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Gerrymandering Roll-Calls in Congress, 1879-2000

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Abstract

We argue that the standard toolbox used in electoral studies to assess the bias and responsiveness of electoral systems can also be used to assess the bias and responsiveness of legislative systems. We consider which items in the toolbox are the most appropriate for use in the legislative setting, then apply them to estimate levels of bias in the U.S. House from 1879 to 2000. Our results indicate a systematic bias in favor of the majority party over this period, with the strongest bias arising during the period of “Czar rule” (51st-60th Congresses, 1889-1910) and during the post-packing era (87th-106th Congresses, 1961-2000). This finding is consistent with the majority party possessing a significant advantage, either in “buying” vote options, in setting the agenda, or both.

Gerrymandering Roll-Calls in Congress, 1879-2000

“The definition of alternatives is the supreme instrument of power.” –E. E.

Schattschneider (1960, p. 86).

The U.S. House of Representatives, like other legislatures, takes official actions pursuant to formal motions proposed by its members. Each motion is voted upon, either implicitly (e.g., an appeal for unanimous consent) or explicitly (e.g., a voice vote). Votes on the most important motions are usually *roll call votes* in which each member’s decision is a matter of public record.

Congressional parties can affect legislative decisions on the floor in at least two basic ways. First, they can influence how members vote on the various motions put to the House. Second, they can influence what motions are offered for the House’s consideration to begin with. In this paper, we focus on the latter issue—and particularly on the agenda power of the majority party.

The paper begins, in the next section, by elaborating an analogy between voting to choose between candidates in an election and voting to choose between alternatives in a roll call. The literature on gerrymandering suggests that the party controlling redistricting in a particular state has both the motive and the opportunity to rig the translation of votes into seats in its own favor, producing what is technically called partisan bias. The literature on agenda power suggests that the party controlling the agenda in a particular Congress has both the motive and the opportunity to rig the translation of votes into decisions in its own favor—again producing partisan bias.

After setting up the basic analogy, we argue that the standard toolbox used in electoral studies to assess the bias and responsiveness of electoral systems can also be used to assess the bias and responsiveness of legislative systems. We consider which items in the toolbox are the most appropriate for use in the legislative setting, then apply them to estimate levels of bias in the U.S. House from 1879 to 2000. Our results indicate a systematic bias in favor of the majority party over this period, with the strongest bias arising during the period of “Czar rule” (51st-60th Congresses, 1889-1910) and during the post-packing era (87th-106th Congresses, 1961-2000).

Votes and decisions

In a typical U.S. congressional election, a set of voters is presented with a choice between two candidates, one Republican and one Democrat. In a typical congressional roll call vote, a set of legislators is presented with a choice between two alternatives, the state that would obtain were the motion accepted and the state that would obtain were the motion rejected. In both the electoral and legislative example, each chooser has just one vote to cast and the alternative receiving the most votes wins (we exclude from analysis votes on veto overrides and other motions in the U.S. House that require a 2/3 approval to pass).¹

The consequence of winning in an election is that one party gets a seat in the House and the other fails to get this seat. The consequence of winning in a legislative vote is more complex. If the two parties take the same position (either for or against) a

¹. In the legislative setting, ties are broken in favor of the “no” position. Ties in the electoral arena are broken in various ways.

motion, then both win.² If the two parties take opposite positions then, as in the election, one wins and one loses. In what follows, we focus on the cases of party disagreement.

Responsiveness and bias in electoral voting processes

Students of elections have a long-standing interest in how votes map into seats. Within a single district, the answer is transparent (in the case of plurality elections dominated by two parties): a party's seat share is zero, if it secures less than 50% of the two-party vote; and one, if it secures more than 50% (we ignore ties). Aggregating across all the districts in a legislature, the votes-to-seats mapping becomes more complex and is usually described in terms of two key parameters: responsiveness and bias.

Responsiveness refers to how much a party's aggregate seat share responds to changes in its aggregate vote share. To be concrete, let s denote the share of all seats that a party wins in a given state legislature (elected in single-member districts by plurality rule); and v denote the average vote share garnered by the party's candidates in the various districts within the state. If all the districts in a state are "safe" for one party or the other, then the statewide vote share may change (moderately) yet produce no change in the statewide seat share. This would be an example of low responsiveness. In contrast, if all the districts in a state are closely contested by the two parties, then a small statewide vote swing may produce a very large change in the parties' seat shares—an example of large responsiveness.

Bias refers to an advantage for one party in the efficiency with which its votes translate into seats. For example, if a state legislature has been gerrymandered by the Republicans, there may be a few extremely safe Democratic districts and a large number

² In the electoral arena, this would be like a fusion candidate (a nominee of both major parties) running unopposed (something we ignore).

of just-winnable Republican districts. In this state, the Democrats “pay” a lot in votes for each seat they win, while the Republicans “pay” substantially less per seat won. Put another way, the Republicans have arranged the districts so that they win by a little and lose by a lot, thereby increasing the number of seats they can eke out of a given expected statewide vote.

The standard equation used to represent (and to estimate) the levels of responsiveness and bias, given average vote (v) and seat (s) shares, is the seats-vote curve:

$$\frac{s}{1-s} = \exp(\lambda) \left(\frac{v}{1-v} \right)^\rho, \quad (1)$$

where the parameter ρ represents responsiveness, and λ represents bias.³ This specific functional form generalizes the classic cube law (Kendall and Stuart 1950), which emerges when $\lambda = 0$ and $\rho = 3$.

Examples of seats-vote curves can be found in Figure 1. To see the effect of responsiveness, ρ , it is simplest to assume no bias ($\lambda = 0$). In this case, $\rho = 1$ corresponds to “proportional representation”: a party can expect to get a statewide seat share equal to its statewide average vote share. Values of ρ larger than one imply larger seat bonuses for the party winning more votes on average; that is, the vote-richer party’s seat share exceeds its average vote share.⁴ Positive values of ρ smaller than one imply larger and larger seat bonuses for the party winning fewer votes statewide; that is, the vote-poorer

³. For discussions of bias and responsiveness in elections using this equation, see King and Browning (1987), King (1990), and Campagna and Grofman (1990).

⁴. A larger bonus for the vote-richer party also implies a larger slope near $v=.5$ —that is, greater responsiveness of seat shares to vote shares.

party's seat share exceeds its vote share. Finally, if $\rho = 0$, then seat shares are completely unrelated to vote shares.

[Figure 1 about here.]

Now consider bias, reflected in the parameter λ . Note that there is bias in favor of a given party ($\lambda > 0$) if and only if its expected seat share, conditional on garnering exactly half the vote on average, exceeds one-half. That is, bias can be identified with the difference $E[s|v=.5] - .5$. Negative values indicate that the party is getting less than half the seats for half the votes, while positive values indicate that the party is getting more than half the seats for half the votes. Departures in either direction indicate bias, in favor of one party or the other.

Yet another equivalent way to characterize bias is as follows. There is bias in favor of a given party ($\lambda > 0$) if and only if, conditional on $v = .5$, that party's average margin of victory is less than its average margin of defeat. In other words, there is bias if the favored party tends to win by a little and lose by a lot, conditional on its average vote share equaling one-half.⁵

Responsiveness and bias in legislative voting processes

Both responsiveness and bias can be defined in the legislative setting as well. To see how, first consider how to define the variables, seats (s) and votes (v), in the seats-votes equation above.

In the electoral context, the variable v is the average, across all the districts of a given state, of the vote share garnered by the Democratic candidate. In the legislative

⁵. More formally, assume that there are J districts with the vote share for the focal party in district j denoted v_j . There will be bias in favor of this party if and only if $E[v_j - .5|s_j = 1, v = .5] < E[.5 - v_j|s_j = 0, v = .5]$.

context, v is the average, across all “party” votes occurring in a given Congress, of the vote share garnered by the “Democratic position.” A “party” vote is one that pits majorities of the two parties against one another (one favoring the motion, one opposing) and the “Democratic position” is whichever side of the question a majority of Democrats favor.

In the electoral context, the variable s is the share of times that Democratic candidates in a given state win. In the legislative context, s is the share of times that Democratic positions in a given Congress win (where the denominator is restricted to “party” votes).⁶

Having defined the variables in the legislative arena, one is in a position to estimate the votes-to-seats equation by one of the several techniques on offer in the electoral studies literature. We consider the best estimation option later, simply noting now that it is possible to estimate both responsiveness (ρ) and bias (λ) for legislative binary vote data.

To provide some intuition about responsiveness in the legislative setting, consider some examples. First suppose that both parties are perfectly disciplined voting blocs. In this case, it makes no difference whether the majority party holds 218 seats against the minority’s 217, or 318 seats against the minority’s 117: the majority always wins, because all its members always vote on the same side of any issue. The (v,s) data that perfectly disciplined parties produce (over a period in which a single party always has a majority) might thus look like $(.51,1)$, $(.55,1)$, ..., $(.95,1)$. One interpretation of such data is that legislative responsiveness is nil and pro-majority bias is infinite ($\rho = 0$, $\lambda = \infty$):

changes in the majority's average vote share (v) do not affect its victory rate (s) but the majority always wins ($s = 1$). Now suppose that the defection rate of majority party members is positive, rather than zero. With a positive defection rate, the party's victory rate would be sensitive to variations in its average vote share. That is, responsiveness increases at lower levels of party discipline. Note that something very similar is true in the redistricting case: responsiveness increases as voters' partisan attachments become weaker (cf. McDonald 1999).

To provide some intuition about bias in the legislative setting, consider the following example. The majority party in a particular Congress has 218 members. On 51 roll calls, the majority suffers no net loss of support (the number of majority defectors equals the number of minority defectors) and gets 218 votes to the minority's 217. On 48 roll calls, the majority suffers a net loss of one, and loses to the minority 217 to 218. Finally, on one roll call, the majority suffers a net loss of two and loses 216-219. As the reader can verify, the majority's average vote share across these 100 roll calls is .5. Yet, the majority wins 51 of the 100 votes.

This example illustrates two points. First, even a little departure from symmetry can produce bias as conventionally defined. Second, merely because a majority party has a majority of seats does not guarantee that it will, on average, win a majority of votes in roll calls. If the majority is less cohesive than the minority, or it gets unlucky in the particular questions that are put to a vote, it can in principle end up with an average vote share less than .5 or, as in the example, equal to .5. Indeed, the majority party's average vote share falls below .5 in three out of the sixty-one Congresses in our dataset (or 5%).

⁶. Note that the seats won in the electoral context are plausibly equally valuable but the victories won in the legislative context can vary widely in importance. Nonetheless, lacking any way to systematically assess

Having laid out the analogy between votes-to-seats translations in the electoral arena and votes-to-victories translations in the legislative arena, we note that the mechanics of biasing these translations differ in the two arenas. Bias is engineered in the electoral arena by drawing district lines that will last for a number of elections (although some states during some periods in the 19th century drew new district lines for every election). In contrast, bias is engineered in the legislative arena by making decisions about which bills will be considered on the floor, which amendments will be allowed, how votes are influenced on the margin, and so forth.⁷ We turn to a more detailed consideration of these matters next.

Why we should expect majority-party bias in electoral votes

Many scholars argue that the party in control of redistricting in a state will engineer bias in its own favor. Cox and Katz (2002), for example, view responsiveness and bias as properties of state districting laws. Each such law affects the number of marginal and safe districts and their distribution between the two parties. Districting plans that create more safe districts across the board will exhibit lower responsiveness. Districting plans that give one party a markedly higher safe-seat-to-marginal-seat ratio than the other will exhibit bias.

The usual method by which partisan effects in redistricting are detected is to allow bias (λ) to be a function of which party controls the redistricting. States in which the Republicans control both houses of the state assembly and the governorship, and hence control the redistricting process, are expected to exhibit pro-Republican bias, with

importance, we count all victories equally here—and compute a simple victory share.

⁷ The richer array of tools available to manipulate the translation of votes into victories in the legislative arena might lead to greater bias and certainly makes it hard to tell which among the array of tools is producing any bias that is discovered. However, we do not view it as affecting the underlying analogy.

just the opposite expectation for states in which the Democrats are in control. Empirically, Cox and Katz (2002) and Engstrom (2003) find considerable support for this line of reasoning over most of U.S. electoral history.⁸

Why we should expect majority-party bias in legislative votes

We highlight two arguments in the literature that, although not framed explicitly in terms of bias, nonetheless lead one to predict bias in favor of the party that sets the agenda in the U.S. House—i.e., the majority party. Each is similar to the argument that the party controlling the redistricting process will benefit from electoral bias in its favor, in that it specifies a mechanism by which the majority party may tend to win by a little but lose by a lot.

Vote options

King and Zeckhauser (2003) argue that legislative leaders will typically not buy *votes* but instead will buy *vote options*.⁹ For example, the Speaker will line up members who are willing to sell their votes to the majority party, if necessary to produce victory. When the Speaker can eke out a victory by exercising his options, he schedules the vote, calls in the vote options, and produces a close victory for his party. When the Speaker is too far short of votes, then there is no point in exercising any of his options and the majority party thus loses by a lot. Thus, as King and Zeckhauser note (p. 397), “if leaders use vote options on closely contested votes, then...they will have many small wins and few small losses...”

⁸ For broader reviews of literature on redistricting, see Butler and Cain (1992), McDonald (1999) and Cox and Katz (2002).

⁹ Previous work on “pocket votes” in the US House also recognizes that leaders line up members just in case they are needed. See e.g. Binder, Lawrence and Maltzman 1999 and the citations therein.

If both the majority and minority parties' leaders were equally able to line up vote options, then there would be no reason to expect bias. However, it is the majority party leadership, not the minority leadership, that is typically credited in the literature with the ability to win close votes. Bauer, Pool and Dexter (1963, 432), for example, put it this way: "The [majority] leadership usually has enough of a reservoir of political credit to have a few votes switched if it would otherwise lose by a narrow margin." King and Zeckhauser (2003, p. 402-3) provide evidence that the majority party regularly eked out close victories on CQ Key Votes over the period 1975-2001. To the extent that such patterns generalize, the majority party will significantly more often be able to secure narrow victories and avoid narrow defeats. Hence, because winning by a little and losing by a lot leads mathematically to bias, one should expect a pro-majority bias in congressional votes.

Agenda manipulation

Another argument concerning why the majority party might tend to win by a little but lose by a lot on "party" votes, hence enjoy a statistical bias in its favor, has to do with its control of the agenda. Non-partisan theories of the US Congress (e.g., Mayhew 1974; Krehbiel 1998) view the majority party as having no significant advantage over the minority in its ability to set the agenda. In contrast, Cox and McCubbins (2002) argue that the majority party has the power to block the consideration of bills on the House floor, while the minority sometimes does not (depending mostly on the membership of the Rules Committee in a particular Congress).¹⁰ This differential power to block, when it arises, may produce pro-majority party bias.

¹⁰. Other scholars who emphasize the agenda power of the majority party include Aldrich and Rohde (2000) and Sinclair (2002).

To see how, consider a simple spatial model. We will assume that the legislators possess single peaked preferences on n left-right issue dimensions. On each of these issue dimensions is a pre-defined status quo point, which we will denote q_1, \dots, q_n . These are the policies that will remain in force if no new bill is passed on the given dimension. Assuming that members have additively separable preferences across the dimensions, we can consider each in isolation. Denote the median majority-party member on the j th issue by M_j , the median House member by H_j , and the median minority-party member by m_j . Given a Democratic Congress, one can assume that $M_j < H_j < m_j$. Now suppose that q_j lies between M_j and H_j . The majority-party leaders can foresee that bringing a bill to the floor to change q_j can only lead to a rightward policy change (to H_j) that will displease a majority of Democrats. Thus, if they can prevent the consideration of this particular issue dimension, they will. A similar point holds for the minority and issue dimensions on which q_j lies between H_j and m_j : the minority will, if it can, block consideration of such issues.¹¹

Now consider a Congress in which *only* the majority has a reliable power to block. The majority party will *allow* bills targeting status quo points that are slightly to the right of the legislative median and the final passage votes on such bills will produce narrow wins for the majority. At the same time, the majority will *block* bills targeting status quo points that are slightly to the left of the legislative median and the final passage votes on such bills would have produced narrow losses for the majority. In other words, majority-party agenda power prevents narrow losses on final passage votes for the

¹¹. To be more precise, a party will block a bill that will foreseeably defeat it on the floor from being brought up as a stand-alone measure. Possibly, the bill can be packaged in an omnibus proposal that is acceptable to the blocking party. We assume, however, that a simple log-roll—a *sequence* of votes on which promises are made to trade votes—is not credible.

majority party but not for the minority party—thus depriving the minority (but not the majority) of “efficient” wins and contributing to pro-majority bias.

It is not just by censoring what would have turned out to be close minority wins that majority agenda power produces bias, however. There is also a systematic pattern across amendments and final passage votes. To provide a detailed example, consider two status quo points near H_j but on opposite sides: $q_L = H_j - e$ and $q_R = H_j + e$, for some small $e > 0$. The majority party will allow a bill targeting the right-of-center status quo, q_R , to be considered on the floor. Suppose that some of the majority’s left-wing members propose a bill $b_j < M_j$ near their ideal points. The majority leaders allow the bill onto the floor (thereby allowing their left-wing members to stake out a clear position and claim credit) but give it an open rule (so that the ultimate bill will be more moderate). When the bill is brought up on the floor, the median legislator moves to amend it. Thus, the first vote pits the original bill, b_j , against an amended version of the bill, $b'_j = H_j$. Let the cutpoint, $(b_j + H_j)/2$, be slightly greater than M_j .¹² In this case, a majority of the majority party will vote against the amendment, yet the amendment will carry by a large margin. The amended bill, b'_j , will then be pitted against the status quo, q_R . In this vote, the majority position will carry by a small margin (small because e is small). Thus, in this example, a single issue produces two votes, one of which the majority loses by a lot, one of which it wins by a little. Note that this pattern will not be balanced by the House’s consideration of the left-of-center status quo, q_L , because the majority will block any bill targeting that status quo.

¹² In particular, let $b_j = 2M_j - H_j + 2e$. In this case, $(b_j + H_j)/2 = M_j + e$. As e converges toward zero, the majority party loses by a larger and larger margin.

This example is certainly stylized but similar examples can be generated with less stringent assumptions. Moreover, the example illustrates the gist of a not-uncommon empirical pattern. As Cox and McCubbins (2005) report, during the long period of Democratic dominance in the House, the so-called conservative coalition was active almost entirely at the amendment stage. As they note, the typical pattern produced was one or more amendments carried by the conservative coalition (often by large margins), followed by a narrow passage of the amended bill with mostly majority support and mostly minority opposition.

Now consider a Congress—perhaps in the period 1937-1960, during which the Rules Committee has been characterized as controlled by a conservative coalition—in which *both* the majority and minority party have some power to block.¹³ In this Congress, status quo points in both the region $[M_j, H_j]$ and the region $[H_j, m_j]$ will be blocked (and possibly others as well, depending on the ability of various actors to commit to closed rules). This will prevent narrow defeats for both the majority and the minority party, so that no systematic effect on bias is predicted. Moreover, the minority may also be able to prevent the majority from putting far-left bills on the agenda to begin with, thus preventing the large majority losses that occur when such bills are amended.

Bias in favor of a given party arises when that party wins by a little and loses by a lot, relative to the other party. Thus, bias is a joint product of the ability to block—avoiding narrow defeats of one's party; and the ability to push—forcing through legislation in the teeth of the minority's strenuous opposition (and hence producing

¹³. We imagine that the majority's power to block derives from its possession of key posts, such as committee chairs, while the minority's power to block depends on forming alliances with some majority members.

narrow victories).¹⁴ We thus expect pro-majority bias to arise in those Congresses in which the majority possessed both the ability to block what would have become narrow defeats *and* the ability to push through to sometimes narrow victories. In other words, pro-majority bias should arise when there is both an agenda cartel (per Cox and McCubbins 2005) and conditional party government is more visible (Aldrich and Rohde 2000). The Congresses that best fit this description are the czar-rule Congresses at the turn of the twentieth century; and the post-packing Congresses (1961-present). In the empirical work below, we will test whether these periods stand out in terms of detectable bias.

Does the majority party win more than half of the close votes?

We have noted above two equivalent ways to characterize bias in favor of a given party: (1) the party wins more than half the time when its average vote share is one-half; and (2) $\lambda > 0$ in the party's estimated votes-to-victories curve. In this section, we examine whether the first of these patterns arises in the U.S. House.

Our method is suggested by the heading of this section: we take four successively more stringent definitions of what a "close" roll call is and compute the proportion of such votes that the majority party wins. Close roll calls have $v \approx .5$ and hence the proportion of times that the majority wins on such votes provides one way to approximate $E[s|v=.5]$. Comparing this proportion to .5 then reveals the bias in favor of (or against) the majority.

Our results are displayed in Table 1. Regardless of whether one focuses on roll calls with margins less than 1.0%, less than 0.5%, less than 0.25% or less than 0.125%,

¹⁴. Equivalently, bias is a joint product of asymmetric blocking power (one party having it, one party

the majority party wins about the same percentage of the time—viz., 66%. As shown in the last column of Table 1, the difference between the majority's share of victories (.66) and what would be expected given no bias (.5) is statistically significant in all cases.

Table 1 about here.

One might complain that even the last row of Table 1 does not impose the relevant theoretical condition—that $v = .5$. Thus, some readers may wonder whether it remains possible that congressional votes simply exhibit high responsiveness, rather than pro-majority bias.

One way to address such concerns is to impose the constraint $\lambda = 0$ and ask what ρ must be in order to give the majority a victory rate of .662 when it has an average vote share of .50125. The answer (computed from equation (1)) is $\rho \approx 1334$.¹⁵ Is it possible that $\lambda = 0$ and $\rho \approx 1334$? Were these the true parameter values, then one could use them to compute the majority's expected victory rate, given an average vote share of .51: it should be .995. As can be seen, however, the first row of Table 1 does not come close to .995 or even show any growth from the value given for the fourth row. Thus, the data displayed in Table 1 cannot be explained purely in terms of a high responsiveness; pro-majority bias is also at work, as we shall show in greater detail in the next section.¹⁶

lacking it).

¹⁵ The actual average vote share in the fourth row is of course less than .50125, since the items being averaged in that row all have margins between .5 and .50125. Taking account of this wrinkle merely increases the value of ρ that is required to fit the data.

¹⁶ To fit the data displayed in Table 1, the best values are, roughly, $\rho = 0$ and $\exp(\lambda) = 2$. Of course, once the full range of data is considered, those values change, as will be seen.

Estimating the votes-to-decisions equation in the House

Our data consist of all recorded votes from the U.S. House of Representatives in the 46th-106th Congresses (1879-2000). The starting point for our dataset (1879) was chosen because including Congresses before the 46th enters a much different congressional world, in which the southern representatives are largely or wholly absent. The end point for our dataset (2000) reflects the available data when our investigation began. Given that we include over 120 years of congressional data, we are confident that extending the end point would not change our basic findings.¹⁷

We exclude votes that require a 2/3 majority for passage (such as suspension of the rules). We also exclude the vote on election of the Speaker and all votes on which the two parties were in agreement (i.e., majorities of both parties voted in the same manner). For the remaining votes—votes on motions requiring a simple majority for passage and on which the two parties were opposed—we calculate the percentage of the total vote cast for the “Democratic” position and whether the Democratic position prevailed. Averaging across each Congress, we then compute the average vote share garnered by the “Democratic” position, DV ; the number of all motions that the Democrats won; and the total number of motions voted on (meeting our criteria).¹⁸

We use these data to estimate the parameters, ρ and λ , defined in Equation 1. This is done by solving for s in terms of v , yielding

¹⁷ It is not a trivial exercise to extend the data because we need to categorize each vote correctly, as to the size of majority needed for passage—as explained below in the text. Moreover, there are no off-the-shelf categorizations available for the most recent congresses, and so we need to construct one based on a reading of the header materials in the roll call datasets.

¹⁸ . It has been suggested that part of the change we document below maybe due to a shift in the composition of the votes we include in our analysis. However, we note that the set of recorded votes is endogenous under the maintained hypothesis of majority party agenda control and therefore does not pose a problem for our analysis.

$$s(v; \rho, \lambda) = \left[1 + \exp\left(-\lambda - \rho \ln\left(\frac{v}{1-v}\right)\right) \right]^{-1}. \quad (2)$$

This is the standard grouped logit model with a single independent variable, $\ln(v/(1-v))$, the natural logarithm of the ratio of the average vote share. We actually will allow the bias to differ between Democratic and Republican controlled congresses. In order to account for possible un-modeled heterogeneity, we use the extended beta-binomial model that generalizes the grouped logit model (cf. Palmquist 1999). Complete details of the estimation can be found in Appendix A. From our analysis, we can compute the bias in favor of the majority party (which we shall take as positively signed, with negative values indicating pro-minority bias).¹⁹

We have analyzed bias in the entire time period from 1879-2000 and in four sub-periods: (1) the pre-Reed Congresses (1879-1890); (2) the Czar-rule Congresses (1889-1910); (3) the post-Cannon Congresses (1911-1961); and (4) the post-packing Congresses (1961-2000). The four sub-periods were chosen to correspond to major organizational watersheds identified in the previous literature. In particular, we use the following landmarks to define our periods: the adoption of Reed's Rules in 1890; the revolt against Speaker Cannon in 1910; and the packing of the Rules Committee in 1961.

The landmarks we have chosen as demarcating our periods stand out in the previous literature as the logical choices. This is obvious enough for the first two, Reed's Rules and the revolt against Cannon (see, e.g., Galloway and Wise 1976), but let us say a few words about the last. Before the Rules Committee was packed with additional liberal

¹⁹. We do not discuss the overdispersion parameter estimated in the extended beta binomial model below. One interpretation of it in our context is that there are positive correlations between formally different roll

members after the 1960 election, standard sources view it as independent of the majority party (and, indeed, dominated by a conservative coalition of Southern Democrats and Republicans). Afterwards, the majority's control was improved but standard accounts stress that Rules continued to be largely independent of the majority party until further reforms in 1975 (see Rohde 1991, p. 25; Peabody 1963; Oppenheimer 1977). Nonetheless, Cox and Poole (2001) find that party pressures on procedural (and especially special rule adoption) votes increased after 1961, while Cox and McCubbins (2005) find that, relative to other procedural motions, the majority party became abruptly more likely to win on special rule adoption votes after 1961, and the minority party abruptly more likely to lose. We have thus chosen to pool the 1961-73 period with the post-reform period, rather than with the previous period. If one chooses a different cutpoint for the data, the results are similar to those we report below.²⁰

Results for the U.S. House, 1879-2000

Our numerical results can be found in Table 2. A graph of the “victories-votes” curve—i.e., the seats-votes curve with the legislative data—estimated for the full time period, 1879-2000, is displayed in Figure 2. The solid line is for Democratic Congresses and the dashed line is for Republican ones. We have also included the actual data points used to estimate the curves. As can be seen, the estimated responsiveness nearly follows the classic cube law since the curves are nearly perfectly S-shaped, with a value of 3.45; while estimated bias in favor of the majority party is 6.5, statistically significant at the .01

call votes, as when the House votes on essentially the same issue in slightly different guise (e.g., previous question, rule adoption, tabling motion, final passage).

²⁰ We have tried using every Congress from the 85th (elected 1958) to the 93rd (elected 1972) as the cutting point. There are negligible differences between these various choices, in terms of statistical fit, regardless of which cutpoint is chosen. The main difference is that estimated bias in the fourth period increases substantially when the cutpoint is the 92nd or 93rd Congress, underscoring the importance of the 1974 reforms.

level. A bias of this size means that, were the majority party to average 50% of the vote in a series of roll calls, it would expect to win 56.5% of them. Somehow, the majority is getting more bang for its buck: more legislative victories for its legislative votes.

[Table 2 about here]

[Figure 2 about here]

Breaking the analysis into the four sub-periods noted above we find some stark differences. Responsiveness is relatively high in the first, third and fourth periods—2.59, 3.76 and 3.97, respectively. However, in the second period, it falls to virtually nil (.01). Bias, meanwhile, is positive (pro-majority-party) in all periods but small and insignificant prior to Reed’s rules (.006)²¹; very large in the czar-rule Congresses (.355)²²; moderate in the post-Cannon Congresses (.029); and very near the overall level of bias (noted in Table 1) in the post-packing Congresses (.065). By and large, these results fit with conventional accounts of these Congresses. More importantly, they gibe with what one would expect from Cox and McCubbins’ cartel model: bias is insignificant when the minority’s procedural hand is good (pre-Reed and post-Cannon); but it is significant when the minority’s procedural hand is poor (in the czar-rule and post-packing Congresses).

²¹. The pre-Reed Congresses appear to have been level playing fields with no pro-majority bias to speak of. Cf. Den Hartog (2003).

²². The czar-rule Congresses appear to have been very tilted playing fields in which the majority won significantly more victories than one would expect based on its vote share alone. Indeed, the low estimated responsiveness suggests that majorities were winning at a constant rate, regardless of their size and average vote share.

Robustness Checks

To check the robustness of our findings, we conducted the following analysis. We first split each Congress into sub-periods and calculated the average vote (v_{tj}) and victory (s_{tj}) shares for the Democrats in each sub-period (j) of each Congress (t). We then used the sub-period data from Congress $t \pm 3$ (that is, the data $\{(v_{\tau j}, s_{\tau j}): t-3 \leq \tau \leq t+3\}$) to estimate a sort of running average of the bias and responsiveness across time. We display the estimated bias for the time period centered on t , denoted λ_t , below.

Before looking at our results, it is worth stressing that our proposed method will not work if the Congresses $t-3, \dots, t+3$ are all very similar. For, in this case, the data $\{(v_{\tau j}, s_{\tau j}): t-3 \leq \tau \leq t+3\}$ will simply be a tight cluster of points centered at one point in the seats-votes space. Put another way, there will be no variance in the independent variable, v , hence no real chance to estimate the relevant slope and intercept terms. Our method can only work if there is substantial variation in the average vote shares, which typically requires a change in party control of the House. Recalling the history of the House, this means that our method will likely not work for the 87th to the 100th Congress, as each of these Congresses were deep enough within a period of uninterrupted Democratic control that there is no change of party within the window of Congresses examined. (These were the only Congresses so affected, except for two czar-rule and two New Deal Congresses.)

With that caveat in mind, the reader can examine Figure 3, which displays the estimated “running average” bias, λ_t , for $t = 46, \dots, 106$. The results are largely consistent with those in Table 2. In the pre-Reed era, the running average bias is statistically insignificant in four out of five Congresses, corresponding to Table 2’s finding of insignificant bias. In the czar-rule era, the running average bias is statistically significant in nine out of ten Congresses, corresponding to Table 2’s finding of significant bias. In

the post-revolt era, the running average bias is statistically significant in only four out of twenty-five Congresses, corresponding to Table 2's finding of positive but insignificant bias. Finally, in the post-packing era, there is initially a long run of Congresses (87th to 100th) for which the method is unlikely to, and does not, detect any bias. This is presumably because the Congresses in this period all have similar Democratic vote shares, so that it is not possible to separately estimate bias and responsiveness. As soon as we reach the first Congress for which a change of party control is within the window of Congresses examined—the 101st—bias is significant. Moreover, it remains significant for the duration of the post-packing period, registering values comparable to those found in the czar-rule era. Thus, all told, the results in Figure 3 corroborate those in Table 2.

Figure 3 about here.

We also note that some of the finer-grained findings in Figure 3 gibe with conventional accounts of partisanship in the House. In particular, note that the three Democratic Houses in the immediate aftermath of the revolt against Cannon all exhibit significant pro-majority bias, as do the first three New Deal Democratic Houses (weakly). The nadir of pro-majority bias arrives in the four Congresses immediately preceding the packing of the Rules Committee.

As another check on the robustness of our results, we added an additional control variable, tapping changes in the location of the House median. The rationale for this variable (which simply subtracts the t-1 House median from the t House median) is that the status quo policies should be near the lagged House median. Suppose that the House moves rightward between t-1 and t. This will mean that the House at time t will face a

fair number of left-of-median status quo policies. Dealing with them should produce rightist victories and may increase pro-right bias. Thus, for example, when the Republicans took over the House in 1994, one might attribute the observed pro-Republican bias to the fact that there were many leftist status quo policies to change, rather than to the majority party's ability to manipulate the agenda or buy votes on the margin to secure victory.

Including a variable equal to the change in the House median from $t-1$ to t does not change any of the results reported above. Thus, one can more confidently attribute pro-majority bias to something the majority does, rather than to a consistent pattern of change in the House median that favors the majority party.

Conclusion

Parties, whether electoral or legislative, seek to win enough votes to attain “victory.” *Electoral* victories produce control over legislative seats (and other offices). *Legislative* victories can be as small as fending off a dilatory motion or as large as passing a major piece of legislation. In both arenas, attracting more support in one vote expends resources that could otherwise be used to attract more support in another vote. Thus, in both arenas, parties wish to use their votes efficiently, winning victories at the cheapest possible price in manufactured votes. One can use standard statistical analyses, such as those employed in this paper, to detect any partisan bias—which will arise if one party is systematically more efficient in its translation of votes into victories.

In this paper, we have estimated the bias in congressional votes over the period 1879-2000. What we find is consistent with the cartel theory of how majority parties in the U.S. House operate (Cox and McCubbins 1993; 2002; 2005). When the majority

party is both able to block bills it does not like (virtually always) and to push bills it does like against the minority's opposition (in the czar-rule and post-packing Congresses), then it is able to both avoid narrow defeats and generate narrow victories. This means bias in its favor in the translation of votes into victories.

The primary weakness of our method for detecting majority-party agenda-setting advantages is its reliance on highly aggregated data, as is also the case in electoral studies using this method. Other techniques for detecting majority-party advantages rely on a more disaggregated analysis of roll call voting data than we provide here. For example, Sinclair (2002) focuses on how members' votes change between the adoption of a special rule for consideration of a particular bill, and the final passage of that bill. Lawrence, Maltzmann and Smith (2003) and Cox and McCubbins (2002; 2005) similarly rely on features of roll call voting that can be analyzed within a given Congress. In contrast to these more disaggregated approaches, our method focuses more clearly on changes in the main independent variable: majority status. (The other studies necessarily hold this constant when applied to a single Congress, although pooling across Congresses does allow majority status to vary and hence the effects of such variation to be explored.)

Our technique is general and could in principle be applied to any legislature. However, we note that it will yield indeterminate results in some cases of very strong party government. In the U.K., for example, the majority party will typically win a very high percentage of all votes, regardless of its share of the seats; and it will hold most of its members on every vote. The consequence of this is a pattern of data that can be "fit" by a statistical model in either of two ways: zero responsiveness and high pro-majority bias; or high responsiveness and zero bias.

Appendix: Estimation

In this appendix we consider estimation of Equation (1). As written the equation is deterministic and can not directly be used to estimate the parameters of interest from observed data. However, if we assume a stochastic model — following King and Browning (1987; see also King 1990) — then Equation (1) defines the expected portion of Democratic victories in Congress t :

$$\begin{aligned}
 E[s_t] &= \left[1 + e^{\lambda} \left(\frac{v_t}{1-v_t} \right)^{\rho} \right]^{-1} \\
 &= \left[1 + \exp \left(-\lambda - \rho \ln \left(\frac{v_t}{1-v_t} \right) \right) \right]^{-1}.
 \end{aligned} \tag{3}$$

The second expression for the expected seat proportion is same as the mean function for the standard logit model for grouped data with a constant, λ and a single independent variable, $\ln \left(\frac{v_t}{1-v_t} \right)$. If we were to further assume that the probability of the Democrats winning in each Congress are independently and identically distributed, we could model the process with a binomial distribution. The binomial assumption and Equation (3) then set up a standard grouped logit model that we could estimate either via maximum likelihood (as in King and Browning 1987) or two-step minimum Chi-Square methods (see Greene 1993:653–657 or Maddala 1983:28–34).

However, we suspect that there is still some un-modeled heterogeneity — beyond that being picked up by the logistic of the vote shares — and possibly some correlation in the probabilities across districts. In fact, an optimal partisan gerrymander would require such heterogeneity across districts. Assuming that there were not enough partisan voters for

the dominant party to win every district, there would be two types of districts in the state: a handful that the minority party wins overwhelmingly and the remaining districts in which the dominant party wins but not by huge margins. In order to handle this we assume that the seat shares follow an extended beta-binomial, instead of a standard binomial distribution. The extended beta-binomial is generated by assuming that the probability (from a binomial model) that a district is won by the democrats varies according to a beta distribution.²³ Let S_t be the number of roll-calls the Democrats win in Congress t and N_t the total number of party votes in t . The extended beta-binomial can then be written as

$$f(s_{i,t} | \pi_t, \gamma) = \frac{N_t!}{S_t!(N_t - S_t)!} \frac{\prod_{j=0}^{S_t-1} (\pi_t + \gamma j) \prod_{j=0}^{N_t-S_t-1} (1 - \pi_t + \gamma j)}{\prod_{j=0}^{N_t-1} (1 + \gamma j)},$$

where we assume the convention that if any of the constituent products are negative, then the term is set to 1. Note that since we are explicitly conditioning on N_t , the model incorporates the heteroskedastity caused by the varying number of votes across years in our sample.

The parameter π_t is the average probability that a given roll-call in Congress t is won by the Democrats. Thus,

$$\pi_t = \frac{E[S_t]}{N_t} = E[s_t].$$

So we can use Equation (3) to model the systematic variation in the underlying probability. The parameter γ captures the amount that π_t varies over the Congresses or the correlation between roll-calls. If γ is zero, then the extended-binomial is just the binomial

²³. See King 1989:45–48 for a complete derivation of the extended beta-binomial distribution.

and roll-calls are identically and independently distributed. If $\gamma > 0$, there is positive correlation between roll-call and when $\gamma < 0$ there is negative correlation between roll-calls.

The log likelihood is straight-forward to derive assuming independence across Congresses. The contribution of each Congress t , ignoring terms that do not depend on the parameters, is

$$L_t(\pi_t, \gamma | S_t, N_t) \propto \sum_{j=0}^{S_t-1} (\pi_t + \gamma j) + \sum_{j=0}^{N_t-S_t-1} (1\pi_t + \gamma j) - \sum_{j=0}^{N_t-1} (1 + \gamma j).$$

We then substitute Equation (4) for π_t to get $L_t(\lambda, \rho, \gamma | S_t, N_t, \nu_t)$. The likelihood for the entire sample is found by summing the L_t across the Congresses.

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Table 1: What proportion of close votes does the majority party win?

Roll calls qualify as “close” if the margin of victory was less than...	Number of such roll calls in the 46 th -106 th Congresses...	Proportion of such roll calls that the majority party won...	Is the majority’s victory share significantly greater than .5?
1.0%	833	.660	Yes (p = .0000)
0.5%	368	.663	Yes (p = .0000)
0.25%	172	.669	Yes (p = .0000)
0.125%	71	.662	Yes (p = .0063)

**Table 2: Bias and responsiveness in House voting,
1879-2000**

Period	Bias	Responsiveness
1879-1888	0.06 (3.33)	2.59* (0.51)
1889-1910	35.55* (2.95)	0.01 (0.45)
1911-1960	2.91 (2.42)	3.76* (0.37)
1961-2000	6.48* (3.05)	3.97* (0.50)
1877-2000	6.48* (2.11)	3.45* (0.33)

* Indicates statistical significance at .05 level. Standard errors are in parentheses.

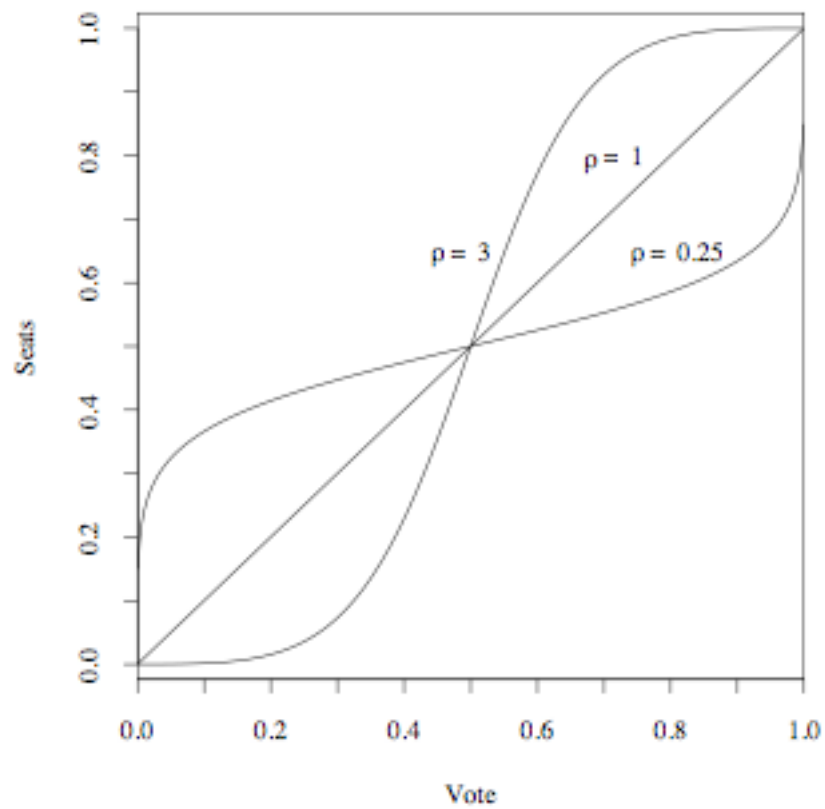


Figure 1: Examples of Seats-Votes Curves with varying values of ρ and $\lambda = 0$.

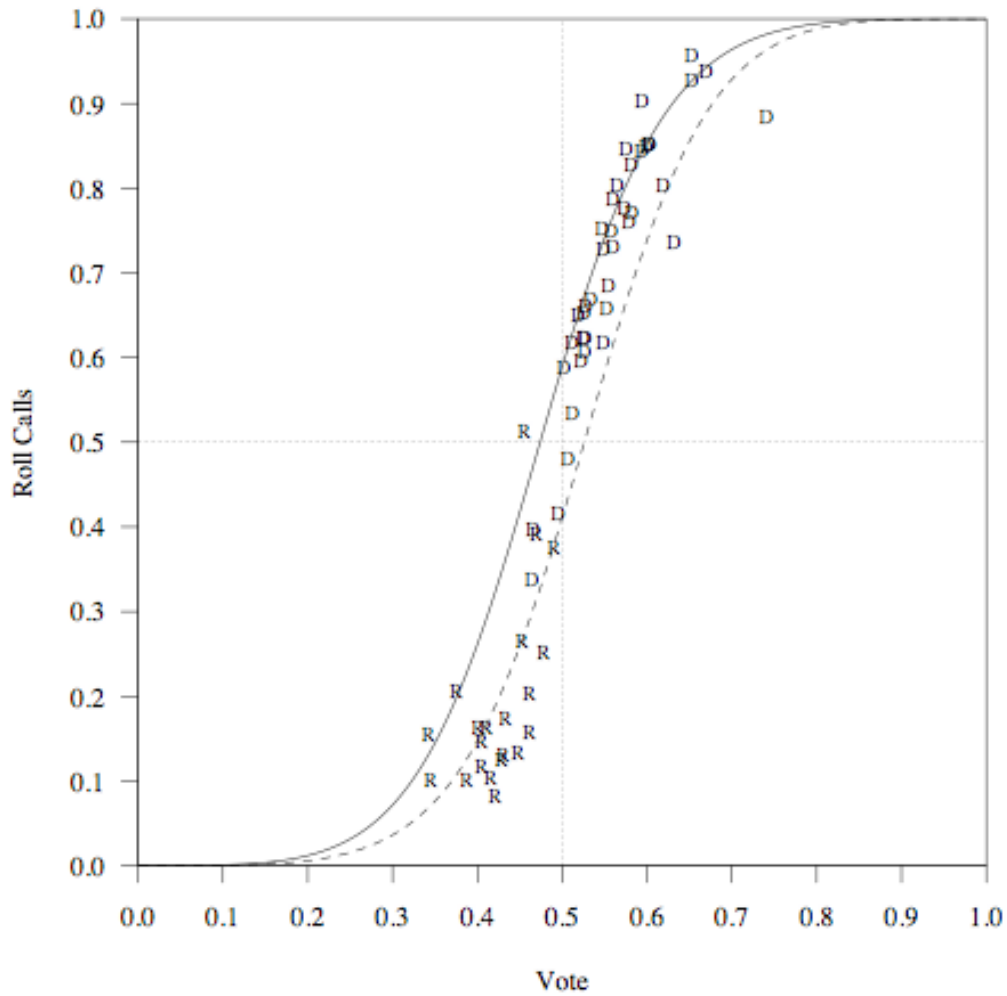


Figure 2: Victories-Vote Curve for Congressional Roll Calls from 1877 to 2000. The solid line is the curve for Democratic Congress and the dashed line is for Republican Congresses. The data points used to estimate the curves are denoted by the points marked “D” and “R”.