Setting the Committee Agenda: Measuring Speaker Influence in Congressional Hearings

Joshua Y. Lerner Robert Shaffer

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Abstract

Congressional committees play a pivotal role in the policymaking process, but scholars have paid little attention to the content of committee deliberations. As a result, we know little about which representatives are most influential in committee hearings or the downstream implications of influential committee participation. Using a framework proposed by Nguyen *et al.* (2014), we outline a new measure of speaker influence in Congressional hearings, which focuses on speaker ability to control the topic of conversation in hearings. After validating our measure, we apply it to study patterns of legislative productivity and agenda control. We find that majority party members, committee chairs, and senior members consistently control the topic of conversation. We further show that influential participation predicts legislative productivity even after controlling for individual and institutional characteristics, which should encourage scholars to rethink the role of committee hearings in accounts of Congressional agenda-setting.

Word count: 9785

1 Introduction

Committees play an outsized role in Congressional proceedings. As early movers in the lawmaking process, committees aggregate information, filter and sharpen legislative proposals, and help shape the Congressional agenda. Though committees and committee leaders can exert influence in many ways, committee *hearings* represent a particularly visible venue. Since committee hearings are on-the-record, the conversations that occur within hearings offer a valuable opportunity for members of Congress to gather information, publicly advance policy proposals, and hone their rhetorical strategies. Judges also use committee testimony as evidence of Congressional intent, granting hearings direct influence over the political process (Breyer 1991).

Despite their importance in the lawmaking process, traditional accounts of committee activity do not unpack the contents of committee hearings. As Hall (1998) demonstrates, members of Congress participate selectively in committee activities, with varying participation strategies. For example, while members like Rep. Jim Jordan (R-OH) famously use committee hearings to "grandstand" (Park 2020) and harangue witnesses called by the opposite party,[1] others – such as Reps. Adrian Smith (R-NE) or Thomas Petri (R-WI) – are more circumspect, and use their time in committee hearings to absorb information and shape policy proposals.[2] However, we know relatively little about *which* members are most effective at influencing committee proceedings, and *whether* effective participation in committees is associated with downstream lawmaking success.

To address these shortcomings, we offer three innovations. First, we clarify the notion of "effective" participation in committee hearings. We argue that "effective" hearing participants are those participants who are best-able to guide the hearing agenda by convincing other participants to discuss their preferred policy topics. Second, leveraging innovations from the natural language processing and machine learning literatures, we present a new individual-level measure of speaker effectiveness, which we validate in a series of empirical tests. Third, we use this measure to study both the *predictors* of effective committee participation and the *consequences* of effective participation on downstream legislative effectiveness.

Our paper proceeds as follows. We begin by describing a theory of participation in committee hearings, with a focus on the circumstances under which we expect speakers to be "effective" committee participants. To measure speaker effectiveness, we turn to the Speaker Identity for Topic Segmentation (SITS) model (Nguyen *et al.* 2014), a natural language processing approach that captures the degree to which a given member

[1] For example, during the 2019-2020 impeachment hearings, House Republicans temporarily moved Jordan to the House Intelligence Committee to serve as President Trump's primary defender. Most Republicans present at the hearing yielded their time to Jordan to maximize his speaking time. Newell, Jim. "Confidence Man". Slate, 13 November, 2019.

[2] Both Smith and Petri were featured in Roll Call's 2014 "Obscure Caucus", highlighting low-profile members who prefer to build expertise and work behind the scenes.

"controls" the topic of a conversation. After introducing and validating our measure, we then investigate the *correlates* and *consequences* of effective committee participation. We find that institutional and partisan characteristics drive individual committee hearing agenda control. Majority members, committee chairs, senators, and to a lesser extent, ideological centrists are most effective at controlling the topic of conversation. Individually, more senior members are more effective hearing participants, but other identity-related factors – such as gender and race – do not appear to be strongly associated with effective participation. We further find that effective hearing participants are more adept at advancing bills through committee and beyond. Our findings should encourage scholars to study committee deliberation more closely, and to unpack the ways in which members use that deliberative process to influence the Congressional policy agenda.

2 A Theory of Speaker Effectiveness

2.1 Substance and Style in Committee Hearings

> The Standing Committee is the eye, the ear, the hand, and very often the brain of the House.
>
> Thomas Brackett Reed (1890), quoted by Hall (1998).

Why would members of Congress choose to participate in committee hearings? Since the early 1900s, committees have occupied a central role in the Congressional lawmaking process. Committees help members build policy expertise (Krehbiel 1992), act as mechanisms for partisan gatekeeping (Rohde 1991; Cox & McCubbins 1993, 2005), and allow members to promote particularistic policies aimed at narrow constituencies (Shepsle & Weingast 1987; Weingast & Marshall 1988). However, the benefits offered by committee *hearings* are less obvious. Committee hearings tend to be low-visibility affairs, which provide limited opportunities for advertising, position-taking, or credit-claiming (Mayhew 1974). As a result, a Mayhewvian view of Congressional activity would lead us to expect members of Congress to shirk their committee responsibilities.

Hall (1998)'s study of Congressional participation in committee activity provides a partial answer to this question. Hall finds that members participate *selectively* in committee activities. When committee jurisdiction overlaps with constituent interests, Hall suggests, members of Congress are willing to invest time in committee activities, and to develop the knowledge and experience required to become experts in a particular policy area. Members who develop this experience can deploy it to produce and pass legislative proposals, for which they can take credit in future reelection campaigns. As a result, committees only act on the goals of a subset of their members, and participation during committee deliberations is correspondingly incomplete. Though other studies do examine when *outside* groups participate in committee hearings

(Esterling 2009), outside of Hall (1998) few studies further examine Congressional participation in committee hearings.

Parties play an important mediating role in encouraging and altering the incentives for individuals to participate during hearings. Partisanship encourages the partial participation tendency Hall highlights by encouraging members to treat lawmaking activities as part of a collective enterprise. By coordinating behavior, parties encourage development of institutional knowledge to further collective legislative goals, making more knowledgeable members more likely to participate in their areas of expertise. In the modern Congress, rule changes and growing partisan divisions have strengthened this tendency.[3] For example, House rule changes in the 1970s limited members to a single subcommittee chair position, and eliminated many elements of the seniority system that previously dominated committee leadership selection (Rohde 1991). The House majority party also assumed a more prominent role in committee deliberations after the Republican takeover of the House of Representatives in 1994 (Aldrich & Rohde 1997; Hurwitz *et al.* 2001; Sinclair 2016), which further encouraged partisan coordination and differential participation among individual members.

An alternative explanation for participation in committee hearings is that committee hearings simply provide members of Congress an opportunity for performative "cheap talk." Most committee chairs control the calendar and timing of witness testimony in their respective committees. These powers, combined with committee chairs' staffing resources, give committee chairs substantial authority to organize hearings in order to publicly advocate for politically convenient policies (Esterling 2009). If accurate, this logic suggests that committee hearings should be characterized not by persuasion or information collection, but rather by position-taking and advertising (Mayhew 1974). Committee chairs, by this reasoning, should coordinate with witnesses and their co-partisans to advance their favored policy narratives, while minority members should work to disrupt that narrative through disruptive, non-substantive speech, such as "fighting words" (Monroe *et al.* 2008) or partisan taunting (Grimmer & King 2011). And, backbench members of the majority party should speak in service of the the committee chair's and the party's agenda, rather than to advance their individual interests.

Though possible, we believe this story is implausible. As Kingdon states, "congressmen themselves believe the hearings do provide them with the bulk of information needed to legislate, and the hearings do affect their decisions" regarding committee staff members (Kingdon 1984, 213). DeGregorio states that "according to a sizable proportion of senior staffers, legislators may decide whether or not to pursue a policy on the strength of the arguments that they receive in testimony" (1992, 978-9). Since committee staffs have limited time and personnel, it is implausible to assume that committee members already have full information

[3]Though some scholarship suggests a trade-off between substantive expertise and ease of partisan coordination. See Krehbiel (1992), Curry (2019) for expertise, but Cox & McCubbins (1993, 2005) for party coordination.

about what will be said at hearings, as the staff and MCs will often lack both the specific information presented and the expertise to adjudicate the quality of expert testimony (Esterling 2009). Moreover, other political actors believe Congressional hearings represent a useful signal. Most prominently, courts use hearing testimony as evidence of Congressional intent in statutory interpretation cases, which incentivizes members of Congress to express their sincere preferences and priorities during hearing proceedings (Eskridge Jr & Frickey 1990; Breyer 1991; McNollgast 1994).

Since members of Congress are strategic actors, members may not always accurately describe their goals during public events. However, committee hearings are often low-visibility settings, and usually do not represent attractive venues for electioneering or partisan position-taking. We should therefore expect most Congressional hearings to be more substantive in nature, with self serving publicity stunts and "grandstaning" being the exception, not the rule (see also Park 2020). Though some hearings are certainly dominated by partisan fighting and sloganeering, we argue that the *modal* hearing should be more substantive in nature, and should afford individual members substantial time and autonomy to gather information and argue for their preferred policy issues and solutions.

2.2 Conceptualizing Speaker Effectiveness

If the modal committee hearing is not "cheap talk" – and instead contains substantive factfinding efforts and policy debates – what does it mean for a member of Congress to be an "effective" hearing participant? Because hearing participation can advance a variety of goals, defining a general notion of "effectiveness" is not straightforward. For example, for policy-motivated MCs, effective participation might involve unearthing information that helps improve the policy outcomes produced by a piece of legislation. An effective hearing participant might also be be more skilled at convincing other MCs, relevant committee(s), or Congress as a whole to advance that participant's preferred policy goals. Further afield, effective participation might help raise an MC's media profile. For certain members – such as Reps. Adam Schiff (D-CA) or Jim Jordan (R-OH) – aggressive, high-profile committee participation forms an important part of their personal "brands" which can enhance name recognition, improve reelection prospects, and position members for higher office. Though committee hearings do not usually offer high-profile opportunities for partisan position-taking, some members clearly do use hearings in this fashion.

All of these definitions of "effective" committee participation are plausible, and represent useful ways to understand MC goals on Congressional committees. For the purposes of this paper, we follow Nguyen *et al.* (2014) and focus on a more contained definition: namely, we define an MC as an "effective" hearing participant to the extent that MC is able to *guide the topic of conversation* within a hearing. Effective

MCs, from this perspective, are those individuals who are able to effectively "pull" the topic of conversation within a given hearing towards the policy topics, problems, and solutions they favor, and away from topics they oppose.[4] Since most Congressional hearings consist of conversations between witnesses and members of Congress, this notion of "effectiveness" most frequently implies that a member is able to convince (or compel) witnesses to speak on their preferred topics. But, our notion of "effectiveness" also extends to conversations between members and to the broader arc of the hearing conversation.

Our definition of "effectiveness" has at least three advantages. First, unlike definitions that focus on a member's use of committee testimony to change the content of legislation or convince other members to support bill proposals, our definition focuses solely on a member's actions within the committee itself. As a result, the evidence of "effective" committee participation is observable and temporally contained, rather than being dependent on temporally distant outcomes.

Second, our definition of "effectiveness" is likely one that is *shared* by all members. Conditional on choosing to speak, members of Congress should prefer that other hearing participants discuss and respond to their interventions. The more that a member's questions and concerns are discussed by witnesses and other members of Congress, the more likely those concerns are to reach the broader Congressional policy agenda through floor speeches, advertisements, party platforms or substantive legislative proposals. By contrast, though effective participation may help raise members' media profile in some circumstances, not all MCs may wish to use their limited speaking time to produce the kinds of "meme-able" moments that are likely to be covered on TV news or social media outlets.

Third, our definition of "effectiveness" is largely attributable to *individual* actions. Since chamber majority parties can coordinate to advance or block legislative proposals, it is difficult to identify the extent to which a representative is responsible for a bill's success. An individual legislator can propose a high-quality bill, persuade her fellow members that the bill is worth supporting, and run a successful media campaign to create public support for the bill's contents, and yet fail to receive credit for the bill because majority party leaders decided to attribute that credit to a more electorally vulnerable member. Our definition of "effectiveness" avoids this problem.

We emphasize that our measure of "effectiveness" is designed to supplement rather than supplant existing definitions of lawmaking efficacy. As we argue in the following section, members who excel at the actual control over legislative hearings should also be adept at advancing legislation. Our conceptualization and measurement approach allows researchers to answer this question.

[4]See, e.g., Rienks *et al.* (2006), who find topical change to be the highest-importance variable in a supervised learner used to predict an individual's level of influence in a conversation.

2.3 Committee Participation as Individual Agenda Setting

With this definition in hand, a natural follow-up question is to ask about the *causes* of effective participation. Effective hearing participation, in our view, represents control over a rivalrous good. Each member has some latent ability to control the topic of conversation at a given time, but only one person can successfully do so. Since hearings have a finite duration, we can view committee discussion as a type of common-pool resource allocated to policy topics according to speaker interest and persuasive ability. This framework suggests that, though members all have incentives to control the agenda, exerting control is costly, and requires active attention and consistent dedication of resources.

We should expect three sets of characteristics to be associated with "effective" participation in Congress. First, some individuals may be more effective at guiding the topic of conversation because of the interpersonal and social skills they possess. Individual rhetorical ability is partly a function of long-term processes such as education, professional training, social status, or even parenting and upbringing. Viewed from this perspective, we should expect some MCs to be inherently effective because of factors linked to their identity, personal history, or experience and status within an institution or social group. At the most basic level, we might expect members who resemble the modal member of Congress—white and male—will be more effective than their counterparts, based on demographic similarity alone. We might similarly expect MCs from highly-educated and professional backgrounds to be more effective hearing participants, since these experiences tend to emphasize public speaking and communication skills. Lawyers offer a paradigmatic example of this type, but other professional backgrounds - such as management consulting or business - might offer similar advantages. However, since members of Congress have relatively homogeneous educational and social backgrounds, the variance on these variables is likely to be low. As Bonica (2020) shows, lawyers and highly-educated individuals have consistently dominated Congressional ranks, which reduces variance in professional background (see also Carnes 2012).

Most of these characteristics are determined before a person wins election to Congress. We should therefore expect that the individual-specific "skill" component of effective committee participation will be constant over time. However, we emphasize that an individual's ability to effectively participate in Congressional hearings is not entirely static. Effective participation is also partly a function of an individual's knowledge of a policy area and informal social relationships with witnesses and other members (Curry 2019). Since most MCs build knowledge, formal status, and informal social relationships over time, we should therefore expect an individual's skill in directing the topic of conversation to increase over time as well.

Second, some individuals may be institutionally endowed with agenda-setting powers that make them better-able to guide hearing conversations. Unlike ordinary discourse, Congressional hearings are structured

and hierarchical, with scheduled speaking turns and special privileges for particular participants. This structure affords members with leadership roles in a given hearing (e.g. committee chairs or ranking members) with both formal and informal opportunities to influence the topic of conversation. Presiding members formally shape conversation by managing transitions between speakers and ruling on procedural challenges, which allows them to compel speakers to address their preferred topics. Informally, leadership members generally offer the opening statement in committee hearings, which allows them to frame the hearing agenda before other speakers can intervene.

Third, political and ideological considerations can influence the effectiveness of an MC's interventions. Based on standard models of political persuasion – such as the Lupia-McCubbins (1998) persuasion model – we should expect speakers who share interests with their audience to be more effective. In Congressional hearings, this mechanism implies that ideologically centrist members should be more effective, since their policy preferences should be more spatially proximate on average to those of their audience. Members of the chamber majority should also be more effective than their minority counterparts, since majority members by definition share their partisan affiliation with both the committee chair and with a majority of other committee members. By a similar logic, speakers who share traits with the modal member of Congress – such as race or gender – should be more effective, since listeners are likely to find speakers who share their identity characteristics more persuasive.

We should also expect members who are able to influence any committee hearing's agenda will also be able to influence the committee's downstream legislative products. While writing and advancing legislation is the quintessential example of a team production (Cox & McCubbins 1993), Krutz (2005) and Volden & Wiseman (2014) show that individual members' political and personal characteristics can influence both the success and the contents of proposed bills. Members who are more influential during committee proceedings should be more adept at this task. All else equal, an effective hearing participant should be more successful at convincing her colleagues to study her preferred policy problems and to support her bill proposals and amendments both within and beyond committee.

3 Describing the Dataset

To test the theoretical expectations we develop in the preceding sections, we rely on an updated dataset of Congressional hearing transcripts originally introduced by Shaffer (2017). This dataset consists of all Congressional hearing transcripts posted on the Government Publishing Office (GPO)'s website, as well as any hearing- and committee-level metadata available on the accompanying metadata pages.[5] The

[5]Last scraped in January of 2020.

dataset covers the 108th-114th Congresses, which encompasses three Presidential administrations as well as all combinations of divided/unified government and Democratic/Republican control of Congress and the Presidency.

To prepare each transcript, we followed a three-step process. First, wherever possible, we removed any extraneous editorial notes, supplemental documents submitted for the Congressional record, and transcription notes, to ensure that all remaining text was actually spoken during the hearing proceedings. Second, we segmented the transcripts by speech action, and isolated the name of each speaker from the text that was spoken. Third, we attempted to match speaker names to accompanying metadata. Unfortunately, the GPO provides hearing transcripts as plain-text files without embedded metadata or unique speaker identifiers, which complicated this process; however, using a series of heuristics described in Shaffer (2017), we were able to identify and match speakers to metadata in approximately 84% of speaking turns.

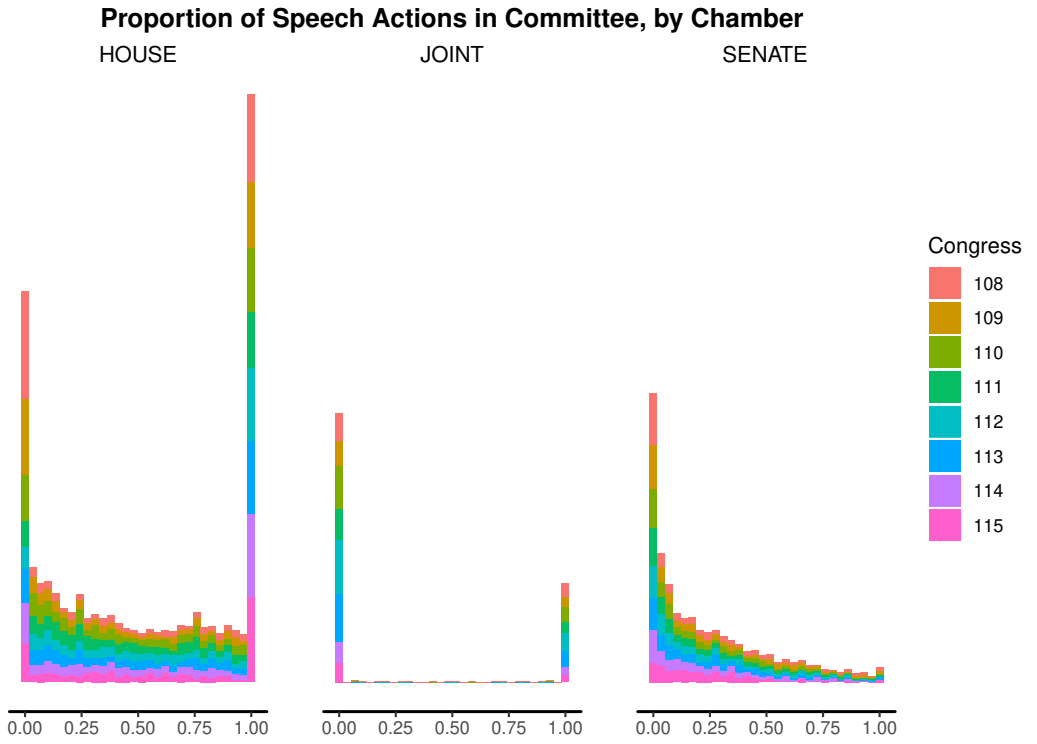
Restricting our attention solely to members of Congress, nearly all members participate in committee activities. Out of over 4,000 member-Congress combinations, we only observe 52 instances in which a member did not speak on any committees to which they were assigned in a Congress. On average, we observe 565 speaking actions per speaker-Congress combination, with an overall maximum of 6,355. As shown in Figure 1, House members - who are usually assigned to one or two committees - frequently devote all of their committee speaking time to a single committee in a given Congress. By contrast, senators - who are often assigned to three or more committees - tend to spread their attention more evenly. Perhaps because of these differences in numbers of committee assignments, senators more frequently neglect at least one of their committee assignments; some 21% of speaker-year-committee assignment observations in the Senate contained zero speech actions, compared with only 16% of such observations in the House.

Before proceeding, we emphasize two limitations with this dataset. First, since the GPO relies on individual committees to provide transcripts and metadata, not all hearings held during our period of study are present in our dataset. Committees do not digitize or post their transcripts at the same rates; as a result, for slower committees, many hearings are not available for more recent Congresses.[6] Second, not all committees provide the same kinds of hearing metadata. Some provide detailed lists of hearing participants and witnesses, as well as the subject of the hearing and the presiding member(s). By contrast, other committees provide almost no metadata at all, which makes matching witnesses to names and roles difficult.

Though important to note, we do not view either of these limitations as critical. To our knowledge, missingness patterns in both hearing transcripts and metadata are unrelated to the content or participants

[6]For example, many hearings in the House Committee on Veterans' Affairs has approximately complete coverage, with digitized transcripts from the mid-1990s all the way to the 114th Congress. By contrast, the Senate Judiciary Committee is much slower, with almost no hearings from the 114th Congress .

Figure 1: Speaker Distribution of Attention, by Committee



Speaker distribution of speech actions, by committee. The plotted variable is the proportion of each speaker's speech actions that took place in a given committee, in a given Congress. Only committees to which a speaker was assigned are plotted.

of those hearings, and are instead a function of the data collection protocols for each committee.[7] Moreover, since individual-level metadata missingness is predominantly concentrated among witnesses, we cannot reliably differentiate between witnesses or examine the rhetorical strategies they employ. However, since missingness is largely unrelated to our outcome variable or any of our other explanatory variables, these missingness patterns are otherwise unproblematic.

4 Measuring Speaker Influence

4.1 Modeling and Estimation

To measure the notion of speaker effectiveness we use, we rely on the Speaker Identity for Topic Segmentation (SITS) model (Nguyen *et al.* 2012, 2014). SITS is a Bayesian approach which simultaneously models the topics discussed in a set of conversations - in our case, Congressional hearings - and a series of speaker-specific latent parameters that indicate each speaker's ability to influence the topic under consideration.

[7] With some rare exceptions. For example, the Senate Judiciary Committee appears to post confirmation hearings for judges and executive-branch officials before posting substantive hearings.

As a result, this model offers a useful, principled way to identify the extent to which speakers are able to control the topic of conversation. We are not the first paper to use this method to study agenda setting in political conversations.[8] To, our knowledge we are the first to apply this method to discourse within political institutions. We are also, as far as we know, the first to adapt this model to explore patterns of influence over time.

Under the parametric SITS model, we begin with a corpus containing M unique speakers and C conversations, with each conversation consisting of T_c speaking turns, $c \in [1, C]$.[9,10] Turn t in conversation c is uniquely associated with a speaker $a_{c,t}$, where a is a matrix mapping conversation turns to speakers. Each speaking turn consists of a bag-of-words vector $\{w_{c,t,n}\}$ of size $N_{c,t}$ drawn from an overall vocabulary of size V. Given these data, the SITS generative process functions as follows:

1. Draw topic shift probabilities $\pi_1 ... \pi_m \sim Beta(\gamma)$ over M speakers.
2. Draw topic-word proportion vectors $\phi_1 ... \phi_K \sim Dir_V(\beta)$.
3. For each turn $t \in [1, T_c]$ in conversation $c \in [1, C]$:
    - If $t = 1$, set the topic shift indicator $l_{c,t} = 1$. Otherwise, draw $l_{c,t} = Bernoulli(\pi_{a_{c,t}})$.
    - If $l_{c,t} = 1$, draw a document-topic proportion vector $\theta_{c,t} \sim Dir_K(\alpha)$. Otherwise, set $\theta_{c,t} \equiv \theta_{c,t-1}$.
    - For each token index $n \in [1, N_{t_c}]$:
        - Draw a topic $z_{c,t,n} \sim Multinomial(\theta_{c,t})$.
        - Draw a token $w_{c,t,n} \sim Multinomial(\phi_{z_{c,t,n}})$

With $Beta(\gamma)$ a symmetric Beta distribution and $Dir_V(\beta)$ and $Dir_K(\alpha)$ K- and V-dimensional Dirichlet distributions with symmetric hyperparameters β and α, respectively. This model can be loosely interpreted as a straightforward LDA topic model (Blei *et al.* 2003) in which "document" boundaries are determined by estimated author-specific topic shift parameters, rather than being pre-specified in the input data.

Like many complex modeling approaches, the SITS model is computationally intensive. To fit this model to our corpus, we therefore adopt two simplifying measures. First, from a modeling standpoint, we rely on the parametric rather than the non-parametric version of the SITS model. Under the non-parametric SITS approach, conversation topics and topic shifts are instead modeled using a hierarchical Dirichlet process, in which segment- and conversation-specific topic-word distributions are drawn from shared conversation-specific and global Dirichlet process priors, respectively. This approach offers added flexibility to the model's underlying topic distribution and allows users to avoid specifying K, the number of topics used in the model. Unfortunately, we found that this approach was computationally infeasible to estimate for our corpus. However, Nguyen *et al.* (2014)'s experimental results suggest that the choice between these

[8] See, e.g., Rossiter (2020) for applications and tests of the method over presidential campaign and general policy debates. See also Nguyen *et al.* (2014) for related applications.

[9] This discussion is adapted from Nguyen *et al.* (2014) and Rossiter (2020, 9-10).

[10] Consecutive speech actions by the same speaker that do not contain a topic shift are mapped into a single speaking turn.

approaches is unlikely to substantially affect performance, with the parametric version of the SITS model performing similarly to or outperforming non-parametric SITS for sufficiently large corpora.

Second, from a data standpoint, we focus our attention on the population of interest – namely, members of Congress – by collapsing the speaker identity of all witnesses into a single "witness" speaker.[11] We take this step primarily for data availability reasons. As described in the previous section, data limitations prevent us from reliably linking witness statements to metadata, which means that positively identifying witnesses is often not possible. Fortunately, since our focus is on the rhetorical strategies of members of Congress, the choice to collapse witness statements sustains most of the key information contained in the SITS model while easing the model's computational burden. Updating the modeling approach and the underlying data to investigate witness testimony patterns represents a direction for future work.

4.2 Descriptive Results

Using this approach, we fit independent parametric SITS models with $K = 100$ topics to hearings held during each of S Congresses for the dataset described in §3.[12] Fitting independent SITS models allows us to account for changes in committee assignments, speaker status (e.g. leadership/backbench or committee assignment), as well as changes in committee-level missingness patterns we describe in §5. For each Congress model, we then extracted speaker-specific topic shift probabilities $\pi_{m,s}$ for each of the $M_s - 1$ members serving in Congress s.[13] $\pi_{m,s}$ represents the probability that speaker m_s will shift the distribution of topics under conversation at each of her speaking turns. This quantity therefore offers a direct measure of the s^{th} speaker's average "influence" over the conversations in which she participates in a given Congress.

Figure 2 provides a basic descriptive summary of the distribution of topic shift probabilities $\pi_{m,s}$. On average, members of Congress rarely shift the topic of conversation in Congressional hearings with each of their speaking statements, with an average topic shift probability of 0.022.[14] These low topic shift probabilities reflect the structure of conversation within Congressional hearings. Hearings are generally focused conversations, which address a relatively small set of predetermined issues. When shifts occur, these shifts are usually orchestrated by a small set of actors, such as committee chairs or ranking members. As a result, backbench members possess few opportunities to change the topic of conversation, compared with free-flowing conversations common in more informal discourse.[15]

[11] Speakers that cannot be definitively identified either as members of Congress or as witnesses are also collapsed into this speaking unit.

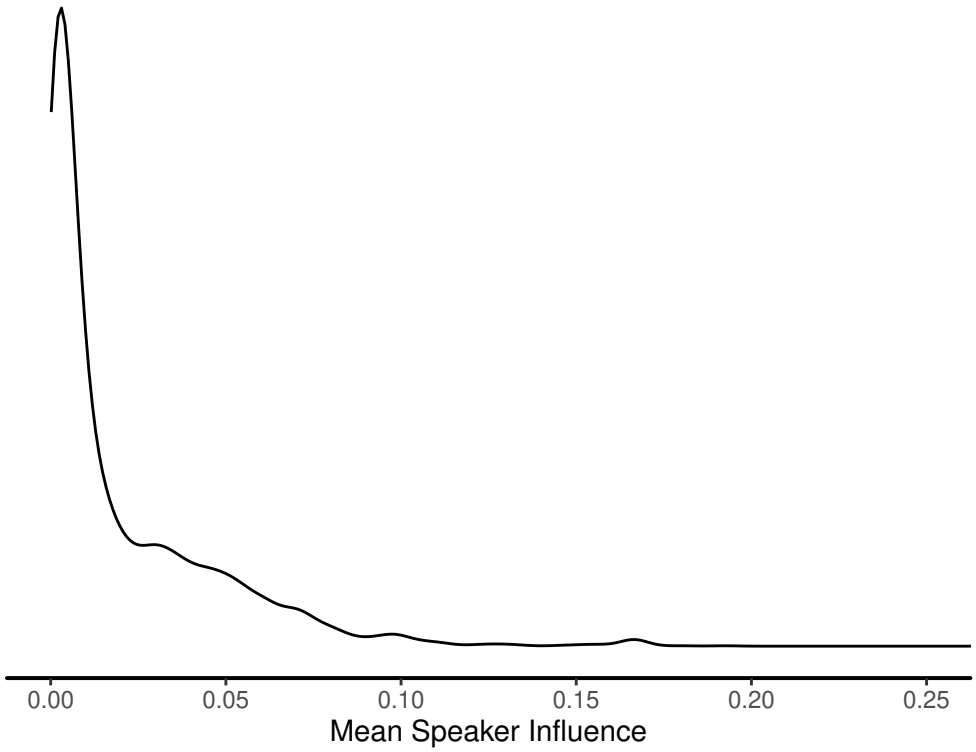
[12] For details on preprocessing, priors, estimation settings, see Appendix 1. We explore robustness to the choice of K in Appendix 4.1.

[13] With the final speaker the collapsed "witness" speaker for that Congress.

[14] The scale of this variable is sensitive to the number of topics, ranging from 0.0091 (with $K = 25$) to 0.017 ($K = 150$). We explore robustness to this parameter choice further in Appendix 4.1.

[15] Contrast with Rossiter (2020), who reports higher topic shift scores in political debates using a similar modeling approach.

Figure 2: Mean Speaker Influence



Density plot of mean influence scores, for each individual and each Congress. Truncated at 0.25 for readability.

Table 1 shows the top scoring members in the House, restricted to members who served in multiple Congresses and averaged over all Congresses in which each member appears. Intuitively, this list is largely composed of senior, institutionally-minded members of both parties with clear legislative agendas. James Clyburn – a member of the House Democratic leadership throughout our period of study – heads the list, with members like Charles Stenholm – the longtime Democratic ranking member of the Agriculture Committee – and James T. Walsh – the stalwart Republican member of the Appropriations Committee and chair of four separate subcommittees – at the second and fourth positions. Thomas Petri, the tenth-ranked House member by our measure, is anecdotally known as a policy-focused member with a reputation for in-depth participation in hearing activities.[16] On the Senate side, the highest scoring member is Daniel Inouye, the longest tenured Democrat, who, in his 50 years in the Senate chaired 5 separate committees, indicating strong facility with the institutions of the Senate.[17] Both the House and the Senate lists are also largely composed of older, white, and male representatives, which both reflects the demographics of Congress (and especially Congressional leadership) and offers suggestive support for the identity-based hypotheses we outline in §2.3.

Based on these results, a possible concern is that our measure may simply capture the *volume* of

[16] See Roll Call's 2014 Obscure Caucus.
[17] Corresponding Senate table available in Appendix §2.1, Table 1.

Table 1: Highest Career Scoring Members of the House

Rank	Member of Congress	Score
1	James E. Clyburn	0.2279
2	Charles Stenholm	0.1471
3	Ike Skelton	0.1271
4	James T Walsh	0.1099
5	Samuel Graves	0.1015
6	John Boehner	0.0967
7	Cheri Bustos	0.0965
8	Howard P. (Buck) McKeon	0.0956
9	Matt Salmon	0.0941
10	Thomas Petri	0.0911

Average influence score for members over the Congresses in which they served. Limited to members who participated in hearings in multiple Congresses.

speech uttered by a speaker. Leadership members like those listed in Table 1 may be more effective than their backbench colleagues, but they may also simply speak more frequently. Though related to effectiveness, volume of speech is clearly a distinct phenomenon.[18] However, we find that the correlation between number of speaking turns and speaker effectiveness is 0.16, which is significantly different than 0 ($p < 0.01$) but substantively small. This finding is intuitive: to be an effective speaker surely requires some non-zero quantity of speech, but higher quantity of speech should not be strongly related to speaker effectiveness.[19]

4.3 Validation: Measurement Consistency

Since speaker influence is a latent concept, ensuring that our measure taps our underlying concept of interest is difficult. As suggestive evidence of our measure's validity, we therefore propose three construct validity tests, which tap qualities that our underlying concept of interest should possess (Adcock & Collier 2001; Trochim & Donnelly 2001). If our measure possesses these qualities, we can be reasonably confident that our measure is at least highly related to the notion of speaker effectiveness that we investigate.

First, we assert that within-individual influence scores should *grow* over time. As members accrue formal authority (e.g. through committee chairmanships), informal social connections, and familiarity with common topics of discussion, they should become more adept at influencing the topic of conversation within hearings. This pattern is particularly likely to be present in a setting like a Congressional committee, which contains a relatively consistent set of speakers and conversation topics.

To test this assertion, we calculated Congress-on-Congress differences in influence scores for each member of congress, and averaged these differences. The results of this comparisons support our expectations. We find that members' influence scores grow by an average of 0.0015 ($n = 2632$, $p < 0.05$) per Congress, for

[18] Contrast with, e.g., Kathlene (1994); Karpowitz *et al.* (2012), which use volume of speech as a way to measure representation instead of influence in conversations.

[19] See Appendix 2.2 for details.

Table 2: Year-on-year mean absolute difference in influence scores.

Comparison Type	Mean Absolute Difference
Within-Individual	0.0172 (0.001)
Between-Individual	0.0237 (0.001)

Cells show average within- versus between-individual year-on-year variation in mean influence scores. Within-individual scores represent the average year-on-year absolute difference in influence scores for a given member. Between-individual scores represent the average year-on-year absolute difference between members matched on observable characteristics. Average within-individual absolute differences in influence is lower than between-individual differences ($p < 0.01$).

a median percent increase of 9.4 percentage points. This over-time growth is consistent with our influence scores being a learned trait, and provides something of a test of concurrent validity.

Second, we assert that influence scores should be more stable Congress-to-Congress *within individuals* than *between individuals.* In our view, speaker influence results partly from an individual's identity, educational and professional background, social relationship with other speakers, and knowledge of the topic area under discussion. Since these traits should be largely stable, within-individual scores across consecutive Congresses should vary less than between-individual scores, even if those individuals occupy similar institutional positions.

To test this expectation, we first identified all instances in which we observed a member of Congress speaking in both the current and immediate previous Congress. For each such instance, we then matched the member from the current Congress with a randomly-selected similar member from the previous Congress with similar institutional characteristics. We required exact matches on party, committee chair status, power committee membership, chamber, and freshman status, and required the absolute difference in seniority between matched members be no greater than 10 years.[20] Finally, in order to align within-individual and between-individual comparisons, we discarded all instances in which the individual's committee chair status changed between Congresses.

As shown in Table 2 results of this comparison clearly support our expectations. On average, the absolute within-individual difference is 0.017 and the absolute between-individual difference is 0.024, for an estimated difference in means of 0.007 ($n = 1631$, $p < 0.01$). In other words, after matching on observables, matching on unobserved individual-level characteristics reduces the year-on-year difference between speaker influence scores by 28% compared with the between-individual comparison. Since we cannot match on all idiosyncratic short-term factors that might influence a speaker's ability to influence a conversation, this estimate is likely an upper bound on the true influence of the sorts of long-term factors we identify in §5. However, at a minimum, we view these results as encouraging for the validity of our measure.

Third, we assert that speakers should be *less effective* when transferred to a venue in which they have

[20]If multiple matches were available, one matching member was selected randomly without replacement. If no matches were available, the observation was discarded. Some 35% of potential member-year observations were discarded in this fashion.

less experience. Specifically, members who lose their committee assignments *involuntarily* should perform worse in the subsequent term than those that did not, even taking into consideration changes to that political and institutional context. As Grimmer & Powell (2013) note, involuntary exile is driven almost exclusively by changes to the distribution of committee assignments following a change in majority status, rather than strategic considerations. Involuntary committee exile therefore provides us a clear test of divergent validity. If influence is a skill derived from substantive knowledge as well as social and institutional familiarity, then we would expect scores to decline if members were removed from familiar contexts.

To test this hypothesis, we compare the lagged committee effectiveness score for members based on whether or not they lost their seat due to involuntary exile. We find that when a member retains their committee assignment between Congresses, there is a 0.29 correlation between that individual's score in the current and subsequent Congress. Conversely, for involuntarily exiled members the correlation is -0.04. To explore this finding further, in Table 3 we regress the mean influence score of a given member in the current session to their lagged mean influence score for exiled members only (Model 1), non-exiled members (Model 2), and in a model that includes a series of theoretically relevant covariates as well as an interaction between lagged influence and exile status (Model 3).[21] We find a negative and insignificant relationship between lagged and current influence score for non-exiled members (Model 1), and a large, positive, and significant relationship for non-exiled members (Model 2), which persists with covariates included (Model 3).

Table 3: Committee Exile and Lagged Influence

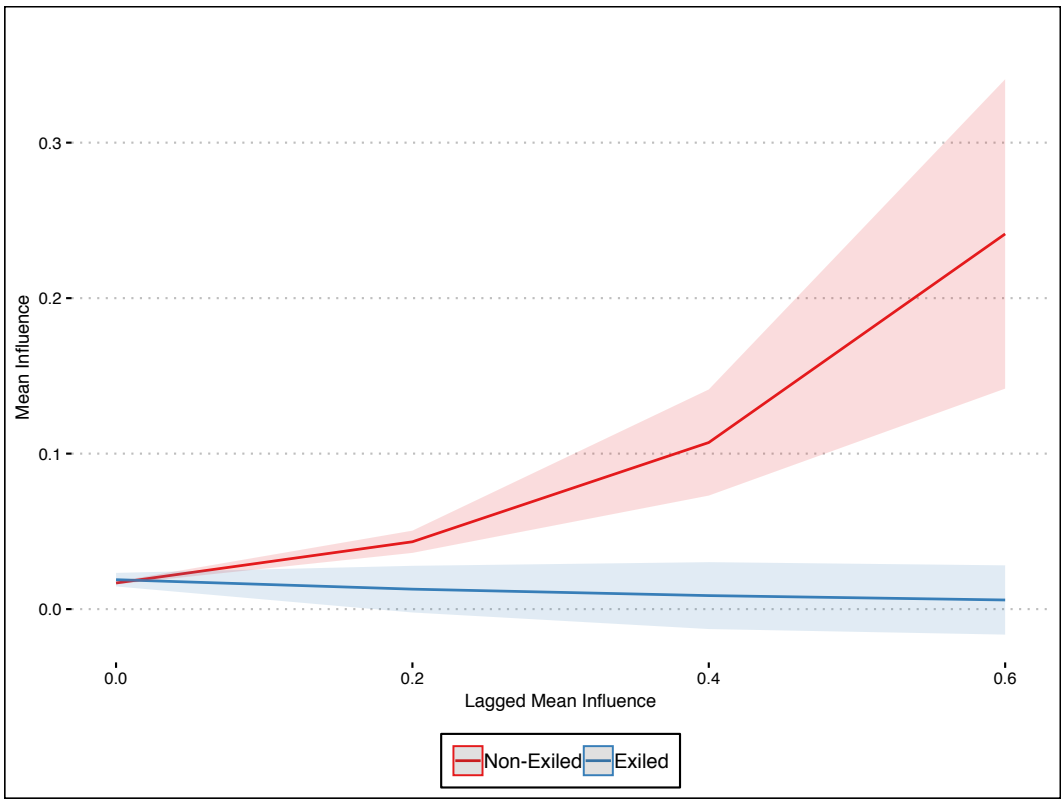
	Model 1	**Model 2**	**Model 3**
	Exiled	**Non-Exiled**	**Both**
Mean Influence$_{t-1}$	−0.662	5.219	4.874
	(3.050)	(0.525)	(0.480)
Exile			0.122
			(0.122)
Mean Influence$_{t-1}$*Exile			−6.847
			(3.398)
N	125	1933	2056
Full Covariates	No	No	Yes

Dependent variable is the mean influence score for each member. Bayesian hierarchical beta regression with Congress random effects included. A member is considered exiled if they involuntarily changed their committee assignment between terms (from Grimmer & Powell (2013) and Powell & Grimmer (2016)). Full covariates for Model 3 include: majority party, committee chair, female, race, |DW-Nominate D1|, and decades of service.

Figure 3 shows the marginal effect of the interaction between the lagged influence score and committee

[21] We discuss our covariate choices and modeling decision in §5.1.

Figure 3: Marginal Effects of Lagged Mean Influence by Committee Exile



Marginal effects plot based on Model 3 from Table 3. The y-axis represents predicted speaker effectiveness, while the x-axis represents the same measure lagged by one Congress. Blue lines represent members exiled from their committees, while red lines represent all other members.

exile from Model 3.[22] For non-exiled members, increasing the lagged influence score has a positive, significant, and increasing effect on that individual's predicted influence score in the current year, while for non-exiled members this relationship is negative and insignificant. We cannot be sure whether this relationship is driven by policy expertise or by social and institutional standing. Clearly, though, members of Congress are most effective at influencing conversation on committees and in policy contexts in which they have more experience. Involuntary contextual changes disrupt this pattern.

5 The Implications of "Effective" Participation

After validating our measure of committee influence, we use our measure to address pair of applied questions. First, *which members are influential?* We find that majority, leadership, and senior members are effective at shaping the topic of conversation in hearings. By contrast, features related to speaker identity - such as speaker race or gender - do not consistently predict speaker influence.

[22]Holding all other covariates at their modes for categorical variables and means for continuous variables.

Second, *are more influential members more productive lawmakers*? We find that our measure is strongly associated with success at advancing legislation through committee, even after controlling for institutional and demographic factors that have been shown to drive legislative productivity. In robustness tests, we find that this relationship persists with the exclusion of "commemorative" laws, and with alternate measures of lawmaking productivity. [23]

5.1 Which Members are Effective?

As we describe in §5, we view speaker effectiveness as both a skill and a choice, which is influenced both by an individual's lived experiences and their position within their political and social environment. This framework suggests three main hypotheses. First, speakers with greater formal authority in Congress should be more effective hearing participants. Second, members who resemble the social and ideological median in Congress should be more effective, since they are more likely to share policy priorities and preferences with their colleagues. Third, speakers whose identity-based characteristics resemble the modal member of Congress should be most effective, since these members are more likely to share social experiences and connections with their colleagues.

To operationalize these hypotheses, we collect three broad sets of variables for each speaker. First, to capture *institutional* components of speaker effectiveness, we include indicator variables for the chamber of Congress to which an individual belongs, that individual's status as a committee chair, and that individual's membership in the chamber majority. In general, senators possess greater autonomy to act and speak as they choose. As a result, we should expect senators to be more influential on average than House members. Committee chairs across both chambers are usually knowledgeable about common conversation topics in their committees, and possess substantial procedural power to dictate the flow of conversation. We should further therefore committee chairs to be more effective on average than backbench members. Similarly, members of the chamber majority should also be more influential than their minority counterparts, since majority members can easily coordinate with the committee chair to call sympathetic witnesses and frame the hearing agenda in a favorable fashion.

Second, to capture an individual's *sociopolitical* position in Congress, we include variables that capture each member's seniority in Congress (measured in decades of service), and the distance between their ideal point and the chamber average (measured as an absolute DW-NOMINATE score). Senior members are generally more knowledgeable about Congressional procedure, more familiar with relevant policy issues, and possess stronger social ties with other members and witnesses, which should make them more effective than their junior counterparts. Compared with extremists, centrist members of Congress should possess more

[23] See Appendix §4.3.4 for further details.

shared policy interests with their colleagues and with witnesses, as well as stronger social ties with other hearing participants. As a result, we should expect centrist members to be more effective hearing participants than their more extremist counterparts.

Third, to capture differences in speaker effectiveness caused by long-term differences in *speaker identity*, we include indicator variables for gender and two racial categories, and individual-specific random effects. Plausibly, observed effectiveness of a given speaker might be influenced by that speaker's membership in a privileged racial or gender group, since members of privileged groups may be implicitly (or explicitly) encouraged to speak in a more assertive fashion. To partially account for this possibility, we include indicator variables for speaker gender and African American/Latino identification. Of course, these three indicator variables do not fully capture the range of relevant identity-based variation, let alone other unobserved factors such as education or professional background. To account for other unobserved time-invariant factors, we therefore include individual-specific random effects in our models.

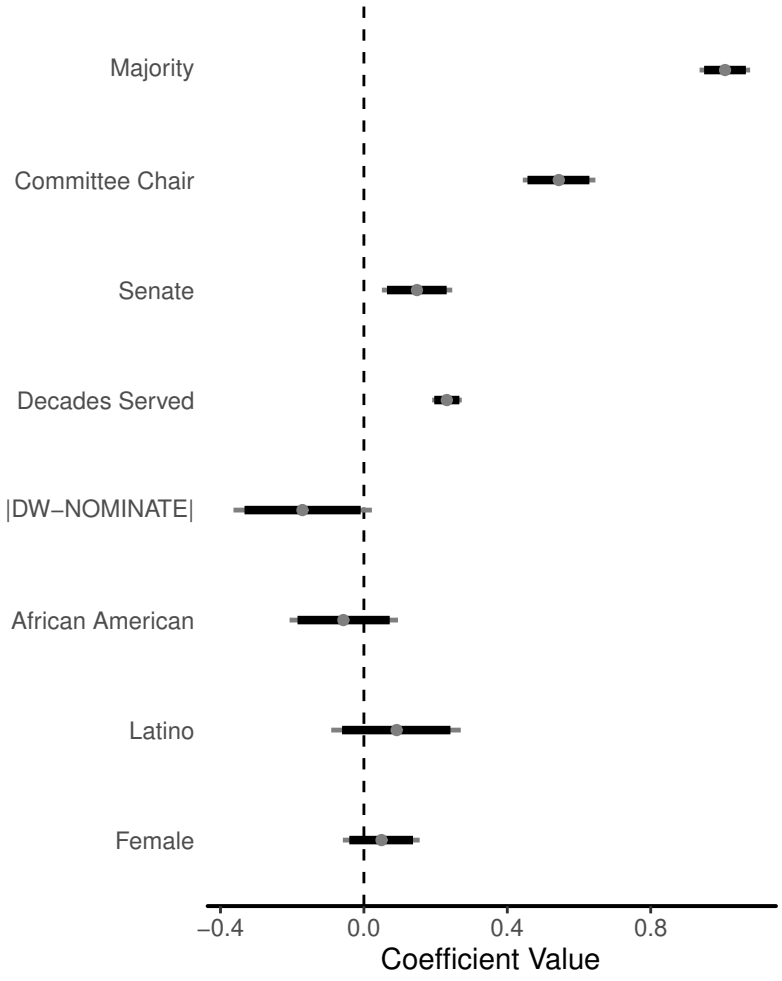
We model the relationship between these variables and our measure of speaker effectiveness using a Bayesian hierarchical beta regression.[24] Since our dependent variable is bounded between zero and one, modelling the dependent variable using a beta distribution represents a natural choice. To capture individual- and Congress-specific factors, we also partially pool the intercept term in our model based on individual and Congress. This approach allows us to capture unobserved Congress and individual-specific heterogeneity while minimizing posterior variance of our estimates.

As shown in Figure 4, our results strongly support both the *institutional* and *sociopolitical* hypotheses we describe. Majority members, committee chairs, and Senators are all substantially more influential than their minority, backbench, and House counterparts.[25] All three of these groups possess substantial formal and informal powers to set the conversation agenda and to influence the direction of conversation in Congressional committee hearings, which make them particularly effective speakers. Senior members are also more effective on average than their junior counterparts, which likely reflects accumulated policy and procedural knowledge as well as informal social connections within Congress. Finally, on average, centrists are also more influential than extremists, though the credible interval on this coefficient estimate is wide. Broadly, we argue that the mechanism through which ideological extremism affects speaker effectiveness is through the presence of shared interests and policy goals. Since committee hearings are a low-visibility activity, one-dimensional measures of ideology like DW-NOMINATE likely represent a noisy measure of shared interests. However, the presence of a weak but notable effect suggests that this is a relevant, if imprecisely measured, effect.

By contrast, we do not observe a strong relationship between *speaker identity* and effectiveness. The

[24] See Appendix §3 for details on model specification, priors, estimation, and convergence.
[25] In Appendix 4.2, we fit independent models for the House and Senate as a robustness check, and find similar results.

Figure 4: Speaker effectiveness coefficient estimates



Dependent variable is the estimated influence score for each speaker in each Congress. Bayesian hierarchical beta regression model. Grey dots indicate posterior mean values. Thick lines indicate 90% credible intervals, and thin lines indicate 95% credible intervals. Positive estimates indicate that an increase in a given coefficient is associated with an increase in estimated speaker influence. Intercept is partially pooled by individual and by Congress, but suppressed for readability.

95% credible intervals for speaker gender and both racial indicators we include in our model include zero, as do the corresponding credible intervals for 96% of our speaker random effects estimates.[26] However, these results should be interpreted with caution. Committee-level speaking ability is likely to be correlated with other reelection-relevant communication skills. Individuals elected to Congress are likely to be skillful speakers relative to the broader population, perhaps especially so for members of gender, racial, or socioeconomic groups who face biases during the electoral process. As a result, the null findings we report may suggest that the true relationship between long-term identity variables and speaker effectiveness is small in magnitude,

[26]In Appendix 4.3.1, we fit a version of this model with indicator variables for committee membership instead of speaker random effects, and find that all substantive conclusions with the exception of the Senate covariate are unchanged.

or they may reflect survivor bias introduced by the Congressional election process.[27]

5.2 Are More Effective Members Better at Advancing Legislation?

If our measure of conversational agenda setting is a meaningful measure of performance in committee hearings, then we should also expect our measure to be related to *legislative productivity*. While the advancement of legislation is the definition of a "team production" activity, Krutz (2005) and Volden & Wiseman (2014) find evidence that individual members can make a difference in advancing their personal bills or their particular interests in other members' bills. Since our definition of effective committee participation requires individual members to persuade their colleagues of the *relevance* and *efficacy* of their preferred topics and rhetorical strategies, that same act of persuasion should affect legislative productivity as well. This prediction is consistent with other research that studies bill progression based on the characteristics of bill sponsors (Anderson *et al.* 2003; Krutz 2005; Cox & Terry 2008; Volden & Wiseman 2014), and provides an opportunity to test our measure's substantive applicability.

To test this prediction, we fit a model of legislative productivity that largely replicates those used in existing work. Our dependent variable is the number of MC-sponsored bills that receive action beyond the committee stage in a given Congress.[28] As predictor variables, we include our measure of effectiveness in committee, all major predictors from Cox & Terry (2008), and all covariates included in our descriptive model of our measure. To estimate this model, we fit a Bayesian negative binomial regression with the intercept partially pooled by individual and Congress.[29]

Table 4 shows the output of three different versions of the model. Model 1 includes only our measure of committee effectiveness, as well as the pooled intercepts for individual members and years. Model 2 includes two major partisan institutional sources of variation: namely, majority party status and an indicator variable for whether a member is a committee chair. Model 3 includes all predictors we included in our earlier models. The results of all three models again support our hypotheses. Unsurprisingly, institutional predictors are an important driver of productivity. However, even conditioning on those institutional effects, we still find strong evidence that our measure of influential committee participation is strongly and positively related to downstream legislative productivity.[30]

[27] For example, voters might plausibly penalize minority candidates more strongly than white candidates for having lower speaking and persuasion skills. As a result, *elected* minority members might plausibly be more adept and persuasive speakers than their white counterparts, which would bias our coefficient estimates upward. Since our research design cannot account for selection bias of this kind, we cannot adjudicate between these possibilities.

[28] We use "action beyond committee" as defined by Volden & Wiseman (2014). In Appendix 4.3, we estimate alternative versions of this model limiting our dependent variable to substantive and significant bills and bills that receive action beyond committee, and find similar results.

[29] See Appendix 3 for details on model specification, priors, estimation, and convergence.

[30] In Appendix 4.2, we substitute member random effects for indicator variables for committee membership, and reach similar substantive conclusions.

Table 4: Predicting Number of Bills Passed Through Committee

	Total Bills Beyond Committee		
	Negative Binomial Mixed-Effects		
	Model 1	**Model 2**	**Model 3**
Mean Influence	14.357	2.549	1.846
	(0.687)	(0.642)	(0.639)
N	3560	3560	3560
Institutional Covariates	No	Yes	Yes
Individual Covariates	No	No	Yes

Dependent variable is total bills sponsored by an MC that advances beyond the committee stage. Bayesian hierarchical negative binomial model, with partial pooling for individual and Congress. Institutional covariates include majority party status and committee chairmanship. Individual covariates include indicators for gender, African American/Latino identification, |DW-Nominate D1|, and decades of service.

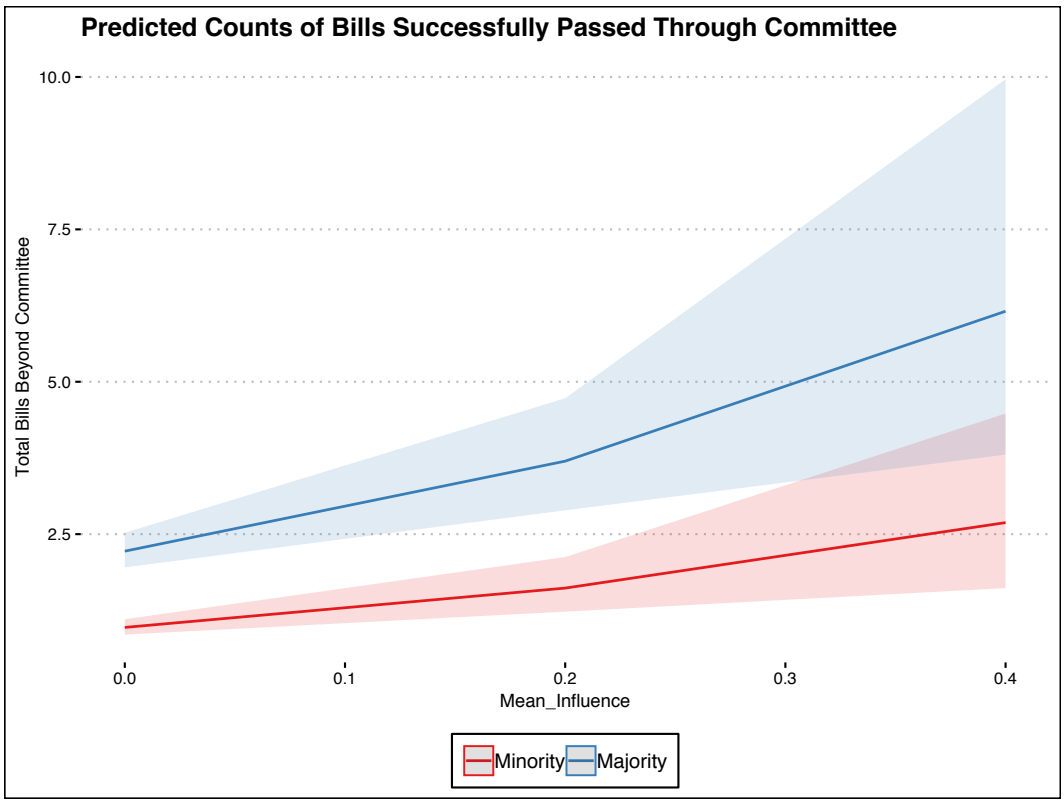
To understand the substantive effect of our measure of speaker effectiveness on legislative productivity, in Figure 5 we plot the marginal effect of our measure on the number of sponsored bills that advance beyond the committee stage. We split this prediction by majority party membership to highlight two substantive findings. First, members of the minority party advance relatively few bills through committee. Second, even after accounting for institutional predictors of legislative productivity, a member of the minority with the single-year maximum on our measure of speaker influence is approximately as productive as a member of the majority with the single-year minimum. In other words, though majority party status is still the strongest predictor of bill progression, our model suggests that both majority and minority party members can still increase their productivity substantially by participating more effectively in committee.

6 Conclusion

Committees play a foundational role in Congressional policy-making. Yet, few existing studies have unpacked *how* committee work translates into legislative outcomes. We provide an account of one key mechanism: control of committee hearings. In this paper, we propose a method of measuring individual-specific legislator agenda control in committee hearings, and demonstrate the measure's validity in a series of empirical tests. Substantively, we find that effective committee participation is associated with some individual-level traits — such as seniority and ideological centrism — but is most strongly driven by institutional factors like committee leadership. We also find that our measure of effectiveness is associated with increased legislative productivity, even after controlling for standard predictors of legislative effectiveness.

These findings have important implications for studies both of individual lawmaking strategies and of the broader lawmaking process. Our findings suggest that, contrary to some expectations about Congressional

Figure 5: Marginal Effects of Committee Effectiveness on Total Bills Through Committee



Marginal effects plot based on Model 3 from Table 4. X-axis is committee speech effectiveness measure. Y-axis is the number of Bills successfully passed through committee by member. Blue lines represent majority party membership; Red lines represent minority party membership.

behavior, conversation in Congressional hearings matters. Congressional hearing conversations are not entirely composed of partisan fighting, grandstanding, or cheap talk but instead include important messages about policy preferences and priorities. Moreover, we demonstrate that the efficacy of these messages matters for downstream legislative productivity. This finding — which would have been difficult, if not impossible, to uncover without the measurement approach we propose — highlights the ways in which lawmakers' rhetorical actions can help shape the Congressional agenda, in an environment overlooked by previous scholarship.

Additional attention to the content of committee hearings using natural language processing methods also should provide new perspectives on older questions. An immediate application of our method would be to augment our dataset and models with information on the identity of witnesses. Doing so could help scholars understand which witnesses are most influential in Congressional hearings and the relative importance of various outside groups. Applying our approach to hearings conducted by various committees could also help scholars understand shifts in jurisdictional conflict (see King 1997; Sheingate 2006, for examples).

Our approach should also be useful to any set of scholars working within environments in which speakers seek to strategically control the flow of conversation. Applying our approach to legislative debates in other

national contexts or international organizations is a natural first step. Our approach might also offer insights to scholars studying patterns of influence in constitutional conventions, at the Supreme Court, in international organizations, or other deliberative bodies.

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