^{**}p < 0.05$. $^{***}p < 0.01$.

Robustness Checks

One possible concern with the preceding analysis is that the model assumes that the interpolated data for the committee members are valid and that Burns's stated preferences set the agenda. The latter assumption is especially important, as it could be the case that Burns proposed an interest rate based on what other committee members wanted rather than on his own preference. To ensure that this is not confounding our results, we run the same models as before, but this time, we use only those cases where Burns speaks first. This reduces the number of FOMC meetings from 99 to 48. The results are given in Table 2.

Table 2: Regression Results for Proportion of Certainty/Uncertainty Words and FOMC Opposing Biases with Agenda Setting

	Share of certainty to uncertainty words (dependant variable)			
	Median voters	Median all members	Median voters	Median all members
Opposing bias	0.717^{***}			
	(0.288, 1.145)			
Opposing bias		0.601^{**}		
		(0.136, 1.067)		
Absolute distance			1.515^{**}	
			(0.308, 2.722)	
Absolute distance				1.594^{**}
				(0.358, 2.830)
Interest rate	-0.318^{***}	-0.298^{***}	-0.376^{***}	-0.380^{***}
	(−0.519, −0.117)	(−0.500, −0.095)	(−0.594, −0.157)	(−0.599, −0.161)
Economic policy uncertainty	−0.008	−0.009	−0.010	−0.009
	(−0.020, 0.004)	(−0.021, 0.003)	(−0.022, 0.002)	(−0.021, 0.003)
Constant	0.327	0.331	0.881	0.783
	(−1.506, 2.160)	(−1.494, 2.156)	(−1.087, 2.849)	(−1.172, 2.737)
Observations	48	48	48	48
Log likelihood	−82.605	−84.734	−84.985	−84.779
Akaike inf. crit.	175.209	179.469	179.970	179.559
Bayesian inf. crit.	184.565	188.825	189.326	188.915

Note. GLMM binomial model.
$^{*}p < 0.1$. $^{**}p < 0.05$. $^{***}p < 0.01$.

Using the restricted sample, where we know that the chair speaks first, we find consistent results with the full analysis reported. We find that a committee with an opposing median is associated with a greater share of certainty words in the FOMC meeting. Furthermore, we find that as the distance in preferences between the chair and the median member grows, the share of certainty to uncertainty words in the documents grows larger. We also find that the interest rate continues to be associated with fewer certainty words and that the EPUI continues to show no statistical relationship with our measure of strategic vagueness.

Another concern is that the EPUI captures economic uncertainty, but what matters is not economic uncertainty but economic sentiment. To check whether economic sentiment matters, we construct and include a measure of economic sentiment for the period using latent semantic scaling (LSS). LSS has been used to measure bias in the news and in United Nations General Assembly speeches (e.g., Watanabe, 2017; Baturo and Watanabe, 2019). To our knowledge, this is the first application of LSS to FOMC meeting reports. The technique relies on word embeddings, and users provide a list of "seed words" to scale documents on a specific dimension. The particular dimension we explore is economic sentiment, and we use a generic sentiment dictionary by Turney and Littman (2003). In short, LSS is similar to other kinds of document scaling techniques that estimate documents in a single-dimensional space. Rather than being based on word frequency in a more traditional "bag of words" framework, LSS scores depend on semantic proximity to the chosen seed words. Such a scaling model is semi-supervised because, on one hand, it automatically estimates semantic proximity between words in a corpus employing word-embedding techniques, yet, on the other hand, the researcher still chooses seed words based on research interests. In this case, we select positive and negative words (sentiment). Figure shows graphically the computed sentiment for the period.

Table 3 shows the results when we include economic sentiment in our analysis. As before, we find a positive and statistically significant relationship between the committee having an opposing median and the share of certainty words in the meeting transcriptions. We also find a similarly positive association between absolute distance and share of certainty words. We find a negative relationship between the interest rate and the share of certainty language. As before, we find no meaningful relationship between the EPUI measure and this is also true for our measure of lexical uncertainty; we find no evidence that economic sentiment affects the share of certainty and uncertainty words.

The fact that economic uncertainty and economic sentiment are unrelated to the proportion of certainty/uncertainty words is at first glance puzzling. Recent research by Firrell and Reinold (2020), however, examined the impact of economic uncertainty on MPC behavior

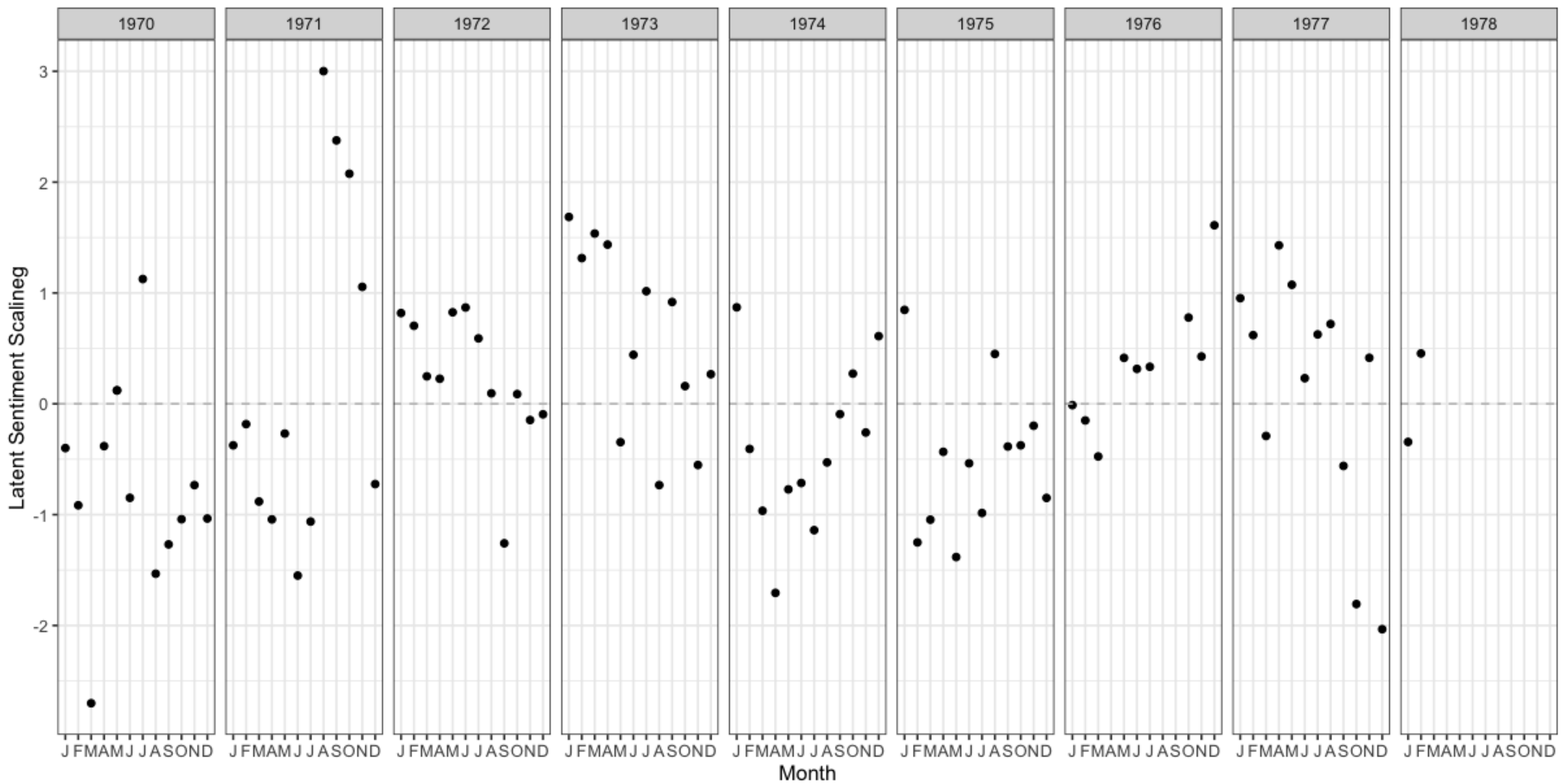

Figure 6: Economic Sentiment

Table 3: Regression Results for Proportion of Certainty/Uncertainty Words and FOMC Opposing Biases with Sentiment

	Share of certainty to uncertainty words (dependant variable)			
	Median voters	Median all members	Median voters	Median all members
Opposing bias	0.473^{***}			
	$(0.159, 0.786)$			
Opposing bias		0.282^{*}		
		$(-0.045, 0.608)$		
Absolute distance			1.053^{**}	
			$(0.035, 2.071)$	
Absolute distance				0.823
				$(-0.206, 1.852)$
Interest rate	-0.196^{***}	-0.167^{**}	-0.190^{***}	-0.181^{***}
	$(-0.332, -0.060)$	$(-0.295, -0.038)$	$(-0.328, -0.052)$	$(-0.318, -0.043)$
Economic policy uncertainty	0.001	-0.0005	0.0004	0.0001
	$(-0.006, 0.008)$	$(-0.007, 0.006)$	$(-0.007, 0.007)$	$(-0.007, 0.007)$
Latent sentiment	0.014	0.039	-0.006	0.003
	$(-0.125, 0.152)$	$(-0.101, 0.178)$	$(-0.148, 0.135)$	$(-0.137, 0.143)$
Constant	-1.149^{**}	-1.118^{**}	-1.106^{**}	-1.112^{**}
	$(-2.223, -0.075)$	$(-2.140, -0.096)$	$(-2.184, -0.027)$	$(-2.178, -0.046)$
Observations	96	94	96	94
Log likelihood	-178.585	-179.909	-180.785	-180.100
Akaike inf. crit.	369.170	371.819	373.569	372.201
Bayesian inf. crit.	384.556	387.078	388.955	387.461

Note. GLMM binomial model.
$^{*}p < 0.1$. $^{**}p < 0.05$. $^{***}p < 0.01$.

directly using the Bank of England as a case study. These authors examined whether periods of high uncertainty translate, first, into changes in voting behaviour by members on the MPC and, second, into number of dissents. Similar to the results shown here, Firrell and Reinold found little evidence that dispersion of economic assessments increases in periods of uncertainty. They also found little evidence that average rates of dissent change. To explain these findings, the authors present a model in which the lack of volatility is explained by a signal extraction problem. In other words, in periods of higher levels of uncertainty, MPC members neither disagree nor dissent more. Such an interpretation is consistent with the idea that internally, committee members vary in terms of preferences rather than in terms of information or expertise.

Conclusion

In this article, we show that strategic vagueness is an important and underexplored feature of committee design. We characterize the ways that committee size, roles, and composition impact the use of language in committee meetings. One important finding is that while ex post, the public prefers either a committee chair acting alone as a single agent (a Dictator) or a committee without an agenda setting chair (whichever is less biased), ex ante, an opposed committee produces lower levels of strategic vagueness. What this finding shows is that both committee members' preferences (biases) as well as committee members' behaviors (strategy) matters for the transmission of information. More specifically, from the perspective of the public, on the one hand, members of the public might prefer the "unvarnished truth" yet the committee may prefer a different outcome. This is either because committee members are biased (i.e. more inflation Hawkish than the average member of the public) or alternatively, have greater expertise. Given this, the public's best strategy is to make sure the committee cannot be too strategically vague for their own personal benefit. The public then prefers committees with opposing views – these opposing views provide internal self governing mechanisms, which make some committees more accountable than others.

Also important is that our findings are opposite to the empirical evidence in judicial politics. Previous research on courts found that greater strategic vagueness is used to lubricate intercommittee disagreement; however, in the context of monetary policy, we find that divided committees use more certainty language. Another important finding is that a single decision maker (a Dictator) is expected to be the most vague. Further empirical research could evaluate central bank reforms that shift from a single governor to decision-making by committee, for example, as in Israel and New Zealand (Liviatan and Barkai, 2007), to see whether our model expectations work there as well. Another contribution that we make is to the literature on central bank appointments. The model we present suggests that if the principal doing the appointing has an interest in limiting strategic vagueness, she would do well to appoint oppositely biased committee members.

One limitation of our study is that our model isolates the effect of strategic vagueness from other forms of vagueness, for example, future flexibility, as well as isolating bargaining over vagueness from other possible objects of bargaining, for example, interest rates. This allows for a relatively simple and clean result about vagueness. In our model, vagueness is assumed to be an instrument that eventually has an impact on outside actors' expectations. Because these outside actors are nonstrategic and the committee members have symmetric information, the model does not uncover any mechanism through which vagueness affects the actions of outside actors, other than through a mechanical relation between the two. This means that our research speaks to agent selection and optimal central bank appointments from the perspective of within-committee design rather than external accountability. Although it is likely that both external (principal agent) and internal (within committee) accountability mechanisms matter, there is much less research on internal, within-committee politics in the study of central bank communications, and so we put our focus there. A model that accounts for both internal and external information games (what Caillaud and Tirole (2007) call "two-tier" information games) is needed and could be pursued in further research.

The empirical section tests our theoretical model on strategic vagueness in the FOMC using the Burns period. We find evidence that opposing preferences are associated with a higher share of certainty words in the meeting transcripts. This application is perhaps an easy test of our theory, as the FOMC exhibits most of those features that our model highlights as being effective: a strong chair, an opposing (or not) counterpoint in the committee, and the ability to take an outside offer by way of publicly dissenting to the policy. Future work might test our model on other types of committees. According to our argument and findings, committee policy making has benefits that have heretofore been overshadowed by an interest in policy.

References

Alesina, Alberto and Alex Cukierman (1990). "The politics of ambiguity". In: *The Quarterly Journal of Economics* 105.4, pp. 829–850.

Ali, S Nageeb et al. (2008). "Information aggregation in standing and ad hoc committees". In: *The American Economic Review* 98.2, pp. 181–186.

Alonso, Ricardo and Niko Matouschek (2008). "Optimal delegation". In: *The Review of Economic Studies* 75.1, pp. 259–293.

Aragones, Enriqueta and Zvika Neeman (2000). "Strategic ambiguity in electoral competition". In: *Journal of Theoretical Politics* 12.2, pp. 183–204.

Baerg, Nicole (2020). *Crafting Consensus: Why Central Bankers Change Their Speech and How Speech Changes the Economy*. Oxford University Press, USA.

Baerg, Nicole, Dominik Duell, and Will Lowe (2021). "Central bank communication as public opinion: Experimental evidence". In: *Working Paper*.

Baerg, Nicole and Will Lowe (2018). "A textual Taylor rule: estimating central bank preferences combining topic and scaling methods". In: *Political Science Research and Methods*, pp. 1–17.

Baker, Scott R, Nicholas Bloom, and Steven J Davis (2016). "Measuring economic policy uncertainty". In: *The Quarterly Journal of Economics* 131.4, pp. 1593–1636.

Baturo, Alex and Kohei Watanabe (2019). "Insults and criticism in international diplomacy: Evidence from the United Nations general assembly." In: *POLTEXT*.

Benoit, Kenneth et al. (2018). "quanteda: An R package for the quantitative analysis of textual data". In: *Journal of Open Source Software* 3.30, p. 774.

Berger, Helge, Volker Nitsch, and Tonny Lybek (2008). "Central bank boards around the world: Why does membership size differ?" In: *European Journal of Political Economy* 24.4, pp. 817–832.

Bholat, David et al. (2019). "Enhancing central bank communications using simple and relatable information". In: *Journal of Monetary Economics* 108, pp. 1–15.

Binder, Carola (2017). "Fed speak on main street: Central bank communication and household expectations". In: *Journal of Macroeconomics* 52, pp. 238–251.

Blinder, Alan S (2007). "Monetary policy by committee: Why and how?" In: *European Journal of Political Economy* 23.1, pp. 106–123.

Bordo, Michael D and Klodiana Istrefi (2018). *Perceived FOMC: the making of hawks, doves and swingers*. Tech. rep. National Bureau of Economic Research.

Bräuninger, Thomas and Nathalie Giger (2016). "Strategic ambiguity of party positions in multi-party competition". In: *Political Science Research and Methods*, pp. 1–22.

Caillaud, Bernard and Jean Tirole (2007). "Consensus building: How to persuade a group". In: *American Economic Review* 97.5, pp. 1877–1900.

Chang, Kelly H (2001). "The president versus the Senate: Appointments in the American system of separated powers and the Federal Reserve". In: *Journal of Law, Economics, and Organization* 17.2, pp. 319–355.

Chappell, Henry W., Rob Roy McGregor, and Todd Vermilyea (2004). "Majority Rule, Consensus Building, and the Power of the Chairman: Arthur Burns and the FOMC". In: *Journal of Money, Credit and Banking* 36.3, pp. 407–422.

Chappell, Henry W, Rob Roy McGregor, and Todd Vermilyea (2007). "The persuasive power of a committee chairman: Arthur Burns and the FOMC". In: *Public Choice* 132.1-2, pp. 103–112.

Chen, Ying and Hülya Eraslan (2014). "Rhetoric in legislative bargaining with asymmetric information". In: *Theoretical Economics* 9.2, pp. 483–513.

Crombez, Christophe, Tim Groseclose, and Keith Krehbiel (2006). "Gatekeeping". In: *Journal of Politics* 68.2, pp. 322–334.

Dal Bo, Ernesto (2006). "Committees with supermajority voting yield commitment with flexibility". In: *Journal of Public Economics* 90.4, pp. 573–599.

Denzau, Arthur T and Robert J Mackay (1983). "Gatekeeping and monopoly power of committees: An analysis of sincere and sophisticated behavior". In: *American Journal of Political Science*, pp. 740–761.

Ehrmann, Michael and Marcel Fratzscher (2013). "Dispersed communication by central bank committees and the predictability of monetary policy decisions". In: *Public Choice* 157.1-2, pp. 223–244.

Eichorst, Jason and Nick CN Lin (2019). "Resist to Commit: Concrete Campaign Statements and the Need to Clarify a Partisan Reputation". In: *The Journal of Politics* 81.1, pp. 15–32.

Ferrara, Federico Maria (2019). "The battle of ideas on the euro crisis: evidence from ECB inter-meeting speeches". In: *Journal of European Public Policy*, pp. 1–24.

Ferrara, Federico Maria and Siria Angino (2021). "Does clarity make central banks more engaging? Lessons from ECB communications". In: *European Journal of Political Economy*, p. 102146.

Firrell, Alastair and Kate Reinold (2020). "Uncertainty and voting on the Bank of England's Monetary Policy Committee". In: *Bank of England Working Paper*.

Fortunato, David (2019). "Legislative review and party differentiation in coalition governments". In: *American Political Science Review* 113.1, pp. 242–247.

Gandrud, Christopher and Cassandra Grafström (2015). "Inflated Expectations: How Government Partisanship Shapes Monetary Policy Bureaucrats' Inflation Forecasts". In: *Political Science Research and Methods* 3.2, pp. 353–380.

Gilligan, Thomas W and Keith Krehbiel (1987). "Collective decisionmaking and standing committees: An informational rationale for restrictive amendment procedures". In: *Journal of Law, Economics, & Organization* 3.2, pp. 287–335.

Haldane, Andrew and Michael McMahon (2018). "Central bank communications and the general public". In: *AEA Papers and Proceedings* 108, pp. 578–83.

Hansen, Stephen, Michael McMahon, and Andrea Prat (2017). "Transparency and Deliberation Within the FOMC: A Computational Linguistics Approach". In: *The Quarterly Journal of Economics* 133.2, pp. 801–870.

Hansen, Stephen, Michael McMahon, and Matthew Tong (2019). “The long-run information effect of central bank communication”. In: *Journal of Monetary Economics* 108, pp. 185–202.
Holmstrom, Bengt (1982). *On the Theory of delegation*. Northwestern University.
Holmstrom, Bengt Robert (1978). *On Incentives and Control in Organizations*. Stanford University.
Istrefi, Klodiana (2019). “In Fed watchers’ eyes: Hawks, doves and monetary policy”. In: *Banque de France Working Paper*.
Jensen, Henrik (2002). “Optimal degrees of transparency in monetary policymaking”. In: *The Scandinavian Journal of Economics* 104.3, pp. 399–422.
Ladha, Krishna K (1992). “The Condorcet jury theorem, free speech, and correlated votes”. In: *American Journal of Political Science*, pp. 617–634.
Liviatan, Nissan and Haim Barkai (2007). *The Bank of Israel: Volume 2: Selected Topics in Israel’s Monetary Policy*. Oxford University Press.
Meade, Ellen E. and David Stasavage (2008). “Publicity of Debate and the Incentive to Dissent: Evidence from the US Federal Reserve”. In: *Economic Journal* 118.528, pp. 695–717.
Meirowitz, Adam (2005). “Informational party primaries and strategic ambiguity”. In: *Journal of Theoretical Politics* 17.1, pp. 107–136.
Moschella, Manuela and Nicola M Diodati (2019). “Does politics drive conflict in central banks’ committees? Lifting the veil on the European Central Bank consensus”. In: *European Union Politics*.
Munday, Tim and James Brookes (2021). “Mark my words: the transmission of central bank communication to the general public via the print media”. In:
Nelson, Edward (2021). “The Emergence of Forward Guidance As a Monetary Policy Tool”. In: *Available at SSRN 3784642*.
Owens, Ryan J and Justin P Wedeking (2011). “Justices and legal clarity: Analyzing the complexity of US supreme court opinions”. In: *Law & Society Review* 45.4, pp. 1027–1061.
Parle, Conor (2022). “The financial market impact of ECB monetary policy press conferences â A text based approach”. In: *European Journal of Political Economy*, p. 102230.
Pennebaker, James W, Martha E Francis, and Roger J Booth (2001). “Linguistic inquiry and word count: LIWC 2001”. In: *Mahway: Lawrence Erlbaum Associates* 71.2001, p. 2001.
Riboni, Alessandro and Francisco J Ruge-Murcia (2010). “Monetary policy by committee: consensus, chairman dominance, or simple majority?” In: *The Quarterly Journal of Economics* 125.1, pp. 363–416.
Riboni, Alessandro and Francisco J. Ruge-Murcia (2020). “The Power of the Federal Reserve Chair”. In: *Center for Economic Policy Research*.
Romer, Thomas and Howard Rosenthal (1978). “Political resource allocation, controlled agendas, and the status quo”. In: *Public Choice* 33.4, pp. 27–43.
— (1979). “Bureaucrats versus voters: On the political economy of resource allocation by direct democracy”. In: *The Quarterly Journal of Economics* 93.4, pp. 563–587.

Shi, Feng et al. (2019). "The wisdom of polarized crowds". In: *Nature Human Behaviour*, p. 1.

Staton, Jeffrey K and Georg Vanberg (2008). "The value of vagueness: delegation, defiance, and judicial opinions". In: *American Journal of Political Science* 52.3, pp. 504–519.

Turney, Peter D and Michael L Littman (2003). "Measuring praise and criticism: Inference of semantic orientation from association". In: *ACM Transactions on Information Systems (TOIS)* 21.4, pp. 315–346.

Ulmer, S Sidney (1971). "Earl Warren and the Brown decision". In: *The Journal of Politics* 33.3, pp. 689–702.

Van Der Cruijsen, Carin and Maria Demertzis (2007). "The impact of central bank transparency on inflation expectations". In: *European Journal of Political Economy* 23.1, pp. 51–66.

Watanabe, Kohei (2017). "Measuring news bias: Russia's official news agency ITAR-TASS coverage of the Ukraine crisis". In: *European Journal of Communication* 32.3, pp. 224–241.

Online Appendix

Proof of Proposition 1

Proof. Because θ^e can be freely distorted within the range of feasibility, when C or M is the sole committee member, she can achieve her optimal distortion if feasible, so that $y_C = b_C$ and $y_M = b_M$, respectively.

The proof proceeds in four steps. The first step establishes when a player i will vote for C's proposal. The second shows that if M votes for a proposal, then it will pass. The third step establishes that equilibrium vagueness v^* is increasing in equilibrium distortions y^*. Finally, the fourth step demonstrates the comparative static results presented in Proposition 1. This requires four cases (1–4).

The **first step** is to establish that i will only vote for a proposal y if $|b_i - y| \leq |b_i - x|$. Plugging into i's utility function, y and x give utility $u_i(y) = -(y - b_i)^2$ and $u_i(x) = -(x - b_i)^2$, which implies that i's utility is weakly higher under y exactly when $|b_i - y| \leq |b_i - x|$ holds.

The **second step** is to note that if M votes for a proposal, which only occurs if $|b_M - y| \leq |b_M - x|$, then the proposal passes; otherwise, it is voted down and the status quo is enacted. This is because if b_M is the median level of bias, then one of two cases must hold. Let M be the mth committee member; (a) $y \geq x$, in which case $|b_i - y| \leq |b_i - x|$ for all $i > m$, or (b) $y < x$, in which case $|b_i - y| \leq |b_i - x|$ for all $i < m$. In either case, the proposal passes. On the other hand, if $|b_M - y| > |b_M - x|$, then M will not vote for the proposal, and either (a) $|b_i - y| > |b_i - x|$ for all $i > m$ or (b) $|b_i - y| > |b_i - x|$ for all $i < m$. Because at least a majority votes against the proposal, it fails, and the status quo is enacted. Finally, note that C is indifferent between proposing x and a failing proposal. In this case of indifference, we assume that C proposes x, which then passes.

The **third step** is to note the relationship between a distortion, y, and the implied level of vagueness, v_y. Vague transmissions imply a range of possible values $\left[\underline{\theta}, \overline{\theta}\right]$. To be truthful, θ must be in the range $\left[\underline{\theta}, \overline{\theta}\right]$. For any distribution, it must also be that $\theta^e \in \left[\underline{\theta}, \overline{\theta}\right]$. This range is minimized (vagueness is minimized) when the range is set so that $\theta = \underline{\theta}$ to achieve a distortion $y > 0$ and $\theta = \overline{\theta}$ to achieve a distortion $y < 0$. Take the case where $y > 0$. Because $\theta = \underline{\theta}$ and $\theta^e = \theta + y$, it follows that $\theta^e = \underline{\theta} + y$. Taking expectations over the uniform distribution, it is also the case that $\theta^e = \underline{\theta} + \frac{\overline{\theta} - \underline{\theta}}{2}$. Taken together, this implies that $y = \frac{\overline{\theta} - \underline{\theta}}{2}$.

Hence, vagueness is increasing in the size of distortions, $d = |y|$, when $y > 0$. A symmetric argument holds for $y < 0$.

The **fourth step** is to characterize the four cases presented in Proposition 1. Recall that we are assuming that x is restricted to be feasible throughout.

Case 1 (Median Chair)

In this case, $b_M = b_C$. Because C and M label the same agent, $y_C = y_M$. Because x is always an option for a proposal, setting $y = y_C$ implies that $|b_M - y| = |b_M - y_M| \leq |b_M - x|$. Hence, y_C is proposed, and it passes. Equilibrium vagueness is then $v^* = v_C$.

For cases 2–4, we prove the case where $b_M > 0$. The case where $b_M < 0$ is symmetric with the appropriate inequality and sign reversals.

Case 2 (Constrained Committee)

In this case, $b_M > b_C$. Because $b_M > b_C$, the argument in the third step implies that $v_M > v_C$.

(a) Let $x \in (b_C, b_M)$; C can propose x, which M weakly prefers to accept. Again, by the argument in step 3, the vagueness associated with x here is such that $v_M > v_x > v_C$. C prefers $y = x$ to $y > x$ because it is closer to C's ideal point. M will reject any $y < x$ because the status quo would then be strictly preferred. Hence, in this case, equilibrium vagueness is such that $v^* = v_x$ and $v_M > v^* > v_C$.

(b) Let $x = b_M$. In this case, M rejects any proposal that is not $y = x$ because M can attain y_M through reverting to the status quo. In this case, equilibrium vagueness is such that $v^* = v_x = v_M$.

(c) Let $x \in [b_M, 2b_M - b_C]$. Consider the strategy where C proposes $y = 2b_M - x$. Because $x \leq 2b_M - b_C$, $y_C \leq 2b_M - x$. Because $x \geq b_M$, $y_M \geq 2b_M - x$. Hence, for proposed distortion y, $v_M \geq v_y \geq v_C$. M accepts proposal y because $|b_M - y| = |b_M - (2b_M - x)| = |-(b_M - x)| = |b_M - x|$ and rejects all proposals $y' < y$. C prefers y to all proposals $y' > y$; therefore, C proposes $y = 2b_M - x$, and it is accepted. Therefore, equilibrium vagueness is $v^* = v_y$ so that $v_M \geq v^* \geq v_C$.

(d) Let $x \notin (b_C, 2b_M - b_C)$. First, let $x < b_C$. Because $y_C = b_C$ and $x < b_C < b_M$, $|b_M - y_C| \leq |b_M - x|$; therefore, the committee will accept y_C, which is C's most preferred option. Equilibrium vagueness is then $v^* = v_C$. Now assume that $x > 2b_M - b_C$. This implies that $x > 2b_M - b_C > b_M > b_C$. Therefore, $|b_M - y_C| \leq |b_M - x|$ because $|b_M - x| \geq |b_M - (2b_M - b_C)| = |b_C - b_M| = |b_M - b_C| = |b_M - y_C|$. Therefore, the committee will accept y_C, which is C's most preferred option. Equilibrium vagueness is then $v^* = v_C$.

Case 3 (Dominant Chair)

In this case, it is assumed that $b_C > b_M$.

(a) In this subcase, it is assumed that $x \geq b_C$. Because $y_C = b_C$ and $b_M < b_C \leq x$, $|b_M - y_C| \leq |b_M - x|$; therefore, the committee will accept y_C, which is C's most preferred option. Equilibrium vagueness is then $v^* = v_C$.

(b) In this subcase, it is assumed that $x \leq 2b_M - b_C$. This implies that $b_C > b_M \geq x$. Therefore, $|b_M - y_C| \leq |b_M - x|$ because $|b_M - x| \geq |b_M - (2b_M - b_C)| = |b_C - b_M| = |b_M - b_C| = |b_M - y_C|$. Therefore, the committee will accept y_C, which is C's most preferred option. Equilibrium vagueness is then $v^* = v_C$.

Case 4 (Constrained Chair)

In this case, $b_C > b_M$. Because $b_C > b_M$, the argument in the third step implies that $v_C > v_M$. (Note that the $x \notin (2b_M - b_C, b_c)$ case is covered by the "dominant chair" case.)

(a) Let $x \in (2b_M - b_C, b_M)$. Consider the strategy where C proposes $y = 2b_M - x$. Because $x > 2b_M - b_C$, $y_C > 2b_M - x$. Because $x < b_M$, $y_M < 2b_M - x$. Hence, for proposed distortion y, $v_C > v_y > v_M$. M accepts proposal y because $|b_M - y| = |b_M - (2b_M - x)| = |-(b_M - x)| = |b_M - x|$ and rejects all proposals $y' > y$. C prefers y to all proposals $y' < y$; therefore, C proposes $y = 2b_M - x$, and it is accepted. Therefore, equilibrium vagueness is $v^* = v_y$ so that $v_C > v^* > v_M$.

(b) Let $x = b_M$. M rejects any proposal that is not $y = x$ because M can attain y_M through reverting to the status quo. In this case, equilibrium vagueness is such that $v^* = v_M$.

(c) Let $x \in (b_M, b_C)$. C can propose x, which M weakly prefers to accept. Again, by the argument in step 3, the vagueness associated with x here is such that $v_C > v_x > v_M$. C prefers $y = x$ to $y < x$ because it is closer to C's ideal point. M will reject any $y > x$ because the status quo would then be strictly preferred. Hence, in this case, equilibrium vagueness is such that $v^* = v_x$ and $v_C > v^* > v_M$. □

Proof of Proposition 2

Proof. First, recall that $b_C \geq 0$ without loss of generality, and by assumption in Proposition 2, it must be that this inequality holds strictly. Second, note that $|x| < \min[|b_C|, |b_M|]$ can correspond to several cases in Proposition 1. We proceed through these cases systematically. Recall that Proposition 2 is divided into two statements (categories of committee biases): in (1), C and M have opposite biases, and in (2), they have like biases.

Case 1 (Median Chair)

This case inherently falls into category (2) of Proposition 2. From the results of this case in step 4 of Proposition 1, this case implies that $y^* = b_C = b_M > x$. By step 3 in Proposition 1, this implies that $v^* > v_x$ and not convergent to 0 as $x \to 0$.

Case 2 (Constrained Committee)

(1) $b_M < 0$: As $x \to 0$, we must be in subcase (a) because $0 \in (-b_M, b_C)$. Therefore, $v^* = v_x$, and v^* converges to 0 as $x \to 0$.

(2) $b_M > 0$: As $x \to 0$, we must be in subcase (d) because $0 < b_C$. Therefore, $v^* > v_C$ as $x \to 0$ and does not converge to 0 as $x \to 0$.

Case 3 (Dominant Chair)

(1) $b_M < -b_C$: This case never occurs as $x \to 0$ because either $x \geq b_C > 0$ or $x \leq 2b_M - b_C < 0$, which means that x cannot be arbitrarily close to 0.

(2) $b_M > b_C$: From the results of this case in step 4 of Proposition 1, this case implies that $y^* = b_C > x$. By step 3 in Proposition 1, this implies that $v^* > v_x$ and not convergent to 0 as $x \to 0$.

Case 4 (Constrained Chair)

(1) $b_M \leq 0 \leq b_C$: This only falls into constrained chair case (case 4), subcase (c). This is because $0 \in (b_M, b_C)$ implies $x \in (b_M, b_C)$ under the assumptions of Proposition 2. Therefore, $v^* = v_x$, and v^* converges to 0 as $x \to 0$.

(2) $0 < b_M < b_C$: This only falls into case 4 under subcase (a) because $0 < b_M$ implies $x \in (2b_M - b_C, b_M)$ under the assumptions of Proposition 2. When $0 < 2b_M - b_C$, we cannot be in the constrained chair case. Therefore, $v^* = v_y > v_M$, and v^* does not converge to 0 as $x \to 0$. $\square$

Additional Empirical Tests

Table 4: Robustness Regression Results for Proportion of Certainty/Uncertainty Words

	Model 1	Model 2	Model 3	Model 4
Opposing bias	0.469^{***}		0.485^{***}	
	(0.163,0.776)		(0.170,0.800)	
Opposing bias		0.287^{*}		
		(-0.025,0.600)		
BP–Governor				0.444
				(-0.659,1.546)
Interest rate	-0.223^{***}	-0.197^{***}	-0.219^{***}	-0.188^{***}
	(-0.364,-0.082)	(-0.330,-0.063)	(-0.359,-0.079)	(-0.318,-0.058)
EPUI			0.002	0.001
			(-0.005,0.009)	(-0.006,0.007)
Dissents			-0.033	
			(-0.178,0.111)	
Constant	-0.847^{*}	-0.962^{**}	-1.082^{*}	-1.060^{*}
	(-1.785,0.090)	(-1.844,-0.079)	(-2.198,0.034)	(-2.135,0.015)
Observations	99	97	97	99
Log Likelihood	-188.120	-189.399	-184.083	-192.138
Akaike Inf. Crit.	384.241	386.798	380.167	394.276
Bayesian Inf. Crit.	394.621	397.096	395.615	407.252

Note. GLMM binomial model.
$^{*}p < 0.1$. $^{**}p < 0.05$. $^{***}p < 0.01$.

This section presents extra empirical tests. The first two columns of Table 4 show the effects of opposing bias on the share of certainty and uncertainty words. As in the main analysis, we find a positive relationship between the share of certainty words and opposing bias. Model 3 (column 3) includes into the model the number of dissents to the proposed policy rate. Including this variable shows little effect on our main variable of interest. Model 4 (column 4) changes the main independent variable and accounts for the absolute value of the difference between mean interest rate preferences of Bank Presidents and Bank Governors. We have no expectation that this value will have any meaningful statistical relationship with the dependent variable and so we use this as a placebo test. Indeed, we find no apparent effect of this on the share of certainty language in the meeting.

Table 5 changes the main dependent variable and examines the effect of our key independent variables using a Poisson model to account for counts certainty and uncertainty words rather than shares. Here we find that the main effects of opposing bias is on the number of certainty words. We find little evidence that opposing bias affects uncertainty words, though we do find that this measure is associated with higher interest rates. Interestingly, there is still no statistical association between the EPUI measure and the count of certainty words in the data. Taken together, these results yield additional support for the findings presented in the main text. Moving from aligned to opposing bias on a committee is associated with a greater share of certainty words, and this is being driven by an increase in certainty language.

Table 5: Robustness Regression Results for Number of Certainty & Uncertainty Words

	Certainty	Uncertainty
	(1)	(2)
Opposing bias	0.382^{***}	-0.067
	(0.094,0.671)	(-0.174,0.040)
Interest rate	-0.223^{***}	0.042^{*}
	(-0.343,-0.104)	(-0.002,0.086)
Economic Policy Uncertainty Index	0.0003	-0.001
	(-0.006,0.007)	(-0.004,0.001)
Constant	2.339^{***}	3.111^{***}
	(1.274,3.404)	(2.652,3.571)
Observations	99	99
Log Likelihood	-218.635	-563.294
Akaike Inf. Crit.	447.269	1,136.588
Bayesian Inf. Crit.	460.245	1,149.564

Note. Poisson model.
$^{*}p < 0.1$. $^{**}p < 0.05$. $^{***}p < 0.01$.