

# The Effects of Congressional Staff Networks in the U.S. House of Representatives

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## ABSTRACT

Standard accounts of legislative behavior typically neglect the activities of professional staff, who are treated as extensions of the elected officials they serve. However, staff appear to have substantial independent effects on observed levels of legislator productivity and policy preferences. In this paper, we use a novel dataset of comprehensive longitudinal employment records from the U.S. House of Representatives to estimate the effects of Congressional staff on legislative behavior. Specifically, results from a series of heteroskedastic Bayesian spatial autoregressive models indicate that members of Congress who exchange important staff members across congresses are more similar in their legislative effectiveness and voting patterns than we would otherwise expect. These findings suggest that scholars should reconsider the role of staff in the legislative process.

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## 1. INTRODUCTION

Research on legislative behavior typically ignores the role of staff. For instance, scholarship on the U.S. Congress has typically considered legislators as individuals (e.g., Mayhew 1974) or as members of parties (e.g., Aldrich 2011), not as managers of small organizations (Salisbury and Shepsle 1981b). Staff are treated as proxies for the legislators whom they serve; agency loss due to delegation and variation in staff effectiveness are thus implicitly assumed to be minimal.

While treating legislators as individuals is a useful simplifying assumption, it ignores the potentially significant effects of staff on legislative behavior. The demands of the legislative process outstrip the time or expertise of even the most capable elected official. As a result, legislators necessarily depend on staff advice when they cast votes on the floor and in committee and rely on aides to help construct, negotiate, and pass legislation on their behalf.<sup>1</sup> This dependence on staff creates the potential for substantial agency loss in voting (e.g., Malbin 1980; Kingdon 1989) and staff-induced variation in members' legislative effectiveness (e.g., DeGregorio 1995; Whiteman 1995; Leal and Hess 2004).

However, the effects of staff on legislative behavior have received scant scholarly attention, especially in quantitative research. Revisiting the role of staff in the legislative process in the contemporary period is especially important given changes in the operation of Congress in recent decades, which have created conditions that might increase staff influence. First, staff are increasingly loyal to parties rather than members (Jensen 2011; Karol 2014), increasing the potential for agency loss but also facilitating staff-led coordination within parties. In addition, increased fundraising demands have reduced the time legislators can spend on legislative activities (e.g., Grim and Siddiqui 2013), which may increase reliance on staff.

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<sup>1</sup>Similar arguments have recently been made about the influence of staff in American state legislatures and how it may have grown in states that have instituted term limits on legislative service — see, e.g., Carey, Niemi, and Powell (2000), Cain and Kousser (2004), and Carey et al. (2006). In comparative politics, Ringe, Victor, and Gross (2013) recently used staff ties to proxy for social connections between legislators in the European Parliament.

In this article, we provide the first rigorous test of the effects of staff on legislative behavior using newly available administrative records on staff employment in the contemporary era. Our empirical strategy focuses on informal staff networks within parties, which play an important role in linking legislators together and shaping their behavior. Using uniquely detailed employment data from the House of Representatives, we identify members who exchanged one or more senior or policy staffers and estimate the similarities in their behavior using spatial autoregressive models. Our results indicate that representatives who exchanged top staffers are more similar in their legislative effectiveness (Volden and Wiseman 2014) and voting patterns (Clinton, Jackman, and Rivers 2004) than we would otherwise expect conditional on numerous explanatory variables. These results suggest that staff play a key role in transmitting expertise and developing policy positions among legislators and thus in the operations and effectiveness of Congress.

## 2. THE ROLE OF STAFF IN THE U.S. CONGRESS

Members of the contemporary U.S. Congress face overwhelming burdens. A typical congressional office must handle numerous tasks on a near-daily basis including responding to constituent requests and inquiries; participating in and tracking legislative debates; writing, amending, and voting on legislation; handling press inquiries; and preparing to run for re-election. These tasks are critical to the success of the member and to the functioning of the legislative branch itself. However, they are also time-consuming and demand significant levels of technical knowledge and task-specific expertise that very few individuals can develop on their own. How can members meet all of these demands for their time and attention simultaneously?

In reality, members themselves can not and do not perform all of these tasks, but instead rely heavily on their staffs. As Hall notes, “Faced with the press of excessive obligations and the frequent prospect of needing to be two places at once, members have responded by relying increasingly on staff... and much of what members do in person is prefigured by the options and information that staffers supply” (1996, 28). The role of legislators has thus changed to include managing — or being managed by — a large team of professionals. As Salisbury and Shepsle (1981b, 559) put it, “each member of Congress has come to operate as the head of an enterprise —

an organization consisting of anywhere from eight or ten to well over one hundred subordinates.”

This heavy reliance on staff is a relatively recent development (Hammond 1984, 1996). As late as the 1940s, staff resources were scarce. The number of professional staff in Congress and the importance of their duties then grew rapidly. Between the end of World War II and the 1970s, for instance, personal staffs increased fivefold (Malbin 1980). Staff growth continued through the 1980s until being scaled back in the 1990s (Hall 1996). However, the decline was concentrated among committee staff (Ornstein et al. 2013); personal staff sizes have remained relatively stable.

### 2.1. *Staff influence*

Of course, the mere presence of staff does not itself imply that they are influential. After all, Capitol Hill staffers are hired, fired, supervised, promoted, and paid by members. Likewise, staffers’ future employment prospects are closely aligned with the political success of their employers (Salisbury and Shepsle 1981a; Bertrand, Bombardini, and Trebbi 2014). For this reason, delegation to staff may result in limited agency loss. Staff also often hold similar views to their member and might thus function more as an “extension” of the legislator rather than an independent influence (Kingdon 1989, 207–208). Kingdon, for instance, initially argued that staff have little influence on members’ voting decisions except among junior members or those in competitive districts (1973). Though he observed a striking correlation between legislators’ votes and staff positions when staff are involved in voting decisions, he attributed this association largely to self-selection in job-seeking and hiring. Similarly, DeGregorio (1995), argues that members primarily delegate important tasks to long-term, “loyal” staffers who can be trusted to pursue member goals rather than staffers’ own preferences.

Nonetheless, researchers and observers have long suggested that Hill staff are not mere ciphers who execute their members’ will while exerting no influence of their own (e.g., Price 1971). Given the complexity and scope of activities undertaken by members’ offices, it would be impossible for legislators to monitor all the activities of their staff closely or to operate effectively without the assistance of staff. Press accounts and past research make clear that staffers are given significant responsibilities and enjoy substantial autonomy (see the Online Appendix for descriptions of the

broad responsibilities they hold). That is, while staffers are responsive to members, they also exert considerable independent influence (e.g., Fox and Hammond 1977; Malbin 1980; DeGregorio 1988; Hall 1996). For instance, in her examination of policy leaders in Congress, DeGregorio concludes that “staffers comprise a goodly share of the leadership elite” (1995, 507). Similarly, Salisbury and Shepsle (1981b, 559) state that the organizations legislators now lead “constrain and shape the behavior of the members in ways that help make the Congress itself a ‘loosely coupled’ collection of these enterprises.” Even critics of staff delegation acknowledge that “Congress could not function in today’s world without the staff on which it has come to depend” (Malbin 1980, 4).

In what ways do staff exert influence? Though existing research has suggested many possible ways in which staff could affect the legislative process, we focus below on two areas identified in previous research: providing legislative expertise and championing specific policy goals.

First, staff help members navigate the often complex process of moving legislation through Congress, providing “a thread of continuity, institutional memory, and expertise within the institution” (Romzek and Utter 1997, 1252).<sup>2</sup> For instance, Senator Mitch McConnell spoke on the Senate floor on July 31, 2013 about the contributions of his outgoing deputy chief of staff Rohit Kumar, a highly regarded staff member who previously worked as a policy adviser to Bill Frist and Trent Lott. According to McConnell, Kumar was “indispensable. . . on the three major deals I helped broker with Vice President Biden. . . We couldn’t have done any of them without Rohit.” Scholars report similar conclusions. Whiteman (1995) uses detailed interviews to argue that staff play a crucial role in gathering information and building support for legislation, while Leal and Hess (2004) suggest that hiring inexperienced staff may hamper the effectiveness of legislators from racial or ethnic minority groups.

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<sup>2</sup>As discussed below, we focus in this study on personal legislative staff. We specifically consider the effects of senior staff, whom we define as individuals holding titles that are variants of chief of staff, legislative/executive/staff director, or administrative assistant, and policy staff, whom we define as individuals with titles that are variants of legislative assistant, attorney/counsel, or specialists in listed issues (non-correspondence). See the Online Appendix for further details.

Other scholars have argued that staff are not only sources of Capitol Hill experience, but help determine the content of legislation and influence members' voting decisions. In this way, member delegation to staff may produce significant agency loss. For instance, Kingdon reevaluated his view on this point in a later edition of his book, conceding "the real possibility that staff influence on legislative voting decisions is greater now than this chapter's portrayal would suggest" as well as the potential for staff influence on the member's legislative advocacy efforts (1989, 206–207). This view is consistent with Price (1971), which argues that staff do not just act as neutral experts but instead play an entrepreneurial role in influencing policy. Similarly, Malbin (1980) contends that staffers exert independent influence in the policymaking process, labeling high-powered Hill staffers "unelected representatives" who can distort the democratic system. Others have argued that staff can influence policy by both championing specific policies and legislation (Degregorio 1996) and by building networks of support in pursuit of legislative aims (Whiteman 1995). Most recently, Wilson (2013) suggests that staff characteristics may affect legislators' issue priorities.

## *2.2. The changing nature of staff in a partisan era*

Changes in working conditions on Capitol Hill make questions about staff influence especially important to consider. First, working conditions have become increasingly unattractive for staff, making staff positions less appealing to those who lack strong partisan views. While Salisbury and Shepsle (1981a, 383) could write that, "The pay is good and... it is often far higher than alternative employment would bring," the period in which staff were well-paid is over. Even in 1995, the Congressional Management Foundation noted that "Staff typically work exceedingly long, unpredictable hours that leave little time for outside activities; receive lower pay than both private sector and federal executive branch staff... and have virtually no job security" (1995, 1). Salaries have continued to decline since then in real terms (Petersen, Chausow, and Wilhelm 2014). Further, increasing polarization in Washington has permeated every aspect of the legislative process, which is likely to make a career as a staffer unattractive to non-partisans (Karol 2014).

As a result of these changes, staff are likely to be less loyal to individual members and more motivated by partisanship or ideology, which increases the potential for agency loss. Commit-

ment to the party is a more important predictor of whether staff leave Capitol Hill than personal commitment to individual members (Jensen 2011).<sup>3</sup> The incentives for staff to demonstrate party loyalty are likely especially high given the possibility of staff working for aligned groups such as interest groups and political campaigns or joining lobbying firms, which offer lucrative salaries in a sector that is increasingly organized along partisan lines (Confessore 2003; Cain and Drutman 2014). Given the increasing role of partisanship in the legislative process, incentives have also likely changed on the hiring side, where members looking for new staff are likely to consider not just expertise but loyalty to the party and its policies. Those staffers who have valuable connections within the party are likely to be attractive to members who want to move into leadership, run for higher office, or advance legislation with the support of partisan allies (e.g., Wolffe 2009).

Second, the time allocation of members of Congress has seemingly shifted. Legislators are not only expected to spend extensive time in their districts but must devote half or more of their time to fundraising, which leaves little time for legislative efforts (Alexander 2005; Grim and Siddiqui 2013). Their reliance on staff is thus likely to be significant, creating the potential for significant agency loss in position-taking as well as greater staff-induced variation in legislative productivity.

### *2.3. Hypotheses*

While many of the works cited above examine the influence of staff on member actions, previous studies have not used quantitative methods to rigorously test whether staff affect the legislative effectiveness and voting patterns of members of Congress. Our empirical strategy leverages movement between offices by senior and policy staff, which create a key informal network within Congress that helps to shape the actions of legislators. Previous studies have not considered how staffers link legislators together, but this approach is consistent with a growing body of research on non-hierarchical linkages between members of contemporary parties and their allies (see, e.g., Bernstein and Dominguez 2003, Koger, Masket, and Noel 2009, Herrnson 2009, Koger, Masket,

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<sup>3</sup>Similarly, we show below that staff crossing party lines is extremely rare. While similar data are not available for the 1970s, existing accounts make clear that partisan and ideological motivations were weaker in that era (Salisbury and Shepsle 1981a, 394).

and Noel 2010, Desmarais, La Raja, and Kowal 2014, and Nyhan and Montgomery 2015). It also provides a novel approach to estimating staff effects on member behavior that are otherwise difficult to isolate.<sup>4</sup>

We expect that staff ties produce increased similarity in legislator behavior via two mechanisms. First, when staff members move between legislators, the specific knowledge, relationships (including with party leaders), and expertise that influenced their previous employer will in turn influence the behavior of their new employer, producing greater similarity in the behavior of the two legislators than we would otherwise expect.<sup>5</sup> When Barack Obama was elected to the U.S. Senate, for instance, he hired Pete Rouse, the former chief of staff to Majority Leader Tom Daschle, because of his deep institutional knowledge and connections (Wolffe 2009; Kim 2010). Rouse played an important role in shaping Obama's legislative career as chief of staff, helping the first-time senator successfully navigate the chamber as a high-profile newcomer and build relationships with influential legislators like Daschle had (Bacon 2007). More recently, after becoming Speaker of the House, Paul Ryan hired David Hoppe as his chief of staff, a former chief of staff to Jack Kemp, Daniel Coats, and Jon Kyl who has deep ties within the party and the conservative movement (Viebeck 2015).

Second, senior and policy staff who move between offices will also facilitate deeper levels of coordination and collaboration between members and their staffs, which will increase their similarity of their records and behavior. For instance, in the 108<sup>th</sup> Congress, Rep. Richard Pombo (R-CA) became chair of the House Resources Committee (Deering and Wahlbeck 2006; Cann 2008). Pombo's former legislative director and deputy chief of staff was serving as legislative director for another member, George Nethercutt (R-WA), who touted his connections to Pombo,

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<sup>4</sup>As we note below, most of the staff we consider only work for a single member.

<sup>5</sup>This argument assumes staff leave lasting effects on their prior employers, which is consistent with, e.g., patterns of relatively consistent position-taking over time (Poole and Rosenthal 2007). Those prior employers may of course also be influenced by replacement staff. If so, however, it should be more difficult for us to find a significant relationship (we thank a reviewer for this point).



stating that the House Resources chair “understands my feelings” and “will work with me to get a bill” to protect an area known as Wild Sky northeast of Seattle (Daly 2004). The staff tie between Pombo and Nethercutt was likely a key mechanism of this relationship.

These mechanisms of influence and coordination are likely to influence two major outcomes of interest. First, senior and policy staff are likely to influence the effectiveness of their new office (either positively or negatively) by altering the ways that their new members’ offices approach the legislative process and fostering working relationships between their former and current employers. In this way, staff play a crucial role in disseminating specific practices and approaches to moving legislation through the chamber and influencing the lawmaking process.

Second, staff not only influence how effective members are in pursuing their legislative goals but the content of the positions that members take and the goals they pursue. Legislators face difficult information constraints that require them to take positions on hundreds or thousands of proposals. Many of these proposals are obscure and/or technical, which may increase legislators’ reliance on staff and other sources in determining which vote to cast or position to take. In addition, other proposals require complex calculations about the substantive costs and benefits of a proposal as well as the potential political consequences of supporting or opposing it. In either case, staff provide advice to members that is likely to reflect what they told their previous boss. In some cases, staffers may even consult or coordinate with their former colleagues or prior employer directly about a bill or upcoming vote. These influences could make legislators who have employed the same staffer likely to vote more similarly than we might otherwise expect. We formalize these expectations as follows:

*Hypothesis 1: Member offices that are linked by high-level staff will be more similar in terms of legislative effectiveness than we would otherwise expect.*

*Hypothesis 2: Member offices that are linked by high-level staff will vote in a more similar manner than we would otherwise expect.*

However, past research provides little guidance about the exact level of seniority or status

required for a staffer's influence on a member to be measurable. Should we expect to detect effects only when examining senior staff (e.g., chiefs of staff and legislative directors) alone or should we also consider the influence of policy staff (e.g., legislative assistants and policy advisers assigned to specific areas)?<sup>6</sup> Lacking clear theoretical guidance, we test our hypotheses for the networks formed by senior staff ties as well as the networks formed from both policy and senior staff ties. Such a decision also requires us to make a tradeoff between the strength of the staff-based connections between members we measure and the number of connections that we can use to test our hypotheses. If we define a staff tie narrowly, the ties we isolate will be stronger but fewer will be observed, whereas a broader definition will encompass more ties at the cost of capturing ties that are weaker on average. It is unclear *a priori* which approach is preferable.

As we discuss below, our empirical results suggest that only senior staff ties have a significant influence on members' legislative effectiveness. By contrast, the effects of staff on voting patterns are measurable when we include both senior and policy staff but not senior staff alone. These results can be understood theoretically in light of the differing responsibilities of senior and policy staff members. Senior staff play a broader role in organizing member offices and exercise greater responsibility in key tasks such as negotiating with other members' offices and coordinating with party leadership. It is thus plausible that they would have a particularly strong influence on members' ability to move their policy priorities through the legislative arena. These tasks often fall outside the purview of policy staffers; including them in the staff ties network may serve simply to dilute the effect of senior staff. By contrast, policy staff are likely to be important in shaping members' broader record of roll call votes on the hundreds of matters that come before the chamber. These matters are the primary focus of activity for policy staff and may receive less attention from senior staff in isolation. As a result, it may be necessary to consider the ties formed by policy staffers in order to find a measurable effect.

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<sup>6</sup>Our focus is restricted to the senior and policy staffers who previous research and press accounts identify as key players on Capitol Hill. We do not expect administrative or constituent service staff to influence the effectiveness or voting of legislators.

Finally, as in any observational study, it is important to take steps to rule out alternative explanations. We therefore control below for a number of relevant covariates including seniority, committee membership, and majority party status in models of legislative effectiveness as well as party and district presidential votes in models of voting patterns. All models also control for the race, ethnicity, and gender of members. Finally, we take additional steps to account for the possibility that staff may tend to choose to work for members with similar policy views or with similar levels of legislative effectiveness. To address this possibility, we conduct falsification tests to assess the extent to which our results appear to reflect self-selection by similar staff and legislators (i.e., homophily) rather than staff influence on legislator behavior.<sup>7</sup>

### 3. DATA AND METHODS

Having laid out our theoretical expectations, we now describe how we estimate staff effects in the U.S. House of Representatives by leveraging senior and policy staff who move between members and provide details about the Bayesian heteroskedastic spatial autoregressive models used in our statistical analyses.

#### 3.1. *Congressional staff and network data*

In early 2012, we licensed a dataset of everyone who held a position in Congress (including members and staffers) since 1993 from CQ First Street, an electronic database that was created by digitizing the print CQ Press Directories from 1993 to 2009 and then updating the data during the subsequent period. We subset the data to records for the personal staffs of members of the House of Representatives during the 103<sup>rd</sup> to the 111<sup>th</sup> Congresses, the period for which we have complete data at the Congress level.<sup>8</sup>

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<sup>7</sup>Additional details about these covariates are provided in the Online Appendix.

<sup>8</sup>The size of the staff population is largely stable over time during the period covered by our data (12,427–13,099 per Congress). We exclude committee staff because our data typically do not distinguish majority from minority staff and it is also impossible to link staffers to specific members in most cases (see Online Appendix for details).

We then coded position titles in the CQ data using pattern and string matching procedures to identify the senior and policy staff will be most likely to affect Congressional voting patterns and legislative effectiveness.<sup>9</sup> We then merged the data on senior and policy staff to House member data from Volden and Wiseman (2014) and Bayesian ideal point estimates (Clinton, Jackman, and Rivers 2004) generated using roll-call records provided by Poole and Rosenthal (2007).<sup>10</sup> Among the 3,973 member-Congress observations in our data during this period, staff data were missing for only 112 cases (2.8%; see Online Appendix for further details).

From these data, we constructed adjacency matrices for each Congress representing the number of staff ties between members for the 105<sup>th</sup> to the 111<sup>th</sup> Congresses, which allows us to test if members who share ties in the network are more similar than we would otherwise expect relative to those who are not connected directly by staff ties. If we have  $n$  members in a given Congress, the edge weight  $W_{i,j}$  between members  $i$  and  $j$  in the  $n \times n$  adjacency matrix  $\mathbf{W}$  is simply the total number of senior and policy staff who worked for both members during the current Congress or one of the previous two congresses.<sup>11</sup> For statistical reasons, these ties are thus undirected<sup>12</sup> — we assume that two offices that have exchanged staffers will be more similar. This approach reflects our expectation that staff have lasting effects on the voting patterns and legislative effectiveness of

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<sup>9</sup>For senior staff, we searched for variants of chief of staff, legislative/executive/staff director or administrative assistant. For policy staff, we searched for variants of legislative assistant, attorney/counsel, or specialists in listed issues (non-correspondence); see Online Appendix for details.

<sup>10</sup>We omit Shelley Sekula Gibbs, who served for less than two months of the 109<sup>th</sup> Congress and lacks an ICPSR identifier. In our analysis of member ideology, we also exclude observations for which the ideology measure is missing ( $n = 29$  due to resignations, deaths, etc. that prevented members from casting enough votes to be scaled accurately — list available upon request).

<sup>11</sup>Because of our use of this lag, we analyze the 105<sup>th</sup>–111<sup>th</sup> Congresses below. In the Online Appendix, we show that our results are robust to instead counting the total number of senior and policy staff who worked for both members during the current or previous congress instead.

<sup>12</sup>Spatial regression models require symmetric weight matrices.

members. For instance, if a staffer works for member  $i$  in Congress  $t - 1$  and then leaves to work for member  $j$  in Congress  $t$ , we expect that the influence of the staffer will make  $j$  behave more like  $i$  in Congress  $t$  by bringing her expertise and priorities (which have left a mark on  $i$  that persists at time  $t$ ) to the office of  $j$ . In addition, the staffer working for  $j$  may continue to communicate and coordinate with  $i$ 's staff during Congress  $t$ , further aligning their activities and priorities.<sup>13</sup>

As discussed above, theory does not provide clear guidance about the exact level of seniority or position required for a staffer's influence on a member to be measurable. We therefore construct two adjacency matrices  $\mathbf{W}$  for each Congress:

- Senior staff only: Ties exist among members who employed the same senior staff member(s).
- Policy and senior staff: Ties exist if members employed the same individual(s) as a senior or policy staff member.

In the empirical analyses below, we report results from both approaches.

To address potential threats to inference, we also construct “placebo” adjacency matrices  $\mathbf{W}$  for each Congress that we use in falsification tests in the results section (described further below). The results from these matrices allow us to estimate whether our results appear to be driven by self-selection by members and staff. First, we identify all staff who are *least* likely to influence the legislative effectiveness or voting record of each member. Specifically, we focus on staff who *not* senior staff, policy staff, or constituency staff.<sup>14</sup> If adjacency matrices constructed these placebo staff ties show high levels of spatial autocorrelation, it would suggest that the relationships we observe are driven by self-selection (lower-level staff are also likely to display homophily with members but are unlikely to directly influence legislative effectiveness or voting patterns). Second,

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<sup>13</sup>This approach differs from research on direct inter-member relationships in legislatures (e.g., Kingdon 1989; Fowler 2006a; Masket 2008; Rogowski and Sinclair 2012). The closest analogue is the Ringe, Victor, and Gross (2013) study of staff ties in the European Parliament.

<sup>14</sup>We thank a reviewer for pointing out that constituency staff may shape the flow of information from the district to members, which implies they should be excluded from our placebo test.

we construct otherwise identical matrices to those above reflecting future senior or senior/policy staff ties — the matrices include ties in a Congress that will be formed in one of the next two congresses but not those that exist in the current Congress or the previous two (as in the standard measures). Again, significant levels of spatial autocorrelation in legislative effectiveness for *future* ties would indicate self-selection by staffers and legislators rather than a causal effect.<sup>15</sup>

### 3.2. Descriptive statistics and example network

To estimate staff effects, we need to observe them working for more than one member. Our analyses below therefore necessarily leverage switches between offices among staff who work for more than one member. We first note that these sorts of position switches are relatively uncommon. Despite high levels of personnel turnover in House offices (e.g., Drutman 2012), most staff members who leave a position on a legislator’s personal staff exit the chamber rather than taking another job in the House. During the period covered by our data, only 12% of the staff who served at the senior or policy leadership level held an equivalent position for two or more House members. However, transitions between House offices are more frequently observed among long-term staff — for instance, 44% of those who served in five or more Congresses in our data worked for more than one member.<sup>16</sup>

In addition, it is worth noting that House staffing patterns display a remarkable degree of stability over this period, increasing our confidence in our ability to generalize across congresses in the data. Figure 1a shows that members average approximately 16–20 unique staff members per Congress (including Washington, D.C. and district staff) and 5.5–7 staff at the senior or policy

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<sup>15</sup>It is not possible to use the future staff ties approach as a falsification test for ideology because scores on the measure are so highly autocorrelated. Ideology is correlated with lagged ideology at  $r = 0.95$ . Correlation across congresses for legislative effectiveness is a much more modest  $r = 0.54$ . Regardless of measurement technique, ideology scores tend to be very stable across Congresses in the aggregate because voting is so constrained by stable factors such as party and district preferences.

<sup>16</sup>See the Online Appendix for further details on staff turnover patterns.

leadership level from the 105<sup>th</sup> to the 111<sup>th</sup> Congresses.<sup>17</sup> The levels of and stability in House personal staff sizes we observe during this period are consistent with a recent Congressional Research Service (CRS) analysis (Petersen, Reynolds, and Wilhelm 2010). In all, we found no evidence of any systematic changes in staffing patterns in this period. Due to the relatively infrequent within-chamber office switching among senior staff noted above, we observe only a modest number of ties between members created by staff change as displayed in Figure 1b. However, the frequency of these staff ties between House members is quite stable (the expected number of connections for a randomly chosen legislator ranges from 0.37 to 0.51 during our sample period). Almost all of these ties have a weight of one, indicating a single senior or policy staffer who went from one office to another (the maximum tie weight is 1 for 96–99% of all members by Congress who have at least one tie to another member). Likewise, most members who have a staff tie are linked to only one other member (61%–80% by Congress).<sup>18</sup> Thus, we also found no evidence for any significant patterns in staff ties across this period.

As expected, cross-party linkages are exceptionally rare in our data.<sup>19</sup> Fewer than 50 of the 12,938 unique staffers who served on the personal staffs of House members at the senior or policy level during this period worked for different legislators on both sides of the aisle. The member-to-member ties created by staff connections that we analyze below should thus be interpreted as potential channels of within-party influence.

To provide intuition about the networks of legislators linked by staff that we analyze, we provide an illustrative example in Figure 2, which shows the network of non-isolate House members

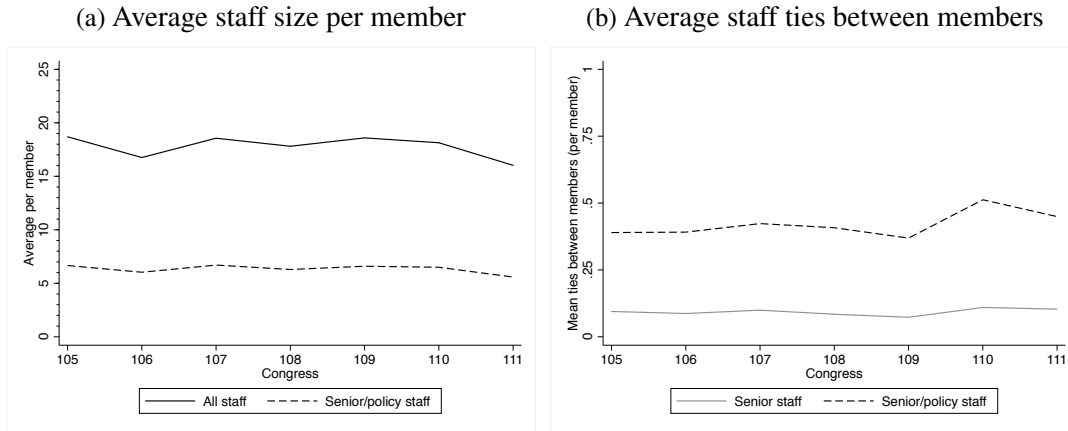
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<sup>17</sup> Policy and senior staff totals at the member-Congress level are almost perfectly uncorrelated with the outcome measures we analyze below (see Online Appendix for further details).

<sup>18</sup>It was not possible to construct usable issue-specific adjacency matrices. When we examined ties among staff with the most commonly listed issue specialties, the resulting matrices had only a handful of ties per Congress (results not shown).

<sup>19</sup>We treat independents who caucused with a party like Bernie Sanders (Democrats) and Virgil Goode (Republicans during the 107<sup>th</sup> Congress) for the purposes of this analysis.

Figure 1: Stability in House staff levels and ties



Data from CQ First Street for the 105<sup>th</sup> to the 111<sup>th</sup> Congresses. Includes all personal staff in the House of Representatives. Ties represent senior or policy leadership staff who previously worked for another member during that congress or one of the two previous congresses.

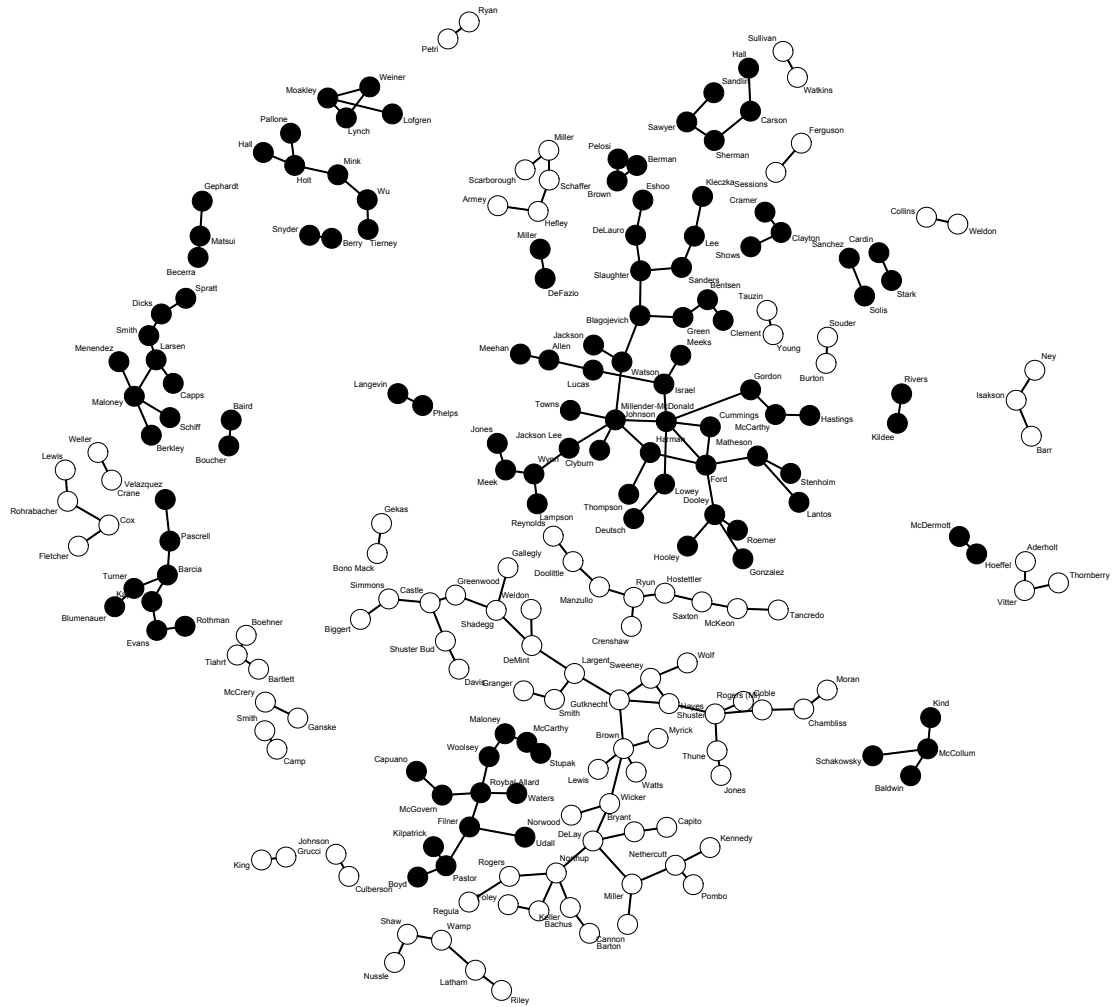
linked by senior or policy staff in the 107<sup>th</sup> Congress. As expected, connected legislators are overwhelmingly segregated by party. In fact, the parties are disjoint; we observe no links between Democratic and Republican legislators via shared senior or policy staff. Also, though the networks are not fully connected, we see large connected components of both Republicans (white nodes) and Democrats (black nodes) as well as isolated dyads and smaller components in each party.

### 3.3. *Spatial autoregression*

Our hypothesis is that legislators who are linked by shared senior or policy staff will have more similar legislative effectiveness scores (Volden and Wiseman 2014) and Bayesian ideal point estimates (Clinton, Jackman, and Rivers 2004) than we would otherwise expect. To test this claim, we estimate spatial autoregressive models (a standard approach in the networks literature — see, e.g., Nyhan and Montgomery 2015) for each Congress from 105<sup>th</sup> to the 111<sup>th</sup>. This choice is driven by our interest in the *effects* of staff ties on member-level outcomes, which are the primary



Figure 2: The staff network of House members in the 107<sup>th</sup> Congress



Data from CQ First Street. Members of the Democratic caucus are indicated by black nodes and members of the Republican caucus by white nodes. Ties represent senior or policy staff who previously worked for another member during that congress or one of the two previous congresses. Isolates are excluded.

focus of Congressional research.<sup>20</sup>

Specifically, we estimate a Bayesian heteroskedastic spatial autoregressive model with covariates (LeSage and Pace 2009).<sup>21</sup> For a continuous outcome  $y$ , we assume that

$$y = \mathbf{X}\beta + \rho\mathbf{W}y + \epsilon \quad (1)$$

$$\epsilon \sim N(0, \sigma^2 V) \quad (2)$$

$$V_{ii} = v_i, i \in [1, \dots, n], V_{ij} = 0 \forall i \neq j \quad (3)$$

where  $n$  is the number of observations,  $\mathbf{X}$  is an  $n \times p$  covariate matrix, and  $\mathbf{W}$  is an  $n \times n$  weight matrix with zeros along the diagonal.  $V$  is a diagonal matrix containing variance scalar parameters, which allow for individual observations to be divergent from the behavior of their neighbors (LeSage and Pace 2009). In essence, adding these scalar terms to the error distribution is equivalent to assuming a Student- $t$  prior distribution for the errors.<sup>22</sup>

The model is fully specified by placing priors over the model parameters,  $\rho$ ,  $\beta$ ,  $\sigma$  and  $V$ . We specify standard uninformative reference priors on the regression coefficients ( $\beta$ ) and variance term ( $\sigma$ ). Further, we place a uniform prior on the spatial autocorrelation coefficient,  $\rho \sim U(-1, 1)$ . Finally, the prior distribution for the variance scalar parameters is  $\pi(r/v_i) \sim iid \chi^2(r), i \in [1, \dots, n]$ . In this case, we use the default hyperprior recommendation from LeSage and Pace (2009) and set

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<sup>20</sup>We do not, for instance, use exponential random graph models (ERGMs) because the goal of those models is to understand how and why networks are formed. Though that is a valuable topic for future research, our goal here is to estimate the effect of staff ties on legislative behavior.

<sup>21</sup>All analyses were conducted in Matlab using `sar_g` (LeSage and Pace 2009).

<sup>22</sup>Our spatial regression approach is preferable to a mixed-effects model (e.g., Ringe, Victor, and Gross 2013) for this application because we wish to model spatial autocorrelation directly rather than treating it as a nuisance parameter. Moreover, our approach provides a single, directly interpretable estimate of the level of autocorrelation among connected members in the spatial lag term ( $\rho$ ).

$r = 4$ , which allows for a modest degree of heteroskedasticity in the data generating process.<sup>23</sup>

Within this context, the spatial adjacency matrix  $\mathbf{W}$  we study represents the strength of the ties between members  $i$  and  $j$  in a unipartite network, which we measure as a simple count of the number of staff currently employed in member  $i$ 's office that were previously employed in member  $j$ 's office in the current congress or previous two congresses and vice versa.<sup>24</sup> The values for  $\mathbf{W}_{i,j}$  are thus the number of staff who worked for both  $i$  and  $j$  in the congress in question<sup>25</sup> and the two previous ones after being row-standardized, which normalizes the matrix so that each row sums to exactly one for members that have one or more shared staff members and to zero otherwise (a standard procedure in this literature; see, e.g., Ward and Gleditsch 2008; LeSage and Pace 2009).<sup>26</sup>

In our statistical model, the key parameter is the spatial autocorrelation coefficient  $\rho$ . This term measures the tendency of members who are linked by staff to behave more more similarly than we would expect by chance alone after controlling for other relevant factors such as party, district preferences, seniority, and gender. Our theory implies that  $\rho > 0$ , which means that members who share staff will be more *similar* than otherwise expected. We emphasize that the  $\rho$  parameter

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<sup>23</sup>The  $v_i$  terms are included to handle heteroskedasticity resulting from large outliers and areas of non-constant variances within the adjacency matrix. Additional options would be to allow for spatial effects in the error term or to specify a spatial Durbin model. However, both Bayesian and ML estimation of these more complex models converged poorly and exhibited pathological instability in parameter estimation (details available upon request).

<sup>24</sup>We show in the Online Appendix that our results are robust to instead considering only staff ties in the current congress or the previous one.

<sup>25</sup>It is not possible to account for indirect ties using weights based on network distance because the networks formed by staff ties are not fully connected and many distances are thus infinite.

<sup>26</sup>The weight  $W_{c,d}$  representing the tie between members  $c$  and  $d$  is set such that  $\sum_d W_{c,d} = 1$  for all who exchange at least one staffer with another office ( $\sum_d W_{c,d} = 0$  otherwise). Though little variation exists in office-level staff totals, this standardization ensures that our inferences are not distorted by any tendency of specific members to share a larger number of staffers.

does not imply a directional relationship. For instance, the positive spatial coefficients we report below do *not* mean that members who exchange staffers have higher legislative effectiveness a more conservative ideology than other members. Instead, positive  $\rho$  values indicate that members linked by staffers are *more similar* in their behavior than we would otherwise expect conditional on the covariates in our models. Thus,  $\rho$  should be understood as the predicted change in the outcome variable for a given member as the scores for all of her “neighbors” in the network increase by one unit (Ward and Gleditsch 2008, 38).

In the analyses below, we report posterior means and standard deviations for  $\rho$  separately for the 105<sup>th</sup> to the 112<sup>th</sup> Congress. We also report pooled estimates for these posteriors across all congresses using the procedure outlined by Gelman et al. (2004). We take this cross-sectional approach out of necessity. Despite advances in analyzing spatial autocorrelation in panel data, all methods of which we are aware assume that the spatial weights matrix  $\mathbf{W}$  is *constant* across time periods. In our case, however, we calculate a new weights matrix for *each* Congress to allow for changes in staff ties over time. We therefore estimate a series of separate cross-sectional models and pool our estimates, which offers a useful way to combine our inferences across congresses while still allowing the network of member-staff relationships to evolve over time.<sup>27</sup>

While the spatial autocorrelation coefficient  $\rho$  is the parameter of primary interest in our analysis, we also report the other key structural parameters below that are denoted  $\beta$  in Equation (1). However, some caution is needed in interpreting these coefficients. In a standard linear regression model in which  $y = \mathbf{X}\beta + \epsilon$ , the expected change in  $y$  resulting from a one unit change in some covariate  $r$ , denoted  $X_r$ , is captured by the regression parameter  $\beta_r$ . (Under the strict linearity assumption in OLS, the partial derivative  $\frac{\partial y}{\partial X_r}$  is just  $\beta_r$ .) By contrast, the predicted value of  $y_i$  in the spatial autoregressive model specified in Equation (1) is a function of not only the covariate values for unit  $i$  but also the covariate values of adjacent units in the spatial weight matrix  $\mathbf{W}$  (LeSage and Pace 2009, 38). In other words, the level of effectiveness we expect to observe for member  $i$

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<sup>27</sup>Likewise, it is not possible to test whether staff influence varies significantly in particular subsets of the data using interaction terms in the spatial autoregressive framework we employ.

is related to the level of effectiveness we expect to observe for all units adjacent to member  $i$  in the adjacency matrix described above. To see this, we can re-write Equation (1) above as:

$$\begin{aligned}
y - \rho \mathbf{W}y &= \mathbf{X}\beta + \epsilon \\
(I_n - \rho \mathbf{W})y &= \mathbf{X}\beta + \epsilon \\
y &= (I_n - \rho \mathbf{W})^{-1}\mathbf{X}\beta + (I_n - \rho \mathbf{W})^{-1}\epsilon
\end{aligned} \tag{4}$$

In this model, the change in the vector  $y$  associated with a one unit change in covariate  $r$  (which we denote as  $S_r(\mathbf{W})$ ) is:

$$\frac{\partial y}{\partial x_r} \equiv S_r(\mathbf{W}) = (I_n - \rho \mathbf{W})^{-1}I_n\beta_r \tag{5}$$

To facilitate interpretation in our analysis below, we therefore follow LeSage and Pace (2009) in reporting the *average direct effect* for covariates we discuss. The average direct effect is the change in  $y_i$  associated with a one unit change in covariate  $r$  for that same unit  $i$ . This quantity can be calculated as  $E(D) = n^{-1}\text{tr}(S_r(\mathbf{W}))$ . The *total average effect*, or the average effect of a one unit change on covariate  $r$  on the entire system, can be calculated as  $E(T) = n^{-1}\mathbf{1}'_n(S_r(\mathbf{W}))\mathbf{1}_n$ . Finally, we also report the *average indirect effect*, a quantity that represents the average effect of changes in covariate values *across units* and can be calculated as  $E(I) = E(T) - E(D)$ .<sup>28</sup>

### 3.4. Outcome variables

To test the influence of staff on legislators' contribution to the legislative process (Hypothesis 1), we use legislative effectiveness scores (LES), which were created by Volden and Wiseman (2014) to capture members' ability to propose new bills and move them through the legislative process. This composite measure includes information about the number of significant and substantive bills members sponsor, whether those bills receive action at the committee stage or beyond, and

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<sup>28</sup>While it is possible in principle to estimate this model using maximum likelihood, we use a Bayesian approach and calculate effects directly using draws from the full posterior distribution.

whether the bills passed the House or became law.<sup>29</sup> In general, these scores capture the “proven ability to advance a member’s agenda through the legislative process and into law” (Volden and Wiseman 2014, 18; see also <http://www.thelawmakers.org/#/method>).

We also wish to test the extent to which staff ties are associated with the positions members take, including how they vote in roll calls on the floor. Hypothesis 2 is therefore tested using one-dimensional Bayesian ideal-point estimates (Clinton, Jackman, and Rivers 2004), which can be broadly interpreted as measuring the ideology of members.<sup>30</sup>

## 4. RESULTS

Having described our data and statistical approach, we next turn to presenting our main results. We begin by focusing on the role of staff in influencing legislative effectiveness and then assess their role in the policy positions that legislators take.

### 4.1. *Legislative effectiveness*

Our first hypothesis is that member offices who are linked via staff members will be more similar in their legislative effectiveness than we would otherwise anticipate. Following Volden and Wiseman (2014), we predict members’ legislative effectiveness scores (LES) using models that also control for the number of years members have served consecutively in the House, majority party status, gender, race, whether they are a committee and/or subcommittee chair, and whether

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<sup>29</sup>In the 105<sup>th</sup>–111<sup>th</sup> Congresses, LES scores ranged from 0 to 18.7. The mean value is 0.996 with a standard deviation of 1.526.

<sup>30</sup>Though several alternative measures exist, they are all highly correlated. In particular, all of our main results in Tables 3 and 4 hold using DW-NOMINATE (Poole and Rosenthal 2007; results not shown but are available upon request). Additional details on the Bayesian ideology estimates are provided in the Online Appendix.

they are in the majority or minority leadership.<sup>31</sup> Note that the majority party indicator implicitly controls for party affiliation because we estimate a separate model for each Congress as described above.<sup>32</sup>

As noted above, our main interest is in the spatial autoregressive term  $\rho$ , which indicates the degree to which legislators who are connected by staffers are *more similar* in their level of legislative effectiveness than we would expect by chance alone. We begin by considering the network of ties created by the movement of senior staff members between offices (e.g., chief of staff, legislative director, etc.). These results are shown in Table 1.<sup>33</sup> The spatial autoregressive coefficient  $\rho$  is positive in each congress except for two, indicating that members who are linked via senior staff ties are more similar in their legislative effectiveness conditional on the covariates in the model than we would otherwise expect. Further, while not all of the spatial autoregressive coefficients are reliably greater than zero, the pooled estimate of  $\rho$  is 0.043 with a 95% credible interval of [0.0095, 0.096], indicating that network effects are reliably greater than zero overall. Senior staff appear to influence the legislative effectiveness of the offices in which they work.

To make the substantive implications of these results clearer, it is helpful to present the estimated effect of partisan staff connections in a particular model. If we focus on the 108<sup>th</sup> Congress,

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<sup>31</sup>Because our observations are defined at the legislator-Congress level, we cannot control directly for dyad-level measures of similarity between members such as shared committee assignments or similar racial or ethnic backgrounds. We thus include indicators for black and Latino legislators instead. In the Online Appendix, we further show that our results are robust to the inclusion of committee fixed effects.

<sup>32</sup>Controlling for party affiliation is statistically equivalent to controlling for majority party status in the models we estimate for each congress. We thus control for majority status, which is more relevant to our outcome of interest (Volden and Wiseman 2014).

<sup>33</sup>Although there is some congress-level variation in our estimates of  $\rho$  in each of our tables, we observe no consistent pattern that can be clearly linked to changes in party control or electoral outcomes. We therefore focus on the pooled results below.

Table 1: Legislative effectiveness results (senior staff ties)

	105	106	107	108	109	110	111	Pooled
Constant	0.062 (0.067)	0.233 (0.067)	0.234 (0.072)	0.198 (0.07)	0.21 (0.074)	0.294 (0.058)	0.293 (0.065)	
Seniority	0.047 (0.01)	0.024 (0.01)	0.023 (0.01)	0.025 (0.009)	0.025 (0.009)	0.025 (0.008)	0.017 (0.009)	
Majority party	0.364 (0.078)	0.42 (0.078)	0.262 (0.079)	0.345 (0.079)	0.407 (0.078)	0.425 (0.072)	0.331 (0.076)	
Female	0.037 (0.091)	0.044 (0.09)	-0.01 (0.084)	0.051 (0.083)	0.142 (0.082)	0.054 (0.077)	-0.01 (0.084)	
African American	-0.017 (0.102)	-0.042 (0.102)	-0.101 (0.099)	-0.025 (0.098)	-0.049 (0.098)	-0.226 (0.106)	-0.301 (0.119)	
Hispanic	-0.022 (0.144)	-0.018 (0.14)	-0.064 (0.131)	0.114 (0.123)	0.009 (0.125)	-0.098 (0.141)	-0.18 (0.143)	
Committee chair	2.685 (0.313)	2.364 (0.379)	2.006 (0.25)	1.843 (0.247)	1.472 (0.432)	2.836 (0.219)	2.299 (0.327)	
Committee subchair	1.108 (0.146)	0.993 (0.121)	0.731 (0.116)	0.692 (0.115)	0.558 (0.116)	0.31 (0.096)	0.345 (0.101)	
Majority leadership	-0.213 (0.25)	-0.199 (0.222)	0.344 (0.273)	1.135 (0.334)	0.764 (0.257)	0.326 (0.171)	0.671 (0.194)	
Minority leadership	-0.085 (0.222)	-0.138 (0.204)	-0.003 (0.216)	-0.06 (0.167)	-0.099 (0.17)	-0.166 (0.183)	-0.142 (0.196)	
Power committee	-0.033 (0.076)	-0.05 (0.07)	0.042 (0.072)	-0.05 (0.072)	-0.151 (0.069)	-0.205 (0.065)	-0.038 (0.074)	
Staff connections ( $\rho$ )	-0.005 (0.043)	-0.048 (0.05)	0.018 (0.078)	0.193 (0.06)	0.091 (0.053)	0.02 (0.056)	0.102 (0.061)	0.043 (0.021)
R <sup>2</sup>	0.456	0.47	0.315	0.313	0.262	0.418	0.366	
N	443	437	442	438	438	446	444	

Bayesian heteroskedastic spatial autoregressive models (LeSage and Pace 2009) estimated in Matlab using `sar_g` on legislative effectiveness scores (Volden and Wiseman 2014). House staff data from CQ First Street for the 105<sup>th</sup>–111<sup>th</sup> Congresses. Ties represent senior staff who previously worked for another member during that congress or one of the two previous congresses. Standard deviations of the parameter posteriors are in parentheses.



the expected direct effect of an increase in legislative effectiveness for committee chairs is 1.853 with a 90% credible interval of [1.376, 2.352] (compared with not serving as chair). However, the chairmanship effect is likely to have spillover benefits to other legislators who are linked via staff ties to the member in question. Allies of that legislator whose offices are led by former staffers of the chair may be more likely to have their bills make it through the committee, for instance. Alternatively, legislators may benefit from ties to the committee chair via former staffers who now work for him or her. The estimated *indirect* effect of being a committee chair, which takes into account the effects on other members connected to the chair via the staff network and is calculated by subtracting the direct effect from the total effect, is 0.442 with a 90% credible interval of [0.131, 0.826], which represents a roughly 0.3 standard deviation increase in that Congress.

Table 2 shows the results of an identical model when the staff ties we consider among members are expanded to include the policy staffers described above (e.g., legislative aides) in addition to the senior staff considered in the previous analysis. In this case, the results are more ambiguous. Legislative effectiveness does not seem to be reliably transmitted through the broader group of senior and policy staff (pooled estimate of  $\rho = 0.013$  with a 95% credible interval of  $[-0.015, 0.037]$ , which is consistent with our expectations but not statistically conclusive). The weaker relationship among this broader group of staff may be the result of the disproportionate role senior staff seem to play in moving specific bills through the legislative process. Policy staffers may be more influential, as we find below, in shaping roll-call voting by members.

#### 4.2. *Voting record*

Our second hypothesis is that legislators who are linked by partisan staff ties have more similar voting records than we would otherwise anticipate. As before, we fit a spatial autoregressive model to test whether staff connections between offices covary with the outcome in question conditional on a series of observable covariates. Obviously, however, the covariates used in our analysis of legislative effectiveness are not necessarily appropriate in modeling voting patterns. (For instance, there is no reason to believe that being a committee subchair is by itself related to voting patterns.) Our models of ideology therefore include covariates that are plausibly associated with

Table 2: Legislative effectiveness results (policy/senior staff ties)

	105	106	107	108	109	110	111	Pooled
Constant	0.056 (0.068)	0.233 (0.068)	0.237 (0.073)	0.201 (0.07)	0.235 (0.075)	0.29 (0.059)	0.296 (0.065)	
Seniority	0.048 (0.01)	0.024 (0.01)	0.023 (0.01)	0.025 (0.009)	0.024 (0.009)	0.025 (0.008)	0.017 (0.009)	
Majority party	0.351 (0.081)	0.427 (0.08)	0.265 (0.081)	0.331 (0.08)	0.422 (0.08)	0.417 (0.074)	0.328 (0.079)	
Female	0.028 (0.091)	0.044 (0.091)	-0.008 (0.085)	0.053 (0.085)	0.135 (0.082)	0.056 (0.076)	-0.024 (0.084)	
African American	-0.016 (0.102)	-0.042 (0.103)	-0.101 (0.099)	-0.033 (0.098)	-0.06 (0.099)	-0.221 (0.107)	-0.304 (0.12)	
Hispanic	-0.016 (0.142)	-0.02 (0.141)	-0.067 (0.132)	0.102 (0.124)	0.003 (0.126)	-0.095 (0.14)	-0.155 (0.144)	
Committee chair	2.686 (0.316)	2.38 (0.386)	2.003 (0.253)	1.828 (0.241)	1.481 (0.423)	2.846 (0.22)	2.252 (0.326)	
Committee subchair	1.109 (0.146)	0.997 (0.124)	0.729 (0.117)	0.691 (0.116)	0.542 (0.116)	0.307 (0.096)	0.348 (0.101)	
Majority leadership	-0.239 (0.246)	-0.215 (0.221)	0.336 (0.269)	1.14 (0.34)	0.773 (0.262)	0.32 (0.171)	0.666 (0.195)	
Minority leadership	-0.085 (0.221)	-0.127 (0.202)	-0.005 (0.215)	-0.052 (0.166)	-0.089 (0.166)	-0.163 (0.184)	-0.138 (0.196)	
Power committee	-0.033 (0.076)	-0.054 (0.071)	0.042 (0.072)	-0.059 (0.072)	-0.147 (0.071)	-0.205 (0.065)	-0.04 (0.075)	
Staff connections ( $\rho$ )	0.022 (0.031)	-0.022 (0.031)	-0.005 (0.041)	0.067 (0.034)	-0.036 (0.038)	0.018 (0.031)	0.036 (0.035)	0.013 (0.013)
R <sup>2</sup>	0.457	0.472	0.316	0.313	0.266	0.419	0.363	
N	443	437	442	438	438	446	444	

Bayesian heteroskedastic spatial autoregressive models (LeSage and Pace 2009) estimated in Matlab using `sar_g` on legislative effectiveness scores (Volden and Wiseman 2014). House staff data from CQ First Street for the 105<sup>th</sup>–111<sup>th</sup> Congresses. Ties represent senior and policy staff who previously worked for another member during that congress or one of the two previous congresses. Standard deviations of the parameter posteriors are in parentheses.

Table 3: Ideology results (senior staff ties)

	105	106	107	108	109	110	111	Pooled
Constant	1.931 (0.271)	2.341 (0.3)	2.078 (0.199)	2.419 (0.202)	2 (0.172)	3.335 (0.256)	3.794 (0.256)	
Democrat	-1.632 (0.047)	-1.575 (0.047)	-1.62 (0.043)	-1.635 (0.044)	-1.305 (0.039)	-2.282 (0.058)	-2.098 (0.056)	
Female	-0.159 (0.053)	-0.158 (0.052)	-0.154 (0.048)	-0.138 (0.049)	-0.112 (0.04)	-0.125 (0.057)	-0.088 (0.053)	
African American	-0.034 (0.078)	-0.018 (0.089)	0.05 (0.075)	0.022 (0.087)	0.165 (0.07)	-0.06 (0.091)	0.005 (0.086)	
Hispanic	0.032 (0.088)	0.177 (0.088)	0.042 (0.075)	0.067 (0.068)	0.065 (0.054)	-0.16 (0.082)	-0.156 (0.079)	
District pres. vote	-3.74 (0.93)	-4.176 (1.037)	-3.975 (0.739)	-4.088 (0.764)	-3.271 (0.674)	-7.243 (0.99)	-10.201 (0.994)	
District pres.vote <sup>2</sup>	0.716 (0.767)	0.724 (0.869)	1.605 (0.649)	1.218 (0.697)	0.625 (0.63)	3.245 (0.89)	5.672 (0.876)	
Staff connection ( $\rho$ )	0.031 (0.028)	-0.014 (0.034)	-0.071 (0.036)	0.019 (0.034)	0.015 (0.039)	0.003 (0.029)	-0.015 (0.024)	-0.003 (0.012)
R <sup>2</sup>	0.905	0.905	0.886	0.911	0.905	0.93	0.927	
N	440	435	435	436	436	442	439	

Bayesian heteroskedastic spatial autoregressive models (LeSage and Pace 2009) estimated in Matlab using `sar_g` on one-dimensional Bayesian ideal point estimates (Clinton, Jackman, and Rivers 2004). House staff data from CQ First Street for the 105<sup>th</sup>–111<sup>th</sup> Congresses. Ties represent senior staff who previously worked for another member during that congress or one of the two previous congresses. Standard deviations of the parameter posteriors are in parentheses.

member voting records including membership in the Democratic party, gender, and race, ethnicity. Most importantly, we also control for district preferences, which we measure using the two-party vote received by the Democratic presidential candidate in the previous election in each member’s congressional district as well as a squared presidential vote share term that allows for potential non-linearities.

We again begin by considering the network of ties created by the movement of senior staff between offices. These results are shown in Table 3. As with the results in Table 2, the spatial autoregressive coefficients in these models are mostly positive, but the pattern is not consistent over time. As a result, the pooled estimate is very small ( $\rho = -0.003$ ) and is not reliably distinguishable from zero (the 95% credible interval for this parameter is  $[-0.029, 0.020]$ ). We therefore lack sufficient evidence to conclude that senior staff affect members’ voting records (as represented by

Table 4: Ideology results (policy/senior staff ties)

	105	106	107	108	109	110	111	Pooled
Constant	1.926 (0.272)	2.326 (0.303)	2.061 (0.198)	2.39 (0.202)	1.951 (0.172)	3.298 (0.255)	3.752 (0.256)	
Democrat	-1.631 (0.05)	-1.535 (0.051)	-1.557 (0.048)	-1.605 (0.051)	-1.264 (0.043)	-2.241 (0.068)	-2.078 (0.063)	
Female	-0.158 (0.053)	-0.153 (0.051)	-0.134 (0.048)	-0.135 (0.048)	-0.109 (0.04)	-0.125 (0.057)	-0.09 (0.053)	
African American	-0.027 (0.078)	-0.005 (0.091)	0.028 (0.076)	0.025 (0.088)	0.177 (0.07)	-0.048 (0.092)	0.01 (0.086)	
Hispanic	0.037 (0.088)	0.188 (0.088)	0.046 (0.074)	0.075 (0.068)	0.063 (0.054)	-0.16 (0.082)	-0.151 (0.079)	
District pres. vote	-3.722 (0.933)	-4.148 (1.047)	-4.027 (0.731)	-4.046 (0.76)	-3.142 (0.669)	-7.122 (0.987)	-10.05 (0.991)	
District pres. vote <sup>2</sup>	0.693 (0.77)	0.692 (0.88)	1.689 (0.64)	1.192 (0.693)	0.501 (0.626)	3.122 (0.889)	5.545 (0.874)	
Staff connection ( $\rho$ )	0.016 (0.022)	0.036 (0.024)	0.041 (0.025)	0.032 (0.025)	0.05 (0.023)	0.024 (0.021)	0.01 (0.019)	0.028 (0.008)
$R^2$	0.905	0.905	0.885	0.911	0.906	0.93	0.927	
N	440	435	435	436	436	442	439	

Bayesian heteroskedastic spatial autoregressive models (LeSage and Pace 2009) estimated in Matlab using `sar_g` on one-dimensional Bayesian ideal point estimates (Clinton, Jackman, and Rivers 2004). House staff data from CQ First Street for the 105<sup>th</sup>–111<sup>th</sup> Congresses. Ties represent policy and senior staff who previously worked for another member during that congress or one of the two previous congresses. Standard deviations of the parameter posteriors are in parentheses.

Bayesian ideal points).

When we consider the larger network of policy and senior staff ties, however, the data tell a very different story. These results are provided in Table 4. In this case, the spatial autoregressive coefficient is consistently positive and is reliably greater than zero in the 109<sup>th</sup> and 110<sup>th</sup> Congresses. Moreover, the pooled estimate is 0.028 and reliably greater than zero with a 95% credible interval of [0.0129, 0.0465]. These results are especially compelling given how much of the variance in the Bayesian ideal point estimates is already accounted for by our covariates ( $R^2 > 0.88$  in each congress). This result indicates that Congressional voting patterns are statistically associated with members’ roll call voting patterns among legislators linked by staff ties even after accounting for other factors that are predictive of member behavior.

We again provide a substantive effect size estimate for the indirect effects of a covariate of

interest via staff ties. It is first necessary to emphasize, however, that ideological voting is largely a function of party affiliation and district composition. Though our theory indicates that staff should have some influence on voting behavior, we should not anticipate that the effects of other covariates via staff ties will be large—even factors such as gender, race, and ethnicity are swamped by the influence of party and constituency.

With this in mind, we focus on the 109<sup>th</sup> Congress and consider the relationship between the indicator variable for members who are African American (relative to white/non-Hispanic) and ideology. Consider, for instance, a very close primary race between a white Democrat and African American Democrat who have been redistricted into the same district. As we might expect, the direct effect of race is associated with a more liberal ideology.<sup>34</sup> The direct effect of race is 0.176 with a 90% credible interval of [0.042, 0.317].<sup>35</sup> To put this in context, the standard deviation for ideology among Democrats in the 109<sup>th</sup> Congress is 0.474. However, the greater liberalism of an African American member of Congress is likely to have spillover effects on the voting patterns of other legislators who are linked to that member via staff ties. Allies of the legislator whose offices are led by former staffers may be more likely to coordinate across offices, leading to a more liberal voting record. Alternatively, former staffers may bring with them information and viewpoints that support a more left-leaning strategy. The estimated *indirect* effect of a legislator being African American on the ideal point of other members via staff ties is 0.0093 with a 90% credible interval of [0.0003, 0.0238], which is a very modest but statistically reliable effect.

#### 4.3. *Falsification tests*

Any analysis like ours that uses observational data must address concerns about endogeneity. In particular, it is possible that our results are simply a consequence of staff seeking out members with

---

<sup>34</sup>We use causal language here for ease of exposition, but acknowledge that the effects of immutable factors such as race are difficult to analyze in causal terms (Sen and Wasow 2016).

<sup>35</sup>As noted above, the direct effect is calculated as  $E(D) = n^{-1}\text{tr}(S_r(\mathbf{W}))$  where  $S_r(\mathbf{W})$  is specified in Equation 5. In a Bayesian framework, the full posterior for this quantity can be calculated by re-calculating  $E(D)$  for each draw out of the posterior.

similar characteristics to their previous bosses or members hiring staff from legislators with similar records. We therefore performed a series of falsification tests using placebo adjacency matrices of lower-level staff and future senior or senior/policy staff ties between legislators (described in section 3.1 above). If our results are spurious in this way, then we should observe significant spatial autocorrelation for both lower-level and future senior/policy staff ties.<sup>36</sup>

The falsification tests we conducted using these two strategies are summarized in Table 5. The first two rows in the table report falsification tests for legislative effectiveness scores using adjacency matrices constructed from lower-level and future senior staff ties.<sup>37</sup> The third row reports falsification tests for the ideology scores using adjacency matrices constructed from lower-level staff ties.<sup>38</sup>

The results provide relatively little evidence that our results are the result of homophily between staff and legislators, though they do not allow us to rule out such a relationship entirely. Most notably, the pooled estimates are not reliably different from zero in any case. Moreover, the 95% credible interval for lower-level staff ties  $[-0.070, 0.027]$  does not include the pooled estimate from Table 1 (0.043), though the 95% credible interval for the effect of future staff ties on legislative effectiveness does overlap this value  $[-0.033, 0.071]$ , suggesting that some caution is required in interpreting our results as entirely causal. Similarly, the pooled estimate of spatial autocorrelation for ideology using lower-level staff ties is virtually zero (0.006; 95% credible interval:  $[-0.016, 0.067]$ ), though the credible interval for the placebo test estimate overlaps the previous point estimate of 0.028 in Table 4. As we discuss in the conclusion, further research is needed to

---

<sup>36</sup>The goal of this approach is to evaluate whether a modeling approach correctly recovers an effect that is expected to be zero based on theory (Sekhon 2009). Falsification tests thus differ from network permutation tests, which evaluate the probability of an outcome under a null distribution constructed by randomizing the set of ties among actors.

<sup>37</sup>We focus on senior staff ties given the significant relationship we find above.

<sup>38</sup>As noted above, future staff ties are not an appropriate falsification test for measures of ideology since they tend to be so stable across time periods (see Footnote 15).

Table 5: Placebo test results (spatial autoregressive coefficients only)

	105	106	107	108	109	110	111	Pooled
<i>Legislative effectiveness:</i>								
Lower-level staff	0.037 (0.056)	-0.052 (0.061)	-0.077 (0.086)	0.027 (0.052)	-0.083 (0.054)	-0.034 (0.073)	0.028 (0.068)	-0.016 (0.023)
Future senior staff	-0.073 (0.065)	-0.069 (0.057)	0.014 (0.063)	0.215 (0.056)	0.012 (0.057)			0.027 (0.027)
<i>Ideology:</i>								
Lower-level staff	0.059 (0.05)	0.132 (0.084)	0.058 (0.072)	0.06 (0.042)	-0.02 (0.049)	-0.104 (0.042)	0.001 (0.033)	0.006 (0.018)

Cells represent spatial autoregressive coefficients from Bayesian heteroskedastic spatial autoregressive models (LeSage and Pace 2009) estimated in Matlab using `sar_g` (identical specifications to those in Tables 1–4; full results available upon request). House staff data from CQ First Street for the 105<sup>th</sup>–111<sup>th</sup> Congresses. Lower-level staff ties represent non-senior/policy/constituency staff who previously worked for another member during that congress or one of the two previous congresses. Future staff ties represent senior staff who worked for another member in one of the next two congresses. Posterior standard deviations are in parentheses.

disentangle the relationship between staff ties and similarities in behavior, which is likely to reflect both homophily and staff influence on member behavior.

## 5. DISCUSSION

These findings provide the most rigorous evaluation of the effects of staff on legislator behavior to date. Leveraging movement between member offices in the U.S. Congress, we find evidence that senior staff affect the legislative effectiveness of members of Congress. Representatives who employ senior staff that previously worked for other legislators tend to be more similar in their level of effectiveness than we would otherwise expect conditional on a series of key covariates, including being part of the leadership, holding a committee chairmanship, serving on high-profile committees, seniority, and majority party status. The results of falsification tests using lower-level staff as well as future senior staff ties suggest that these findings are not simply the result of homophily in the hiring process, though we cannot fully rule out such a relationship.

Further, we find evidence that legislators linked by senior or policy staff are more likely to have similar voting records (as measured by Bayesian ideal points), although our falsification test results indicate that this relationship is driven at least partly by homophily among members and staff who share similar views towards policy. In this sense, staff may help serve as “extensions”

of members in the sense Kingdon described (1973), helping them develop and maintain a voting record that is consistent with their views and beliefs.

This research also contributes to the study of social networks in political science. By measuring ties between legislators formed by staff, we capture a new aspect of social networks in Congress. The Bayesian heteroskedastic spatial autoregression models we estimate allow us to estimate the extent to which the behaviors of legislators who share staff ties resemble each other conditional on a series of observable measures. Finally, we develop a novel falsification test approach that helps us assess whether these relationships can be plausibly interpreted as causal or are mechanisms for or consequences of the behaviors of interest.

As with any study, however, our findings have limitations that future research should seek to address. First, though our data is more extensive than any previously considered in the literature, it does not allow us to test for long-term changes in the roles or effects of staff in Congress. These relationships may differ, for instance, from those that obtained during the so-called “text-book Congress” of the mid-20<sup>th</sup> century (Shesple 1989). Second, we focus only on the House of Representatives due to the larger number of legislators it contains and the difficulty of adequately accounting for differences between chambers in a pooled analysis. It would be worthwhile to consider the Senate in future research. Third, we are unable to study the effects of committee staff due to the difficulty of linking them to specific members or establishing their partisanship, but they are unquestionably important players in the legislative process and deserve further study. Fourth, as with any quantitative analysis, we rely on imperfect measures of our underlying behaviors of interest — in this case, legislative effectiveness and voting patterns. Fifth, we do not consider the relationship between our network of staff ties between members and other dyad-level variables such as cosponsorship (Fowler 2006a,b), which would require a multiplex networks approach that is beyond the scope of this paper. Finally, it is of course not possible to fully eliminate all possible concerns about confounding, including homophily between staff and members. Future research should pursue other research designs that could generate additional credible estimates of the effects of staff.



However, our findings still represent an important first step toward recognizing that Congressional staff may be more influential than legislative scholars have previously realized. Despite their low public profile, staff play a key role in the operations of Congress and the parties, especially in facilitating the flow of expertise and policy information among members.

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## ONLINE APPENDIX

### *Congressional staff responsibilities and coding*

The Congressional Research Service describes the typical responsibilities of chiefs of staff in sweeping terms (Petersen 2010, 8,11):

An incumbent in this position typically acts as the Member's chief policy advisor, and may also undertake political advising. An incumbent may also

- develop and implement all policy objectives, strategies, and operating plans for a Member's office;
- manage and direct all activities and staff of the Member's Washington, DC, and field offices;
- coordinate the activities of the Member with the leadership of the appropriate chamber and committees; and
- oversee the Member's office budget.

Policy staff (legislative aides, policy advisers, etc.) play a somewhat narrower, but still very influential, role in the legislative process, as the Congressional Management Foundation's description of the responsibilities of legislative assistants makes clear (2015):

- Formulates legislative initiatives for assigned issue areas which include:
  - devising a legislative plan;
  - drafting the plan into legislative form;
  - planning, coordinating and scheduling introduction of legislation in the House (or offering it on an appropriate vehicle if it is in an amendment);
  - gathering support for a bill or amendment from other Members, as well as appropriate interest groups;
  - working with committees on legislation;
  - coordinating legislative support to get the bill passed in the House.
- Tracks legislation and other developments in his or her assigned issue areas and briefs the Member for floor work, committee work, work in the district, and outside House-related activities;
- Monitors legislative developments within committees;
- Plans and coordinates co-sponsorship and support of other legislation;
- Monitors legislation on the House floor, providing the Member with information on each vote;
- Writes Floor speeches for the Member

To identify senior and policy staff, we used the following procedure. Staffers identified as “chief of staff,” “director” (e.g., “executive director,” “staff director,” “legislative director”), “administrative assistant,” or variants of those titles (including deputies) were coded as senior staff based on position descriptions and titles from the Congressional Research Service (Petersen 2010). The list of specific keywords that we searched for in position titles, which was developed in conjunction with research assistants who reviewed the listed positions and compared the descriptions to the target terms, is as follows:

- |                        |                       |                      |
|------------------------|-----------------------|----------------------|
| - legislative director | - exec director       | - asst to **         |
| - legis. dir.          | - director            | - asst. to **        |
| - legls. director      | - political director  | - assistant director |
| - ligis. director      | - staff director      | - asst. director     |
| - legis. dir.          | - washington director | - deputy director    |
| - chief of staff *     | - admin. assistant ** | - chief deputy       |
| - chef of staff *      | - admin. ass **       | - sr. deputy         |
| - executive director * | - admin ass **        | - sr.deputy          |
| - exec. director       | - assistant to **     | - senior deputy      |

Other staff whose titles described them as legislative aides, advisers, or fellows; included legal terms such as “attorney” or “counsel”; or listed issue areas for which they were responsible in a non-correspondence role were coded as policy staff following Drutman (2012). The keyword list is below:

- |                          |                            |  |
|--------------------------|----------------------------|--|
| - legislative assistant  | - senior legislative staff | - legislative dir.                     |
| - legislative, assistant | - legislative staff        | - legislative chief                    |
| - legislative asst       | - legislative analyst      | - legislative detailee                 |
| - legislative-assistant  | - legis. analyst           | - legislative specialist               |
| - legis asst             | - legislative associate    | - director of legislative and research |
| - legis assistant        | - legislative assoc        | - subcom.                              |
| - legis-assistant        | - legislative consultant   | - com.                                 |
| - legislative assi.      | - legis. advisor           | - subcommittee                         |
| - legis, assistant       | - legislative advisor      | - appropriations                       |
| - legis assistant        | - legislative adviser      | - approp                               |
| - legislative aide       | - legislative researcher   | - approp.                              |
| - legis, aide            | - legislative research,    | - committee †                          |
| - legis aide             | arts, animals              | - floor director                       |
| - leigs. aide            | - legislative cones.       | - floor monitor                        |
| - legislative manager    | - legis, director          |  |

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\*and not administrative staff or a staff assistant; i.e., “Assistant to the Chief of Staff”

\*\* and not a staff assistant

†if not a legislative correspondent or staff assistant

- floor manager
- floor manager;  
political adviser
- quorum
- policy
- policy advisor
- policy adviser
- public policy
- policy assistant
- policy director
- policy analyst
- policy aide
- foreign policy advisor
- foreign affairs
- helsinki commission
- national security  
adviser
- homeland security
- military affairs
- military ‡
- u.s. air force  
legislative
- immigration ‡
- health policy
- health advisor
- health adviser
- health assistant
- health and disability  
director
- agriculture
- agricultural rep.
- agribusiness
- senior issues manager
- issues director
- issue director
- senior aide
- senior advisor
- labor
- housing
- energy
- environment assistant
- superfund
- indian
- tribal affairs adviser
- affairs
- domestic issues
- transportation
- dairy
- special advisor
- special adviser
- veteran affairs  
specialist
- va inter-agency staff
- veteran affairs
- intergovernmental §
- veterans §
- national security §
- natl. security §
- defense §
- military §
- health care §
- medicare §
- agricultural §
- education §
- natural resource §
- environmental §
- immigration §
- economic  
development §
- director of commerce and in-  
dustry
- assistant, ways and  
means, taxes, trade
- national economic  
director
- director of economic  
development
- economic affairs
- economic director
- economic dev.  
director
- economic dev.
- economic dev. aide
- senior assoc. banking
- finance advisor
- trade assistant
- co-director,  
congressional  
human rights caucus
- human rights caucus
- science, space and  
technology
- technology  
development  
director
- director, technology  
and development
- science asst.
- senior citizens affairs
- senior citizen aide
- detailee, crime
- advisor, lands issues
- chief minority  
(republican)  
investigator
- special investigator
- investigator
- governmental relations  
director
- government affairs
- congressional adviser
- director of  
congressional relations
- director of  
government affairs
- director of planning
- director of president  
pro tempore affairs
- director of research
- director of research,  
taxes
- director of social  
services
- director of special  
services
- director of strategic  
planning
- director of tourism
- director, mn services
- director, new  
democrat coalition
- director, new  
democrat coalition
- director, resource  
center
- adviser
- coalitions director
- affairs director
- congressional hispanic  
caucus director
- blue dog coalition  
director
- federal programs  
director
- rules associate
- republican director
- task force director
- program director,  
dem. caucus
- staff designee –

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‡with the term “director”

§if not a legislative correspondent, casework specialist, or district representative

- |               |                   |                      |
|---------------|-------------------|----------------------|
| intelligence  | - clerk           | - legal aide         |
| - principal   | - ombudsman       | - legal aide,        |
| - fellow      | - judicial clerk  | arts and humanities, |
| - campaign †† | - judiciary       | animal rights        |
| - counsel ‡‡  | - legal assistant | - counsel            |
| - attorney    | - legal adviser   |                      |

Although there is some heterogeneity in staff organization and responsibilities between offices, this approach has significant face validity and is consistent with prior research (Petersen 2010; Drutman 2012). The full list of titles coded as senior and policy staff, which includes more than 12,000 variants due to idiosyncrasies in how staff titled are reported (e.g., “Admin Asst.,” “Admin. Assistant,” “Admin. Assistant Banking Defense Labor,” etc.), is available upon request.

Finally, the following terms were used to identify individuals whose primarily role was constituency service (this group was also excluded from our placebo tests):

- |                            |                       |                               |
|----------------------------|-----------------------|-------------------------------|
| - constituent              | - northwest director  | - local                       |
| - casworker                | - southwest director  | - michigan                    |
| - casework                 | - area rep.           | - milwaukee                   |
| - field                    | - area representative | - madison                     |
| - advocate                 | - state               | - illinois                    |
| - case                     | - community           | - jersey                      |
| - constituency             | - region              | - minnesota                   |
| - consitutent              | - liason              | - calif                       |
| - const.                   | - county              | - deleware assistant          |
| - constit.                 | - outreach            | dirstict director             |
| - constitutent             | - rural               | - beaumont director           |
| - visitors                 | - liaison             | - bellingham director         |
| - constit                  | - director central    | - distirict director          |
| - congressional social     | - director eastern    | - dist. devel. director       |
| worker; senior services    | - director Brooklyn   | - east river director         |
| - senior services director | - western director    | - galveston director          |
| - service academies        | - eastern director    | - mi director                 |
| - service academy          | - northern director   | - mn director                 |
| assistant                  | - southern director   | - mobile director             |
| - washington, d.c.         | - montana             | - northeast-midwest coalition |
| services director          | - chicago             | - ocs director                |
| - casework                 | - nevada              | - oklahoma city director      |
| - district                 | - new jersey          | - outreach rep.               |
| - regional                 | - maine               | - thousand oaks director      |
| - area. representative     | - california          | - thousnad oaks director      |
| - area director            | - suburban            | - west fl aide                |
| - northeast director       | - suburan             | - west river director         |
| - southeast director       | - florida             | - wisconsin director          |

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††if not coded into another position category

‡‡if not administrator or scheduler/assistant

- |                             |                        |                      |
|-----------------------------|------------------------|----------------------|
| - seacoast director         | sula director          | peninsula director   |
| - service director          | - reno/sparks director | - manhattan director |
| - so. az director           | - delaware assistant   | - quad city director |
| - south sound director      | - kent-sussex director | - county rep         |
| - southsound/olympic penin- | - kitsap/olympic       | - beach rep          |

### *Descriptive statistics on personal staff data*

As we note in the main text, personal staff data were missing for less than 3% of member-Congress observations. Missing data is somewhat more common in earlier congresses, ranging from a maximum of 21 members in the 103<sup>rd</sup> and 107<sup>th</sup> to a minimum of 6 members in the 108<sup>th</sup>, 109<sup>th</sup>, and 111<sup>th</sup>. These seem to be the result of data collection errors by CQ First Street or members of Congress failing to provide CQ with staff information. Approximately two-thirds of the 55 members with missing staff data were only observed once (68%), suggesting random error, while another one-third repeatedly did not match to staff (32%), suggesting a possible lack of cooperation with CQ.

The main text demonstrates that staff levels are stable at the member level over time. Here we consider variation in staff turnover over time. Very few senior/policy staff are reported as working for two or more offices during the same Congress in our data (just 1.6% of the 24,361 senior/policy staff-congress observations in our data) and temporal variation in these within-congress shifts is minimal ( $R^2 = 0.002$  in a regression predicting within-congress turnover using Congress fixed effects; details available upon request). A significant portion of staff do exit Congress over time, however. Specifically, 50% of the senior/policy staff we observe in the 103<sup>rd</sup> to 110<sup>th</sup> Congresses were not observed in the subsequent Congress. However, these exit rates again vary only modestly over time, ranging from 46% after the 104<sup>th</sup> to 56% after the 103<sup>rd</sup>. Moreover, senior/policy staff who continue to serve in a subsequent congress are very likely to work for the same member if they do so — 90% of those observed in the 103<sup>rd</sup> to 110<sup>th</sup> Congresses who served in the next congress worked for the same member — and these rates vary little over time (88–91% by congress). As a result, the rates at which senior/policy staff observed in a given congress work for the same member in the subsequent congress are relatively stable, ranging from 40% for the 103<sup>rd</sup> Congress

to 50% for 108<sup>th</sup>.

Finally, as noted above, we observe no pattern of correlation between senior or policy/senior staff totals and our outcome variables at the member-Congress level. For total senior staff, the correlations for legislative effectiveness, the Clinton, Jackman, and Rivers (2004) ideal point estimate, and the absolute value of the ideal point estimate are -0.01, 0.06, and -0.04, respectively. The corresponding values for total senior and policy staff are 0.02, -0.06, and 0.02.

#### *Details on why committee staff data were excluded*

We were unable to consider Congressional committee staff in this study for two reasons. First, only 7% of committee staff position titles in the CQ First Street data allow us to link a staff member to a specific committee member or to a chair or ranking member. Second, the position titles included frequently do not even allow us to distinguish between majority and minority staff. Only 38% of the 8,467 committee staff-Congress cases we observe can be linked to one of the two major parties or a legislator who is a member of or caucuses with a party. As a result, we are not confident that we can adequately estimate the effects of committee staff on legislator behavior, though we believe this is an important topic for future research. We therefore restrict our sample to personal staff. Our expectation is that excluding committee staff, who are key players in the legislative process, should make it harder for us to find staff effects.

#### *Details on variables used in regressions*

Bayesian ideal point estimates were generated using the `psc1` package in R version 3.2.1 and roll call data came from the Voteview website maintained by Keith Poole. Estimates were generated using the `ideal` function were all roll calls with fewer than 10 dissents were dropped and legislators casting fewer than 200 roll calls were removed. We identified the model by constraining estimates for Dennis Kucinich (D) and Jeff Sessions (R) to the points  $-2$  and  $2$  respectively (Clinton, Jackman, and Rivers 2004). For each Congress, we ran the model separately for 500,000 iterations (thinning by 250) and discarded the first 250,000 iterations. In one case (Pennsylvania Republican Bud Shuster in the 107<sup>th</sup>) estimation failed due to a lack of variance in the roll call

record (Shuster retired only a month into the Congress) and the estimate was removed.

Our seniority variable comes from the legislative effectiveness project (Volden and Wiseman 2014), which itself relies on the *Almanac of American Politics*. Seniority is coded as the number of terms served in Congress (1=freshman). Majority party, leadership status, female, African American, and Latino also rely on the *Almanac*. The indicator for “power committees” was provided by volden14 and indicates membership on the Appropriations, Rules, and Ways and Means Committees. District presidential vote is measured for each member as the share of the two-party presidential vote received by the candidate in each members’ party as recorded in the Jacobson dataset. For the 103<sup>rd</sup> and 104<sup>th</sup> Congresses, we used the 1992 election results. We likewise used the 1996 results for the 105<sup>th</sup> and 106<sup>th</sup> Congresses, the 2000 results for the 107<sup>th</sup> and 108<sup>th</sup> Congresses, the 2004 results for the 109<sup>th</sup> and 110<sup>th</sup> Congresses, and 2008 for the 111<sup>th</sup> Congress.

In our robustness checks, we include Agriculture, Appropriations, Armed Services, Banking and Finance, Budget, Education, Commerce, Foreign Affairs, Oversight, Judiciary, Treasury, Transportation, Rules, Science, Small Business, Veterans’ Affairs, Ways and Means, Intelligence, and Homeland Security (108<sup>th</sup>–111<sup>th</sup>). These data came from Stewart and Woon’s data on Congressional committee assignments and records from the House Clerk.

#### *Additional robustness checks*

In addition to the results reported in the main text, we conducted numerous robustness checks. The results for these models (spatial autoregressive coefficients only) are shown in Table A1.

First, Models 1 and 2 provide results including only policy staff. That is, we estimate the same models as in Tables 2 and 4 in the main text but exclude senior staff. While the results shown in Models 1 and 2 are essentially the same as those shown in the main text, we rely on the combined senior/policy staff in the main text because that specification is more consistent with our understanding of the legislative process. While we believe policy staff are important in shaping voting behavior, we do not view them as being exclusively effective as is implied by the policy-only formulation. (It would be odd to assume that legislative assistants can shape behavior while legislative directors cannot.)



Table A1: Robustness test results (spatial autoregressive coefficients only)

		105	106	107	108	109	110	111	Pooled
<i>Policy-only staff:</i>									
(1)	Effectiveness	0.068 (0.037)	-0.02 (0.037)	-0.05 (0.041)	0.053 (0.037)	-0.089 (0.035)	0.04 (0.031)	0.043 (0.038)	0.009 (0.014)
(2)	Ideology	-0.001 (0.024)	0.018 (0.026)	0.022 (0.028)	-0.009 (0.028)	0.048 (0.027)	0.019 (0.022)	0.054 (0.02)	0.024 (0.009)
<i>Staff ties in past or current congress (legislative effectiveness):</i>									
(3)	Senior	0.054 (0.061)	-0.021 (0.075)	0.066 (0.094)	0.086 (0.096)	0.103 (0.055)	-0.025 (0.055)	0.117 (0.067)	0.051 (0.025)
(4)	Senior/policy	0.043 (0.034)	-0.018 (0.039)	0.026 (0.043)	-0.005 (0.043)	0.03 (0.043)	0.016 (0.031)	0.035 (0.033)	0.02 (0.014)
<i>Staff ties in past or current congress (ideology):</i>									
(5)	Senior	0.026 (0.029)	-0.049 (0.042)	-0.061 (0.039)	-0.011 (0.043)	0.054 (0.043)	-0.011 (0.032)	-0.013 (0.027)	-0.007 (0.013)
(6)	Senior/policy	0.005 (0.023)	0.031 (0.024)	0.023 (0.025)	-0.011 (0.026)	0.07 (0.025)	0.011 (0.021)	0.011 (0.019)	0.019 (0.009)
<i>Model with no covariates (legislative effectiveness):</i>									
(7)	Senior	0.011 (0.046)	0.039 (0.06)	0.018 (0.082)	0.2 (0.077)	0.075 (0.06)	0.101 (0.061)	0.138 (0.06)	0.073 (0.023)
(8)	Senior/policy	0.084 (0.033)	0.104 (0.034)	0.06 (0.045)	0.171 (0.04)	0.035 (0.038)	0.097 (0.031)	0.109 (0.038)	0.095 (0.014)
<i>Model with no covariates (ideology):</i>									
(9)	Senior	0.463 (0.06)	0.408 (0.073)	0.453 (0.071)	0.477 (0.07)	0.435 (0.079)	0.428 (0.068)	0.4 (0.061)	0.438 (0.026)
(10)	Senior/policy	0.525 (0.039)	0.549 (0.038)	0.603 (0.036)	0.595 (0.034)	0.561 (0.037)	0.61 (0.033)	0.566 (0.035)	0.576 (0.014)
<i>Full model with committee fixed effects (legislative effectiveness):</i>									
(11)	Senior	-0.003 (0.044)	-0.056 (0.053)	0.022 (0.077)	0.183 (0.058)	0.067 (0.056)	0.003 (0.054)	0.076 (0.06)	0.035 (0.021)
(12)	Senior/policy	0.023 (0.031)	-0.023 (0.033)	-0.012 (0.042)	0.046 (0.032)	-0.034 (0.036)	0.016 (0.032)	0.032 (0.035)	0.009 (0.013)
<i>Full model with committee fixed effects (ideology):</i>									
(13)	Senior	0.042 (0.028)	-0.015 (0.035)	-0.072 (0.038)	0.009 (0.035)	0.01 (0.04)	0.021 (0.029)	-0.007 (0.024)	0.002 (0.012)
(14)	Senior/policy	0.02 (0.023)	0.033 (0.024)	0.033 (0.025)	0.033 (0.025)	0.035 (0.025)	0.026 (0.021)	0.021 (0.019)	0.027 (0.009)

Cells represent spatial autoregressive coefficients from Bayesian heteroskedastic spatial autoregressive models (LeSage and Pace 2009) estimated in Matlab using `sar_g` (identical specifications to those in Tables 1–4; full results available upon request). House staff data from CQ First Street for the 105<sup>th</sup>–111<sup>th</sup> Congresses. Models 1 and 2 replicate the results in the main text using only policy staff. Models 3–6 replicate the results in the main text but define the edge weights between members  $i$  and  $j$  to be the total number of staff who worked for both members only during the current or previous congress. Models 7–10 show the results when no covariates are included, while Models 11–14 show the results when committee fixed effects are added to the specification in the main text. In all cases, these alternative model specifications support the findings in the main text.

Second, in the main text we consider staff ties when a staffer is employed by two members within a single three-congress time horizon (the present congress or one of the previous two). Models 3–6 show how our results change if we instead consider a two-congress time horizon (the present or previous congress). The pooled spatial autocorrelation coefficients in the final column show that the results remain largely consistent with the main findings in the text. The only difference is that the 95% credible interval for Model (3) now includes zero ( $-0.0006, 0.1088$ ), although a slightly less conservative 94% credible interval does not ( $0.0016, 0.1066$ ).

Third, readers may be interested in the extent to which our results vary under various alternative model specifications. In Models 7–10, we therefore provide simple models that include no covariates while in Models 11–14 we add committee fixed effects.<sup>1</sup> When we do not control for possible confounders, all of the pooled estimates in Models 7–10 are reliably distinguishable from zero. Similarly, adding 19 additional committee indicators in Models 11–14 does not substantially alter the pooled results discussed in the main text, except that it is the 94% credible interval ( $0.0005, 0.0830$ ) that excludes zero in Model 11. In general, while omitted variable bias is always possible, the substantive conclusions in the main text have proven to be robust to various model specifications.

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<sup>1</sup>We exclude the “power committee” variable from the regression when using committee fixed effects due to perfect collinearity.

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