

Measuring the Concentration of Legislative Effectiveness: Evidence from U.S. State Legislatures

Abstract: Research on legislative effectiveness has largely emphasized individual-level traits associated with policymaking success. We shift attention to how lawmaking success is distributed within and across legislatures by introducing a new measure—the Effective Legislator Ratio (ELR)—which captures the share of legislators in a chamber who consistently account for policy successes. We argue that two features of legislatures’ institutional design—the centralization of policymaking opportunity and the centralization of agenda power—shape whether effectiveness is concentrated among a small set of lawmakers or more broadly shared, and that this concentration, in turn, alters legislators’ behavior. We test our argument in U.S. state legislatures and report three primary findings. First, the distribution of policy success varies widely across state legislative chambers and is most concentrated for consequential legislation. Second, variation in policymaking opportunity (e.g., chamber size and bill introduction limits) is more strongly associated with the distribution of policy success than variation in agenda power (e.g., agenda control and leadership powers). Third, new legislators adapt their cosponsorship strategies in response to the concentration of effectiveness in their chamber. The ELR is a flexible measure that can be applied to most legislatures, enabling comparative analyses of the concentration of lawmaking success and its consequences.

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Since the development of legislative effectiveness scores (Volden and Wiseman 2014), a substantial body of research has examined why some legislators are more effective than others—highlighting, for instance, the advantages of majority party membership, committee leadership, and bipartisan support (Volden and Wiseman 2014; Harbridge-Yong et al. 2023). Yet this work largely treats legislative effectiveness as an individual attribute. As a result, we know less about how effective lawmaking is distributed within legislative chambers—whether a small or large share of legislators are responsible for policy successes—and how this affects legislators’ behavior.

In this paper, we introduce a new measure—the Effective Legislator Ratio (ELR)—which captures the share of legislators in a chamber who account for policy success, calculated as the effective number of legislators divided by the chamber’s nominal size. Using State Legislative Effectiveness Scores (SLES) from 94 chambers from 1997 through 2018 (Bucchianeri et al. 2025), we compute ELR for all bills, substantive bills, and substantive and significant bills, and we also construct a majority-party version of the measure (MELR). We show that policy success varies widely in its concentration across chambers: in some chambers, policy success is concentrated among a small subset of lawmakers (e.g., Vermont House), whereas in others it is more broadly shared (e.g., Arkansas Senate).

We theorize that two features of legislatures’ institutional design shape this distribution: the centralization of policymaking opportunity and the centralization of agenda power. First, when policymaking opportunities are broadly distributed—such as in smaller chambers and chambers with bill introduction limits—legislative effectiveness should be more dispersed.

Second, rules that centralize agenda power may concentrate effectiveness by allowing party leaders to allocate procedural attention and advancement selectively across legislators. Finally, we argue that the concentration of effectiveness in a chamber affects legislators' behavior: when policy success is concentrated, new legislators have stronger incentives to learn which colleagues are most effective and to collaborate with them; when effectiveness is broadly shared, legislators can collaborate successfully with a wider range of colleagues.

We report three key findings. First, the concentration of effective lawmaking varies widely across chambers. Within chambers, effective lawmaking is most concentrated for substantive and significant legislation (i.e., important and consequential bills that garnered attention outside of the legislature). Second, measures of policymaking opportunity (e.g., chamber size and bill introduction limits) are strongly associated with more dispersed effectiveness, whereas centralizing rules are not systematically related to the distribution of policy success. Third, the distribution of policy success shapes legislators' behavior: when policy success is concentrated, new legislators learn to collaborate with the chamber's most effective lawmakers.

The primary contribution of this paper is the introduction of the Effective Legislator Ratio (ELR), a portable, chamber-level measure capturing the concentration of policy success within a legislature. Because ELR can be computed in any chamber where member-level effectiveness can be measured, it provides a tool for comparative scholars to examine how the concentration of effective lawmaking varies across legislatures in different institutional environments and party systems. In addition to this measurement contribution, the paper adds a new theoretical dimension to research on legislative effectiveness: legislatures vary in how

many members meaningfully contribute to policy success, which may restructure how we think about core theories in legislative politics. When effectiveness is highly concentrated, a small subset of lawmakers disproportionately shapes major policy outcomes, complicating existing accounts of electoral accountability (Mayhew 1974; Ashworth 2012) and substantive representation (Mansbridge 1999). Relatedly, when policy success is concentrated, party leaders and organized interests may have stronger incentives to target information, lobbying, and coalition-building toward the legislators most likely to move policy, potentially reshaping how we think about pivotal actors in the lawmaking process (Krehbiel 1998). Thus, ELR is a broadly applicable measure that enables scholars to study the causes and consequences of the distribution of policy success in a legislature.

Legislative Effectiveness

Legislative scholarship has long been interested in identifying the most successful and productive legislators. While earlier work debated the merits of a variety of measures of success (e.g., Anderson et al. 2003; Kousser 2005; see Makse 2022b for a summary of this debate), the development of Legislative Effectiveness Scores (Volden and Wiseman 2014) has enhanced the ability for scholars to make comparisons across legislative sessions and across individuals with different positions.

Using these scores, recent scholarship has advanced our understanding of how individual traits, features of the political environment, and legislator behaviors map onto effectiveness. Lawmakers' identities (e.g., gender, class, sexuality), for instance, are related to their legislative performance in several ways. Volden et al. (2013) find that women lawmakers

are more effective than men, particularly during consensus-building stages of the lawmaking process and when they are in the minority party. Lawmakers' professional backgrounds are also related to their ability to effectively legislate. Lollis (2024) finds that lawmakers who have previously been employed in working-class occupations are no less effective than those from white-collar backgrounds, while Makse (2022b) demonstrates that lawmakers are highly successful when legislating in policy areas related to their professional expertise. Likewise, recent evidence suggests that prior political experience conditionally predicts legislative effectiveness—former state house members who now serve in the state senate and lawyers are more effective overall—while previously serving in local office or holding general government experience does not increase effectiveness (Hansen and Treul 2025). Finally, Lollis and Dobson (2025) show that, due to election selection effects, LGBTQ lawmakers overperform their non-LGBTQ colleagues.

Various aspects of legislative service also shape effectiveness, including seniority (Miquel i Padró and Snyder 2006), electoral competition (Barber and Schmidt 2019), and membership in legislative factions (Clarke et al. 2024). Needless to say, however, legislative behavior is also a crucial predictor of effectiveness, with theoretical work confirming (Battaglini et al. 2020) an intuitive link between legislative connections and effectiveness. By a variety of metrics for both connections and success, evidence shows that legislators who collaborate (Craig 2020) and attract bipartisan cosponsors (Harbridge-Yong et al. 2023) achieve legislative successes, although much of this work focuses on Congress.

The Concentration and Dispersion of Effective Lawmaking

Although existing work clarifies how individual attributes shape legislators' success in advancing bills, we know far less about how legislative effectiveness is distributed within a legislature. We expect chambers to vary in how broadly lawmaking success is shared across members. We argue that this variation is shaped by the centralization of the policymaking process. In turn, the concentration of policy success reshapes legislators' incentives, influencing their cosponsorship decisions.

We expect that legislatures' institutional design may shape the concentration of effective lawmaking within a chamber through two related, but distinct, centralization mechanisms: (1) the centralization of policymaking opportunity, and (2) the centralization of agenda power. First, the *opportunity* for legislators to introduce, advance, and pass legislation varies across chambers because effective lawmaking is inherently resource-intensive. As a result, only so many legislators can realistically sponsor successful legislation in a given term. In some chambers, the opportunity to be an effective lawmaker is distributed broadly across members; in others, it is concentrated among a smaller subset. When chambers are designed to distribute policymaking opportunity more broadly, we expect that a larger share of legislators will effectively pass legislation into law. We expect two features of legislative design to affect policymaking opportunity: chamber size and bill introduction limits.

In large chambers, the number of legislators competing for policymaking opportunities is high. Because only a limited number of bills can receive serious consideration and ultimately be enacted in a given term, serving in a large chamber reduces the likelihood that any individual legislator can successfully and consistently shepherd their legislation into law. In contrast, in

smaller chambers there are fewer legislators competing for these opportunities, increasing the likelihood that a larger share of members will be able to effectively shepherd bills through the lawmaking process.

Similarly, bill introduction limits constrain the extent to which any single legislator can dominate sponsorship. When members can introduce an unlimited number of bills, ambitious or highly resourced legislators may flood the chamber with their own measures, increasing the probability that a relatively small set of lawmakers are the primary sponsors of the bills that successfully advance and pass the chamber. Introduction limits, in contrast, restrict each member's ability to monopolize sponsorship, which distributes policymaking opportunity more broadly.

As a result, we expect effective lawmaking to be more widely shared in smaller chambers and chambers with bill introduction limits. Because the opportunity to engage in the policymaking process is structured by chamber-level institutions—such as chamber size and bill introduction limits—this relationship should hold for legislators regardless of whether they are in the majority or minority party. Therefore, we expect the relationship to be robust when we examine the distribution of effectiveness only within the majority party. Importantly, we expect chamber size and bill introduction limits to shape policymaking opportunity independent of centralizing rules that affect agenda power or leadership authority.

H1 (Centralization of Opportunity): Smaller chambers and chambers with bill introduction limits are associated with more dispersed effectiveness.

Second, we argue that the concentration of policy success may also be affected by rules that formally centralize agenda power. Whereas the opportunity mechanism focuses on how broadly legislators can access the chance to sponsor and shepherd legislation, agenda power concerns who controls whether bills receive procedural attention and advancement. In some chambers, party leaders and other gatekeepers possess substantial authority over the legislative process, including influence over which proposals receive hearings, committee action, and floor consideration. In other chambers, agenda-setting authority is more decentralized, and rank-and-file legislators have more procedural avenues to secure consideration for their proposals. Accordingly, we expect that legislative effectiveness may be more concentrated in chambers with rules that formally centralize power among legislative leaders—like committee appointment authority (Jenkins 2016), calendar control (Anzia and Jackman 2013), and increased rules committee jurisdiction (Clark 2015)—by enabling leaders to selectively allocate procedural access and advancement to a narrower set of legislators.

We expect this relationship to be particularly strong within the majority party. When chamber rules centralize agenda power among majority-party leadership, leaders can allocate procedural access and advancement selectively across majority-party members, concentrating policy success among a narrower subset of majority legislators. Thus, we expect centralized agenda power to be associated with more concentrated effectiveness when we examine majority-party legislators alone.

It is also possible, however, that centralized agenda power does not always translate into concentrated legislative effectiveness. Party leaders may strategically use their control over the legislative agenda to distribute opportunities more broadly across majority-party

members, enabling a wider set of legislators to achieve policy successes and claim credit in their districts (Mayhew 1974). Likewise, leaders may allocate policy success to legislators who are experts in particular policy areas, which would result in more dispersed effective lawmaking across a chamber. In other words, although agenda power allows leaders to selectively allocate policy success, their incentives may not always favor concentrating it among a small set of legislators. Furthermore, because only a limited number of bills can advance through the lawmaking process, the centralization of policymaking opportunity—through features like bill introduction limits and chamber size—may account for the majority of variation in the concentration of effective lawmaking. For example, in a large chamber with no introduction limits, centralizing rules may have little additional effect on concentrating policy success.

H2a (Centralization of Agenda Power): Chambers with rules that centralize agenda power are associated with more concentrated effective lawmaking.

H2b (Centralization of Agenda Power): Chambers with rules that centralize agenda power are not associated with more concentrated effective lawmaking.

Finally, we expect that the distribution of effective lawmaking within a chamber shapes how legislators engage in the policymaking process. Specifically, we argue that legislators learn over time where legislative success is concentrated, and adapt their cosponsorship behavior to seek out collaborative relationships with the most effective lawmakers in the chamber. To assess this, we compare the cosponsorship patterns of freshman and sophomore legislators across chambers where effective lawmaking is concentrated and where it is dispersed.

In chambers where lawmaking success is broadly dispersed, new legislators likely learn that they can collaborate with a wide range of colleagues without diminishing the chances of

their bills advancing. When many legislators are effective, cosponsoring with any peer is unlikely to reduce policy success. We argue that in chambers where effectiveness is highly concentrated, however, new lawmakers learn that a small number of colleagues wield substantial policymaking power. As a result, sophomore legislators in chambers where policy success is concentrated are more likely than freshmen to identify and cosponsor with effective lawmakers. This suggests that legislators recognize and adjust their policymaking strategies in response to the concentration of legislative success in a chamber.

H3 (Consequences of Concentration of Effective Lawmaking): In legislatures where effective lawmaking is more concentrated, sophomore legislators are more likely than freshmen legislators to collaborate with more effective lawmakers.

Measuring the Concentration of Legislative Effectiveness

We develop a flexible and portable measure, the Effective Legislator Ratio (ELR), which calculates the share of a legislature's membership that is consistently responsible for policy success. The ELR is constructed using State Legislative Effectiveness Scores (SLES) (Bucchianeri et al. 2025). As in previous work on legislative effectiveness in Congress (Volden and Wiseman 2014), SLES assess how many of each legislator's authored bills succeed in advancing through stages of the legislative process (e.g., bill introduction, passage from committee, becoming law), and compare these achievements to the average legislator in the session. Legislation is weighted based on its policy importance and the scores are normalized such that the average score in each chamber is 1.0, enabling comparisons across legislatures and time.¹

¹ Given the ubiquity of work on legislative effectiveness, we point readers to the above studies for more precise details on the construction of these measures.

Using SLES, we construct the ELR, a chamber–term measure defined as the effective number of legislators divided by the chamber’s nominal size. In total, there are 914 session observations from 94 chambers in 47 states from 1997 through 2018.² In designing this measure, we take inspiration from Laakso and Taagepera’s (1979) formula for calculating the effective number of parties in an electoral system based on the relative vote shares of those parties.³ Just as a minor political party who receives a small share of the total vote might be considered a “half party” or “quarter party” in the Laakso-Taagepera measure, a legislator whose successes are scant relative to prevailing patterns in the chambers might be thought of as a fraction of a legislator in terms of the chamber’s legislative output. By expressing the effective number of legislators relative to the chamber size, we produce a novel measure of concentration that can be expressed in intuitive language easily compared across legislatures of different sizes.

To arrive at the ELR, we first must calculate the numerator: the effective number of legislators (More clumsily, we might describe this as the “effective number of effective legislators”). Specifically, the effective number of legislators is calculated with the following

² We limit our analysis to the period from 1997 to 2018 (1996 to 2017 in states with odd-year elections) due to limitations of other variables collected for this paper. Figure A-1 in the Appendix shows the sessions covered in each state, summing to 914 total session observations across 94 chambers in 47 states. We exclude Kansas because of its unavailability in the SLES data, New Hampshire because of additional missing data, and Nebraska due to its nonpartisan elections (see Appendix Figure A-1). However, recoding the majority status variable to treat Nebraska as a Republican chamber produces no changes to the model results. In addition, models which account for partisan majority status exclude sessions with tied chambers and the 2017-2018 Hawai’i Senate term in which no Republicans held office.

³ The Laakso-Taagepera score is the inverse of the Herfindahl index, used to measure market concentration. However, just as it is more intuitive to discuss party systems in terms of the effective number of parties, we find it intuitive to discuss the effective number of legislators.

formula, where $SLES_i$ is the legislative effectiveness score for member i and N is the number of legislators in the session.

$$ELR = \frac{1}{N} * inv \left(\sum \frac{SLES_i^2}{N} \right)$$

The ELR can thus be understood as a measure of the concentration of legislative effectiveness. For example, if a legislature with twenty members has four highly effective members and sixteen highly ineffective legislators (such that their SLES scores approach zero), its effective number of legislators would be just larger than four, or 20% of the chamber's nominal membership size. As we will see, that would constitute a chamber with a very high level of concentration: larger proportions indicate more dispersion of effectiveness (or more egalitarianism) while smaller proportions indicate more concentration of effectiveness (or more inegalitarianism).

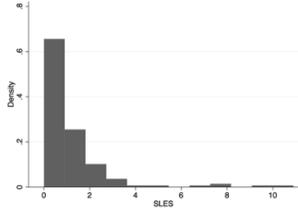
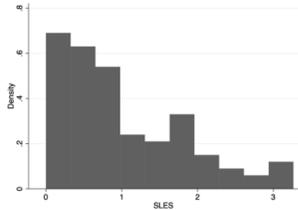
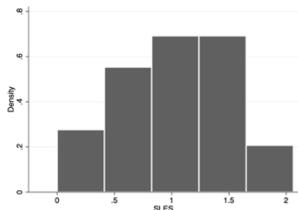
To further clarify how the dependent variable is constructed, Table 1 reports the ELR score—and its calculation—for three state legislative chambers. The SLES score distribution demonstrates that, in chambers like the Vermont House, few legislators are effective.

Accordingly, the ELR score for the Vermont is small ($\frac{38.8}{151} = 0.26$). On the other hand, in chambers like the Arkansas Senate, the distribution of effective lawmaking is more dispersed, resulting in a higher ELR score ($\frac{28.4}{35} = 0.81$).

The mean ELR score across all chamber-sessions is 0.59, indicating that the number of effective legislators is 59% of the chamber's total membership; however, this varies widely across state legislative chambers. Figures 1.1 and 1.2 illustrate values of the ELR by state over time in lower chambers and upper chambers, respectively. We do not contend that lower and

upper chambers are fundamentally different, although some recent work has found differing patterns by chamber for some phenomena (e.g., Hansen and Treul 2025; Howard and Provins 2024). For our purposes, we do not postulate a discrete effect of chamber above and beyond the effect of chamber size (lower chambers are, of course, uniformly larger), although we do consider chamber as a robustness test below.

Table 1: Effective Legislator Ratio Example Calculations

Chamber-Year	SLES Score Histogram	Effective # of Legislators	Members	ELR Score (Percentile)	Distribution of Legislative Effectiveness
Vermont House 2015-16		38.8	151	0.26 (5 th)	Concentrated
Indiana House 2013-14		61.8	102	0.61 (50 th)	Mixed
Arkansas Senate 2013-14		28.4	35	0.81 (95 th)	Dispersed

Note: Table 1 reports the ELR calculation for three state legislative chambers. The ELR score is calculated by dividing the effective number of legislators by chamber size. Note that the number of members listed here may be different from the nominal chamber size due to mid-session vacancies.

Figure 1.1: Distribution of ELR in Lower Chambers

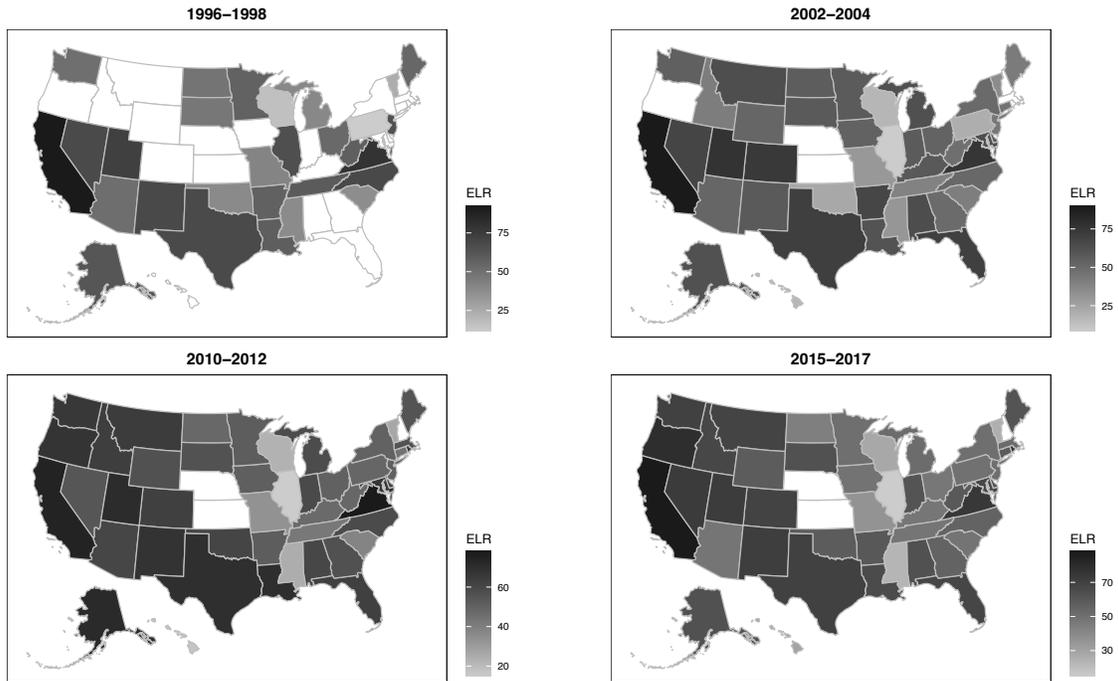
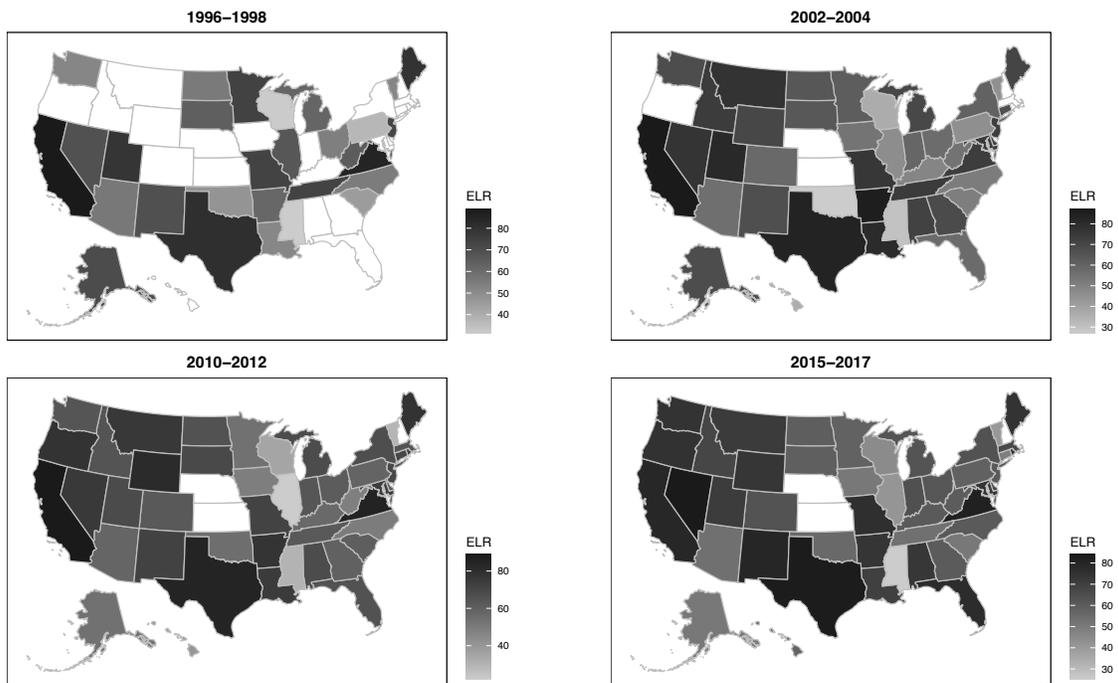


Figure 1.2: Distribution of ELR in Upper Chambers



Note: Figure 1 displays variation in the Effective Legislator Ratio (ELR) across legislatures and chambers. Kansas, Nebraska, and New Hampshire are omitted from both maps.

Across all chambers, the West Virginia and Hawai'i House have the lowest scores (most concentration of effectiveness) while the two chambers of the California legislature have the highest average ELR scores. Most chambers are relatively stable over time with a standard deviation of 0.06 across sessions. The Illinois House and Oklahoma House have the least stable ELR scores over time, while the Georgia House and Hawai'i Senate have the most stable ones. The level of stability does not appear to be affected by leadership change. Although the average change in chambers with new leaders is slightly larger than chambers with stable leadership (0.57 v. 0.50, $p = 0.02$), this difference is not substantively large.

There is also a very strong relationship between the average ELR scores in the lower and upper chambers of the same state ($r = 0.82$), which is not surprising since achieving the highest legislative effectiveness scores (for bills that become law) requires navigating the legislative process through both chambers. However, a few states *do* exhibit substantial differences across chambers (Illinois, Pennsylvania, and especially Missouri). These deviances appear to be associated with bicameral distinctiveness (Makse 2022a), as states with more distinct lower and upper chambers have greater differences in the ELR scores ($r = 0.25$) across chambers.

In addition to our main dependent variable, we calculate a second version of the ELR, the **majority party effective legislator ratio** (MELR) to focus specifically on the concentration of effectiveness among majority party members. Given the often-large gaps between majority party and minority party effectiveness (Bucchianeri et al. 2025), the large number of conditioning factors that affect majority and minority members differently (see e.g., Clark 2015), and the increasing polarization of legislatures, it may be easy to mistake the concentration of effectiveness with the substantial disadvantages that minority party members

face. By using the MELR, we can rule out that patterns observed are merely capturing majority-minority dynamics. The construction of this measure is identical, except that only SLES scores for members of the majority are used in calculating the numerator and the number of majority legislators is used for the denominator.

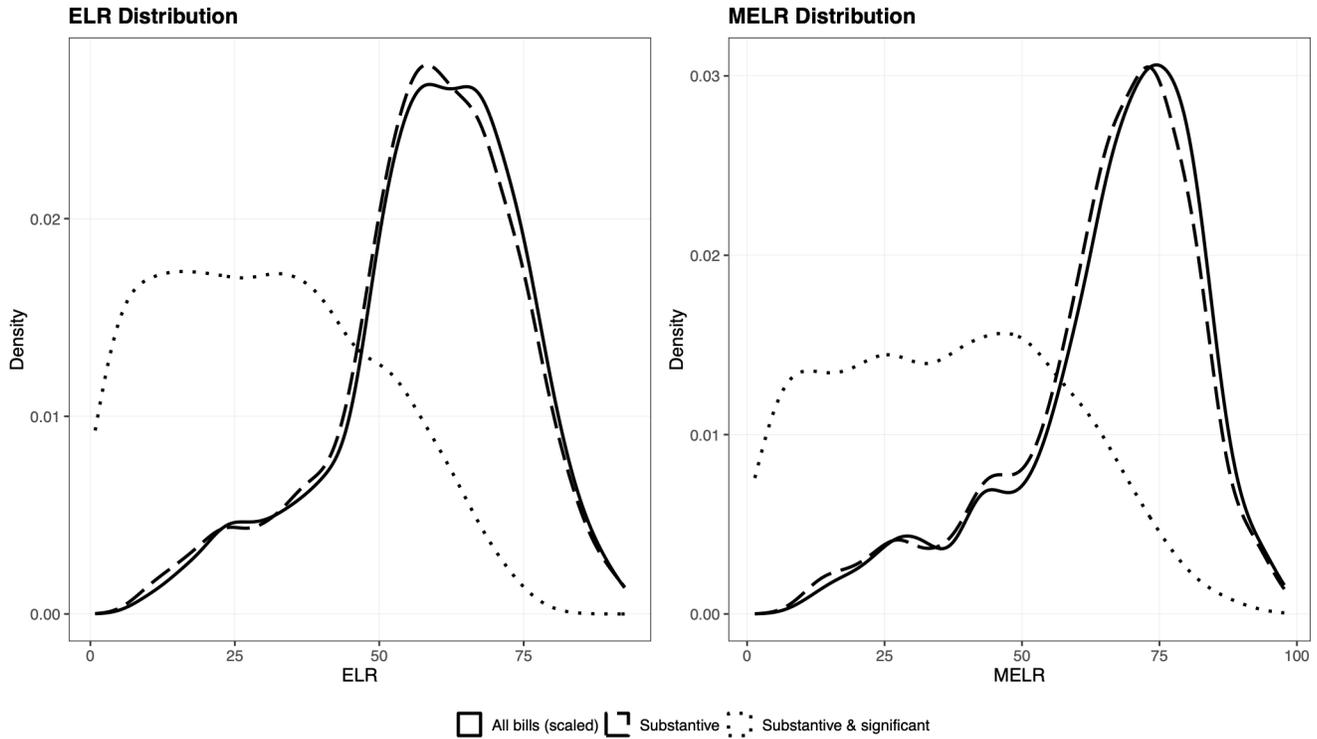
To assess whether the distribution of effective lawmaking is related to the importance of legislation, we also calculate the ELR and MELR only based on (a) substantive and (b) substantive and significant bills, respectively. Substantive bills are important pieces of legislation; substantive and significant bills are a subset of substantive bills that also garner significant attention outside of the legislature. Since substantive bills comprise 95% of all bills, the legislative effectiveness scores (and in turn, the concentration scores) based on these bills do not look terribly different from the versions incorporating all bills. The degree of concentration of effectiveness for substantive and significant bills, however, does differ meaningfully from the overall pattern.

As can be seen in Figure 2, the effective legislator ratio for substantive and significant bills (hereafter, **ELR: SS**), is typically much smaller than the effective legislator ratio for substantive bills (**ELR: S**). The latter quantity has a mean value of 58%, very similar to the mean of 59% for all bills. For the most important bills, though, this value is only 31%, indicating that a far narrower cadre of authors succeeds in advancing significant pieces of legislation.⁴ This finding is also robust when considering the majority party measure (MELR). Importantly, this result indicates that the most consequential legislation that state legislatures consider—for

⁴ The same pattern emerges for the majority-only version of the variable. The measure capturing all bills produces a mean of 66%, the version using only substantive bills (**MELR: S**) has a mean of 65%, and the version limited to significant bills (**MELR: SS**) has a mean of 36%.

example, appropriations, voting access, education reform, and healthcare bills—are shepherded through the lawmaking process by a narrower set of legislators.

Figure 2: Distribution of ELR and MELR by Importance of Legislation



Note: Figure 2 displays the density of ELR and MELR by bill type (all bills, substantive bills, and substantive and significant bills). Effective lawmaking is considerably more concentrated for substantive and significant legislation across both measures.

Independent Variables

We use three primary independent variables to test our expectations. First, we create a binary indicator called **Bill Introduction Limits** that is coded one if a chamber limits the number of bills legislators can introduce in a given term. Second, we use a variable called **Chamber Size**, which is a continuous variable capturing the number of legislators in a chamber. Finally, given the large number of distinct but overlapping measures employed by various scholars to measure the centralization of agenda power in a chamber, we take an ecumenical approach

rather than focusing on a single measure. Specifically, we employ factor analysis to create a variable called **Centralization of Agenda Power** that identifies a single dimension of leadership power. Of the eight measures used⁵, three consistently load onto a single factor: Anzia and Jackman's (2013) calendar control measure, Clark's (2015) centralization index, and a measure of leadership power (Mooney's (2013) index for lower chambers⁶ and Green's (2022) index for upper chambers). We retain predicted values from this single factor and use it as our measure of centralization. In the Appendix, we provide further details on these procedures and produce further tests that examine these measures individually. In the case of these key institutional variables and some of the control variables that follow, we treat these features as fixed over time; while there is a small amount of variation over time in features such as the Mooney index and legislative professionalism, we are interested in exploring the variation *across* legislative chambers. As previously noted, the within-chamber variation in ELR scores over time is minimal; with so little variation in both the dependent and independent variables, explaining such within-chamber variation would likely to be fruitless. (The two exceptions to this, as noted below, are partisan control and polarization, both of which have substantially more within-chamber variation.) Since most of the variation in our variables occurs across states, we omit state and chamber fixed effects from our models.

We do, however, include a variety of control variables that may confound the relationship between centralization and the dispersion of effective lawmaking. First, we control

⁵ See Table A-1 in the appendix for a description of each variable included in the factor analysis. See Table A-5 in the appendix for factor loadings.

⁶ We also consider Clucas' (2001) speaker powers index, but it loads weakly onto the centralization dimension while producing no other substantive differences in the main models.

for legislative professionalism, as the level of resources a legislature has could impact the distribution of legislative effectiveness. In testing the robustness and functional form of various professionalism measures, the relationships between some measures of professionalism and the ELR exhibit signs of nonlinearity, so we follow Brown and Mitchell (2025) by using logged legislative expenditures.⁷ Second, given that term limits place a ceiling on how much experience, and by extension, effectiveness legislators may garner over their tenure (Miquel i Padró and Snyder 2006), we also include a dummy for whether the state has **term limits**.⁸

A dummy variable for **Democratic control** allows us to ascertain whether Democratic- and Republican-led chambers are systematically different in terms of the concentration of effectiveness.⁹ Finally, given that the ideological distance between parties in a legislature may influence collaboration, and thereby patterns of effectiveness, we control for **interparty polarization** in the chamber using the difference of medians in Shor-McCarty (2011) scores.¹⁰

Table 2 provides summary statistics for all variables in the analyses to follow.

⁷ Using Squire's index (Squire 2017) or the separate components of salary, session length, and expenditures from Bowen and Greene's (2014) measures instead has no impact on the central inferences regarding our hypotheses.

⁸ A similar logic might deduce a relationship between legislative turnover and the ELR. Since term limits and turnover are highly correlated ($r = 0.77$), we test this variable in separate models, using Butcher's (2022) measure of turnover. Results are similar.

⁹ Scholars have noted the differences between the Democratic and Republican party coalitions (Grossman and Hopkins 2016), with Republicans featuring a more ideology-driven coalition, while Democrats are fueled by competing group interests. If such patterns animate legislative parties too, Democrats may be more incentivized to allocate access to the floor agenda in a way that enhances the dispersion of effectiveness.

¹⁰ Once again, the expected direction of such a relationship is ambiguous. On the one hand, polarization might make building bipartisan coalitions harder, so effectiveness could be concentrated (especially among minority party members) in the hands of the few legislators with the skill and desire to make such efforts. On the other hand, polarization could make bridge-building almost prohibitively difficult for all legislators, dampening the advantage that natural bridge-builders would have in a less polarized legislature. In that case, polarization could produce more dispersion of effectiveness and higher ELR values.

Table 2: Summary Statistics

Variable	Mean	Standard Deviation	Range
Dependent Variables			
Effective Legislator Ratio (ELR)	58.9	15.8	[8.9 – 92.5]
Majority Effective Legislator Ratio (MELR)	66.2	16.9	[9.7 – 97.7]
Collaborator Effectiveness (SLES Score)	1.26	0.50	[0.16 – 8.20]
Independent Variables			
Chamber Size	72.4	43.1	[20 – 208]
Bill Introduction Limits	0.24	0.43	[0 – 1]
Centralization of Agenda Power	0	0.77	[-1.9 – 1.5]
Sophomore Legislator	0.5	0.50	[0 – 1]
Control Variables			
Legislative Professionalism (Brown and Mitchell)	6.44	0.86	[4.24 – 8.81]
Term limits (Dummy: 1 = legislature has term limits)	0.32	0.47	[0 – 1]
Democratic majority in chamber	0.46	0.49	[0 – 1]
Interparty polarization (Shor and McCarty 2011)	0.66	0.25	[0.14 – 2.08]

Note: Table 2 displays the mean, standard deviation, and range for all dependent and independent variables.

Results

To explore the relationships between the ELR and the centralization of policymaking opportunity (H1) and the centralization of agenda power (H2), we estimate a series of linear regression models reported in Table 3. The dependent variable in column 1 is **ELR**, which includes all legislators, and the dependent variable in column 2 is **MELR**, which limits the analysis to majority party members only. Standard errors are clustered by state-chamber.

As expected, the relationship between chamber size and ELR is negative and statistically significant, indicating that legislative success is more concentrated in larger chambers (and more dispersed in smaller chambers).¹¹ This is true with the aggregate dependent variable and

¹¹ As noted above, we also consider whether chamber size proxies for chamber, since lower chambers are also larger. We find no evidence of this; adding a dummy for upper chamber does not produce a significant difference, nor does it affect the estimate for chamber size.

when subsetting to include only the majority party. Further, the magnitude of this association is meaningful. For every standard deviation change in chamber size (43), the ELR increases by 6%, slightly larger than the magnitude of the introduction limit coefficient.¹² Bill introduction limits are associated with higher dispersion of effectiveness, suggesting that effective lawmaking is less concentrated when individual legislators cannot numerically dominate bill sponsorship.¹³ The effect size of 6% implied by the coefficient is equivalent to a little more than one-third of a standard deviation of the ELR. Both these findings support Hypothesis 1.

The centralization coefficient, however, is not significant in either model. This is not a consequence of our choice of measure: none of the six measures of centralization has a significant association with the ELR. This is true for both versions of the dependent variable (**ELR** and **MELR**) regardless of the significance of the legislation (**ELR:S**, **ELR:SS**, **MELR:S**, and **MELR:SS**).¹⁴ Overall, then, our findings provide support for H2b: there is no systematic relationship between centralization of agenda powers and the concentration of policy success.

Among the control variables, interparty polarization is positive and statistically significant—but we caution overinterpreting this coefficient because in models with state fixed effects the sign reverses, indicating that polarization is associated with more concentration (see Table A.4 in the appendix). The relationship between professionalism and the ELR is positive,

¹² One potential concern is that ELR may decline mechanically in larger chambers because chamber size is directly entered into the ELR formula. This would only be a problem if ELR changed with chamber size even when the underlying distribution of effectiveness is the same. It does not: if the same share of legislators are highly effective, and they are proportionally more effective than other members, the effective number of legislators increases with chamber size, so ELR (effective number divided by chamber size) remains constant.

¹³ We also tried controlling for workload (number of bills introduced per legislator; see also Clark 2015) but found no relationship with ELR or MELR.

¹⁴ These results are reported in Appendix Tables A-2, A-3, A-6, A-7, A-8, and A-9.

although the coefficient is only marginally significant ($p = 0.09$). Taken together, although we find no relationship between the concentration of effective lawmaking and centralization rules (H2b), our results support Hypothesis 1—both bill introduction limits and chamber size are associated with the concentration of success.

Table 3: Linear Regression Models of the ELR and MELR

	1 ELR	2 MELR
Chamber Size	-0.143*** (-5.02)	-0.166*** (-5.88)
Introduction Limits	6.104** (2.79)	5.295* (2.61)
Centralization of Agenda Power	-1.137 (-0.71)	0.334 (0.21)
Democratic Majority	-2.753 (-1.40)	-4.248* (-2.11)
Interparty Polarization	11.72* (2.29)	18.94*** (3.81)
Professionalism (Brown and Mitchell)	2.210 (1.73)	3.878** (3.07)
Term Limits	2.654 (1.12)	1.040 (0.47)
Intercept	46.05*** (5.68)	41.06*** (5.65)
<i>N</i>	914	906
Adj. R^2	0.292	0.363

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Chambers with bill introduction limits are associated with *less* concentrated effective lawmaking, while large chambers are associated with *more* concentrated effectiveness. Centralization of agenda power is not related to the concentration of effective lawmaking. Standard errors clustered by state-chamber.

Does the Concentration of Legislative Success Shape Legislators' Behavior?

To test Hypothesis 3, we examine data on cosponsorship patterns across legislators' first two terms. We expect that legislators in high concentration legislatures will learn from their first term about the collaboration strategy most conducive to legislative success in their own chamber. In their second term, legislators in high concentration legislatures will adapt by seeking out more collaboration with the most effective legislators. Conversely, legislators in high dispersion legislatures may broaden their collaboration network, but do not need to prioritize collaborating with effective legislators.

Our data on cosponsorship patterns are taken from the lower chambers of thirty-six states from 2013-2018, the three most recent terms for which SLES scores are available¹⁵. We identify all legislators who served in both their first and second term during this period, which creates a sample of 2,472 observations (two observations each for 1,236 legislators). The number of legislators observed in both their first and second terms ranges across states from 10 (Nevada) to 80 (Maine).

Our dependent variable, **collaborator effectiveness** is a weighted average of SLES scores for all alters (other legislators) with whom the ego (the legislator for whom the average is being calculated) collaborated. For each legislator in each legislative session, collaborator effectiveness is measured via the alter's SLES score (Bucchianeri et al. 2024). The weighting variable takes into consideration the frequency of collaboration within a dyad of legislators, such that more frequent collaborators count more heavily in measuring an ego's collaborator

¹⁵ We limit the analyses to states where cosponsorship is relatively common; states where fewer than 25% of bills have any cosponsors are excluded from these analyses.

effectiveness. To create this weighting variable, we calculate a collaboration rate for each dyad of legislators. A collaboration occurs whenever one legislator in a dyad cosponsors a bill for whom the other member is the lead author. However, following Fowler (2006), we also take into consideration the number of cosponsors a bill has, reasoning that bills with fewer cosponsors are more likely to reflect genuine collaboration rather than bandwagoning. As such, the collaboration rate is defined as the sum of the weighted quantity of cosponsored bills between the two legislators, with each bill weighted by the inverse of the number of cosponsors. That is, if a bill has just a single cosponsor, that bill would count as 1.0 bills collaborated upon in the dyad; if the bill has ten cosponsors, it would be weighted as 0.1 in the ten dyads connecting the bill's author and each cosponsor.

Our learning model compares the **collaborator effectiveness** scores of freshmen and sophomore legislators by including a dummy for sophomore members, a chamber's ELR score, and an interaction between the two. Our expectation is that sophomore members will learn the value of collaborating with effective members, but that this learning will be especially valuable in chambers with concentrated lawmaking successes (i.e., low ELR scores). As such, we anticipate a positive main effect for sophomore legislators, and a negative interaction between sophomore status and the chamber's ELR score. Since our models focus only on within-legislator variance, we need not control for legislator-level traits known to be associated with patterns of collaboration¹⁶. In light of the consistency of ELR scores across sessions, we treat ELR as a fixed trait, using the average across the 2013-2018 sessions, rather than a time-varying

¹⁶ We also consider whether chamber size has an independent effect as a control variable in these models. No such effect exists, with the estimated coefficients almost precisely zero.

trait that varies by session. Results can be found in Table 4. As expected, we observe a pattern consistent with Hypothesis 3: a positive main effect and negative interaction effect.

Table 4: Linear Model of Collaboration Learning Patterns

Collaborator Effectiveness (SLES Score)	
Sophomore Legislator	0.280** (2.99)
ELR Score	-0.324* (-2.17)
Sophomore Legislator x ELR Score	-0.408* (-2.69)
Intercept	1.407*** (15.30)
<i>N</i>	2472
Adj. R ²	0.033

t statistics in parentheses

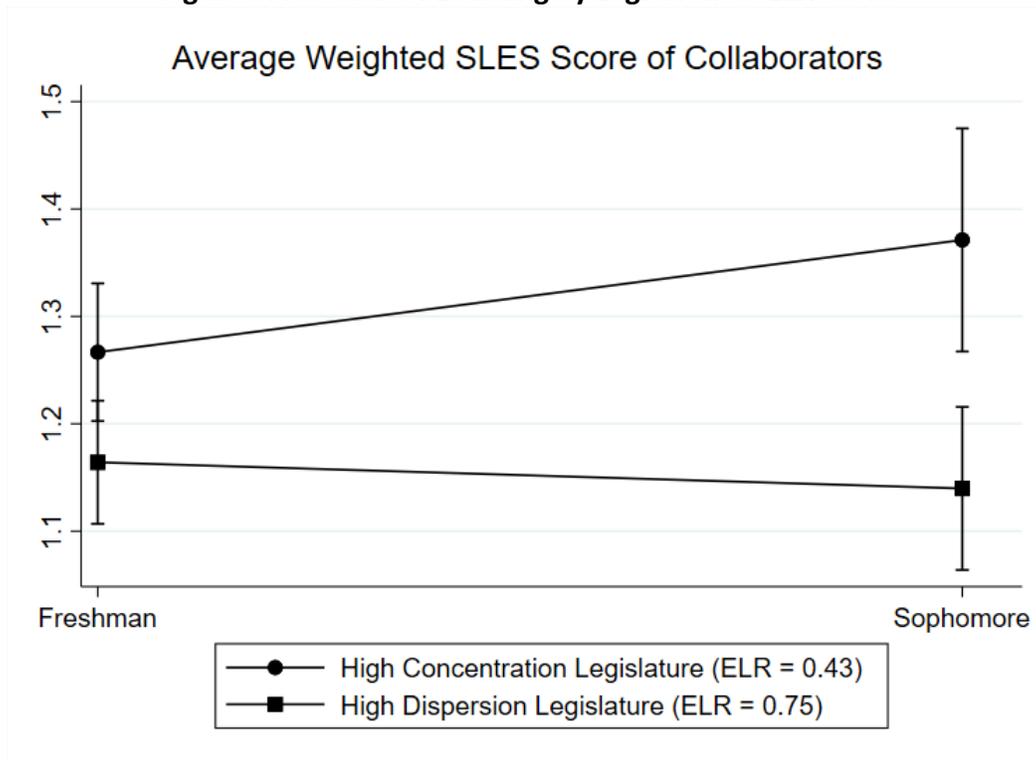
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Sophomore legislators learn to collaborate with effective legislators, especially in chambers where legislative success is concentrated. Standard errors are clustered by state.

Figure 3 illustrates the marginal effects from this model. For legislatures with ELR scores one standard deviation below the mean, legislators adjust their collaboration patterns substantially, such that the collaboration partners of sophomores have an average SLES score 0.12 points higher than the same members as freshmen. By contrast, no such pattern exists in legislatures with ELR scores one standard deviation more dispersed than the mean; for these

legislatures, the estimated difference between freshmen and sophomores is extremely close to zero. Consistent with our third hypothesis, our results indicate that sophomore legislators are more likely to increase their collaboration with highly effective lawmakers in chambers where legislative success is concentrated.¹⁷

Figure 3: Patterns of Learning by Legislature’s ELR Score



Note: Marginal effects estimated from Table 3. In high concentration legislatures, sophomores adjust their patterns of collaboration, cosponsoring with more effective lawmakers, to a greater degree.

¹⁷ In addition to these models, where legislative effectiveness is the key trait of collaborators, we produce an alternative model where the collaborator trait is whether the legislator holds a leadership position or committee chair. This model does not exhibit the same interactive effect with chamber ELR, although the finding is in the expected direction. We suspect that this is because the importance of collaborating with powerful members is more intuitive, and members do not need to learn about the concentration or dispersion of effectiveness for members to act on this intuition. Results from this model can be found in Appendix Table A-10.

Of course, we recognize that this form of learning is but one reason that legislators choose collaborators, whether in terms of seeking out cosponsors for their own legislation or responding to such requests from others. Those considerations may even be more conscious, especially to the degree that they stem from experiences of marginalization (Holman et al. 2022; Swift and VanderMolen 2021), or the existence of organized institutions such as caucuses (Holman and Mahoney 2018). Still, the fact that legislators induce such behavioral changes from one term to the next offers evidence that this feature of legislatures is of more than mere descriptive interest.

Conclusion

Since the creation of legislative effectiveness scores (Volden and Wiseman 2014), a large literature has examined the individual, political, and behavioral factors associated with effective lawmaking. In this article, we shift the focus from which lawmakers are effective to how legislative effectiveness is distributed within and across chambers. In doing so, we develop a novel and portable measure—the Effective Legislator Ratio (ELR)—that captures the concentration of policy successes in 94 state legislative chambers over more than two decades.

Our analyses uncover substantial variation in the concentration of effectiveness across American legislatures. We find that when policymaking opportunity is broadly dispersed, a broader share of the chamber contributes to policy success. In contrast, rules that centralize agenda power are not systematically related to the concentration of effectiveness. One plausible reason is that centralized agenda power may allow leaders to prioritize legislation without monopolizing policy success: leaders can use procedural control to schedule and

advance bills sponsored by a wide range of members, thereby spreading legislative credit. We also demonstrate one behavioral implication of this distribution. In chambers where success is concentrated, sophomore legislators learn to collaborate with a small set of highly effective lawmakers; where effectiveness is more dispersed, sophomore legislators continue to work with a broader range of colleagues.

Although we apply the ELR to U.S. state legislatures, this measure can be extended to most legislatures. For scholars interested in developing a version of ELR for other legislatures, we recommend three considerations. First, the underlying measure of individual legislators' effectiveness should capture legislators' ability to advance legislation through the lawmaking process—ideally as a nonnegative measure of policy success that can be compared across members within a chamber-session. We recommend a measure analogous to legislative effectiveness scores (Volden and Wiseman 2014), which weights the number of bills a legislator advances across stages of the lawmaking process. Second, the individual effectiveness scores that constitute the ELR measure should be normalized so they are comparable across terms. Finally, because the concentration of effectiveness can differ sharply by the substantive importance of legislation, scholars should—where possible—compute ELR separately for commemorative versus consequential legislation. Taken together, ELR provides a portable tool for comparative research on how institutions structure the concentration of policy success—and how that concentration reshapes influence and collaboration across legislatures.

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Table A-1: Measures of Power Centralization in State Legislatures

Variable	Description
Majority calendar control (Anzia and Jackman 2013)	Majority party's power to control the floor agenda
Loci of control (Francis 1985)	Classifies chambers by whether "significant decisions" are made by leaders, committees and/or caucuses (member survey data).
Centralization index (Clark 2015)	Powers of chamber leaders (committee appointment, calendar control, rules committee control)
Minority rights index (Clark 2015)	Majority control of floor agenda and minority party prerogatives (committee appointments, committee seat proportionality)
Committee power index (Jenkins 2016)	Autonomy of committees to hear, kill, and report bills
Speaker power index (Mooney 2013)	Appointment, committee, procedural powers of lower chamber leaders
Senate leader power index (Green 2022)	Appointment, committee, procedural powers of lower chamber leaders

Table A-2: Rules measures are not related to the ELR

	1	2	3	4	5	6
	ELR	ELR	ELR	ELR	ELR	ELR
Centralization (Clark)	-1.883 (-1.20)					
Minority Rights (Clark)		-0.306 (-0.22)				
Committee Powers (Jenkins)			-2.322 (-1.92)			
House Leadership Powers (Clucas)				-0.867 (-1.13)		
Speaker Power (Mooney)					-3.028 (-1.04)	
Senate Leader Powers (Green)						-2.598 (-1.83)
Democratic Majority	-3.493 (-1.53)	-3.373 (-1.49)	-3.146 (-1.37)	-3.407 (-1.03)	-3.545 (-1.06)	-2.330 (-0.89)
Interparty Polarization	10.20 (1.86)	9.336 (1.75)	8.675 (1.68)	16.50* (2.27)	15.62* (2.10)	2.545 (0.45)
Professionalism (Brown and Mitchell)	2.339 (1.31)	2.171 (1.20)	3.426 (1.83)	3.089 (1.24)	3.032 (1.17)	1.657 (0.87)
Term Limits	5.169 (1.76)	5.148 (1.73)	4.258 (1.36)	3.956 (0.99)	4.345 (1.06)	7.267* (2.27)
Intercept	42.50*** (3.86)	39.13** (3.35)	39.48*** (3.89)	38.76* (2.26)	31.90* (2.05)	54.71*** (4.45)
<i>N</i>	914	914	914	457	457	457
Adjusted <i>R</i> ²	0.098	0.089	0.115	0.139	0.130	0.140

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Standard errors are clustered by state and chamber.

Table A-3: Rules measures are not related to the MELR

	1	2	3	4	5	6
	MELR	MELR	MELR	MELR	MELR	MELR
Centralization (Clark)	-1.111 (-0.73)					
Minority Rights (Clark)		-1.468 (-1.13)				
Committee Powers (Jenkins)			-1.658 (-1.30)			
House Leadership Powers (Clucas)				-0.621 (-0.81)		
Speaker Powers (Mooney)					-2.985 (-0.99)	
Senate Leader Powers (Green)						-1.605 (-1.30)
Democratic Majority	-5.194* (-2.21)	-5.462* (-2.41)	-4.971* (-2.09)	-6.218 (-1.77)	-6.327 (-1.80)	-2.942 (-1.19)
Interparty Polarization	16.91** (3.17)	16.83** (3.29)	15.91** (3.12)	22.22** (3.21)	22.39** (3.17)	12.23* (2.19)
Professionalism (Brown and Mitchell)	4.033* (2.24)	3.845* (2.16)	4.835* (2.44)	4.922 (1.90)	4.817 (1.84)	3.196 (1.83)
Term Limits	3.556 (1.28)	3.139 (1.13)	2.910 (0.99)	2.655 (0.70)	2.921 (0.78)	5.002 (1.79)
Intercept	33.56** (3.10)	35.31** (3.27)	31.91** (3.30)	27.21 (1.51)	24.35 (1.62)	45.85*** (4.33)
<i>N</i>	906	906	906	454	454	452
Adjusted R^2	0.168	0.175	0.176	0.213	0.214	0.198

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Standard errors are clustered by state and chamber.

Table A-4: Main Model with State and Chamber Fixed Effects

	1	2
	ELR	MELR
Democratic Majority	-1.595* (-2.25)	-2.877*** (-3.51)
Interparty Polarization	-6.978** (-2.71)	2.195 (0.74)
Intercept	66.70*** (27.70)	73.74*** (26.71)
Chamber Fixed Effects	✓	✓
State Fixed Effects	✓	✓
<i>N</i>	914	906
Adj. R ²	0.81	0.79

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Note: Polarization finding is inconsistent when state and chamber fixed effects are added.

Table A-5: Factor Analysis for Measures of Centralization

Variable	Mean (S.D.)	Range	Factor Loading
Centralization index (Clark 2015) [Less than 1 = 1; 1 to 1.99 = 2; 2 to 2.99 = 3; 3 to 3.99 = 4]	3.04 (0.84)	[1,4]	0.70
Leadership powers [Z-scores based on Mooney 2013 for lower chambers and Green 2022 for upper chambers]	0.00 (1.00)	[-2.61, 1.80]	0.57
Majority calendar control (Anzia and Jackman 2013)	0.59 (0.49)	[0, 1]	0.37
Minority rights index (Clark 2015) [Less than 2 = 1; 2 to 2.99 = 2; 3 to 3.99 = 3; 4 to 4.99 = 4; 5 or more = 5]	2.46 (1.20)	[0,5]	0.06
Locus of control (Francis 1985) [Dummy: 1 = leaders/leaders and committees]	0.34 (0.47)	[0, 1]	0.02
Committee power index (Jenkins 2016)	3.68 (1.22)	[0, 5]	0.01

Note: Factor loading refers to first factor only. Eigenvalue of first factor is 0.95; second factor eigenvalue is 0.14.

Table A-6: Rules measures are not related to the ELR for Substantive Bills

	1	2	3	4	5	(6
	ELR:S	ELR:S	ELR:S	ELR:S	ELR:S	ELR:S
Centralization (Clark)	-2.000 (-1.25)					
Minority Rights (Clark)		-0.621 (-0.45)				
Committee Powers (Jenkins)			-2.378 (-1.97)			
House Leadership Powers (Clucas)				-0.761 (-0.97)		
Speaker Powers (Mooney)					-3.045 (-1.03)	
Senate Leader Powers (Green)						-2.620 (-1.86)
Democratic Majority	-3.156 (-1.35)	-3.107 (-1.35)	-2.793 (-1.19)	-2.790 (-0.81)	-2.917 (-0.84)	-2.306 (-0.85)
Interparty Polarization	10.29 (1.84)	9.480 (1.74)	8.696 (1.64)	16.03* (2.08)	15.62* (2.02)	2.506 (0.40)
Professionalism (Brown and Mitchell)	2.369 (1.28)	2.169 (1.16)	3.477 (1.81)	3.123 (1.19)	3.042 (1.12)	1.680 (0.83)
Term Limits	3.960 (1.33)	3.844 (1.28)	3.030 (0.96)	3.043 (0.73)	3.388 (0.81)	5.821 (1.73)
Intercept	41.94*** (3.68)	39.22** (3.22)	38.68*** (3.66)	36.23* (2.04)	31.18 (1.93)	53.99*** (4.20)
<i>N</i>	914	914	914	457	457	457
Adjusted <i>R</i> ²	0.082	0.074	0.098	0.116	0.113	0.112

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A-7: Rules measures are not related to the ELR for Substantive and Significant Bills

	1	2	3	4	5	6
	ELR:SS	ELR:SS	ELR:SS	ELR:SS	ELR:SS	ELR:SS
Centralization (Clark)	-1.880* (-2.00)					
Minority Rights (Clark)		1.020 (1.32)				
Committee Powers (Jenkins)			-1.719* (-2.54)			
House Leadership Powers (Clucas)				-0.442 (-1.08)		
Speaker Powers (Mooney)					-2.528 (-1.50)	
Senate Leader Powers (Green)						-0.689 (-0.65)
Democratic Majority	-4.125** (-2.94)	-3.633* (-2.45)	-3.625* (-2.54)	-2.947 (-1.61)	-3.076 (-1.72)	-4.745* (-2.32)
Interparty Polarization	7.944* (2.12)	6.494 (1.66)	6.340 (1.65)	9.254* (2.18)	9.797* (2.45)	5.745 (0.91)
Professionalism (Brown and Mitchell)	0.362 (0.34)	0.299 (0.28)	1.311 (1.30)	0.103 (0.09)	-0.0794 (-0.07)	0.734 (0.47)
Term Limits	4.048 (1.92)	4.414* (2.06)	3.027 (1.45)	3.091 (1.16)	3.452 (1.26)	5.285 (1.83)
SS Bill Introductions	9.354*** (9.15)	9.436*** (9.27)	9.608*** (9.40)	11.15*** (6.39)	11.07*** (6.18)	8.205*** (7.41)
Intercept	15.33** (2.73)	7.986 (1.31)	10.75 (1.94)	14.16 (1.64)	13.59 (1.87)	13.89 (1.68)
<i>N</i>	801	801	801	401	401	400
Adjusted <i>R</i> ²	0.668	0.664	0.670	0.657	0.661	0.651

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A-8: Rules measures are not related to the MELR for Substantive Bills

	1	2	3	4	5	6
	MELR:S	MELR:S	MELR:S	MELR:S	MELR:S	MELR:S
Centralization (Clark)	-1.100 (-0.71)					
Minority Rights (Clark)		-1.895 (-1.44)				
Committee Powers (Jenkins)			-1.759 (-1.37)			
House Leadership Powers (Clucas)				-0.484 (-0.61)		
Speaker Powers (Mooney)					-2.630 (-0.86)	
Senate Leader Powers (Green)						-1.709 (-1.40)
Democratic Majority	-4.653 (-1.93)	-5.034* (-2.18)	-4.424 (-1.82)	-5.445 (-1.51)	-5.534 (-1.53)	-2.707 (-1.04)
Interparty Polarization	16.39** (2.92)	16.46** (3.10)	15.36** (2.86)	20.81** (2.72)	21.23** (2.78)	11.69 (1.78)
Professionalism (Brown and Mitchell)	4.001* (2.12)	3.783* (2.05)	4.857* (2.39)	4.899 (1.80)	4.794 (1.74)	3.195 (1.67)
Term Limits	1.902 (0.67)	1.347 (0.48)	1.213 (0.41)	1.523 (0.39)	1.730 (0.44)	2.933 (0.96)
Intercept	33.03** (2.92)	36.05** (3.21)	31.46** (3.12)	24.67 (1.33)	23.20 (1.47)	45.41*** (4.10)
<i>N</i>	906	906	906	454	454	452
Adjusted <i>R</i> ²	0.140	0.154	0.150	0.177	0.181	0.159

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A-9: Rules measures are not related to the MELR for Substantive and Significant Bills

	1	2	3	4	5	6
	MELR:SS	MELR:SS	MELR:SS	MELR:SS	MELR:SS	MELR:SS
Centralization (Clark)	-2.080* (-2.07)					
Minority Rights (Clark)		0.554 (0.63)				
Committee Powers (Jenkins)			-1.306 (-1.69)			
House Leadership Powers (Clucas)				-0.327 (-0.77)		
SPeaker Powers (Mooney)					-3.698 (-1.83)	
Senate Leader Powers (Green)						0.362 (0.34)
Democratic Majority	-5.850*** (-3.45)	-5.483** (-3.14)	-5.401** (-3.12)	-4.688* (-2.11)	-4.979* (-2.35)	-6.274* (-2.61)
Interparty Polarization	15.15*** (3.83)	13.83** (3.30)	13.62** (3.36)	15.47** (3.34)	17.71*** (4.17)	14.70* (2.49)
Professionalism (Brown and Mitchell)	1.604 (1.41)	1.505 (1.31)	2.280 (1.97)	1.332 (1.06)	1.011 (0.88)	1.801 (1.25)
Term Limits	3.397 (1.44)	3.542 (1.48)	2.600 (1.11)	2.304 (0.79)	2.904 (1.00)	4.417 (1.40)
SS Bill Introductions	10.39*** (8.39)	10.52*** (8.55)	10.64*** (8.53)	12.61*** (5.89)	12.37*** (5.62)	8.871*** (6.60)
Intercept	8.820 (1.45)	2.251 (0.34)	3.746 (0.62)	4.681 (0.50)	9.088 (1.23)	6.196 (0.81)
<i>N</i>	793	793	793	398	398	395
Adjusted <i>R</i> ²	0.642	0.636	0.639	0.637	0.650	0.622

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A-10: Linear Model of Collaboration Learning Patterns With Leaders and Committee Chairs

Leader and Committee Chair Collaborator Effectiveness (SLES Score)	
Sophomore Legislator	0.113 (1.71)
ELR Score	0.0782 (0.44)
Sophomore Legislator x ELR Score	-0.148 (-1.12)
Intercept	0.191* (2.13)
<i>N</i>	2472
Adjusted <i>R</i> ²	0.009

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Figure A-1: Sample Inclusion by State and Year

