Representation as a Numbers Game: The Link between Legislative Size and the Representation of Minorities and Women

Geoff Allen
University of California, Santa Barbara

Heather Stoll
University of California, Santa Barbara

Abstract

How does the size of the legislature affect the quality of democratic representation---particularly the representation of minorities and other traditionally underrepresented groups such as women? While prominent early studies of electoral systems looked extensively at the size of the legislature, hypothesizing about its ideal size relative to the population, this feature of the electoral system has fallen out of fashion in the last two decades. In this paper, we argue that the size of the legislature needs to be brought back into the study of electoral systems. We further argue that all else being equal, larger legislatures deliver better representational outcomes. We triangulate the testing of our hypothesis using data on the descriptive representation of two different traditionally underrepresented groups at different levels of analysis: time series data on the representation of blacks at the state level in the United States, and data on the representation of women at both the state level in the United States and cross-nationally in all minimally democratic countries. We generally find support for our hypothesis, with relative legislative size having the strongest effect upon African American descriptive representation.

The size of the United States House of Representatives has increased almost two-fold between 1860, arguably the dawn of the modern political era, and the early 2000s---specifically, from 237 to 453 seats. Yet at the same time, the population of the country has increased almost ten-fold---from just over thirty-one million in 1860 to almost 300 million today. When looking more closely at estimates of the portion of the population eligible to vote on the basis of sex, race, and age, the increase is an even more spectacular twenty-seven-fold (from just under eight million in 1860 to 220 million today).[1] These statistics reveal that, in short, the growth in the size of the legislature has not kept pace with the growth of either the population or the electorate of the United States. Over time, legislators have come to represent more people---a fact recently bemoaned in a New York Times op-ed piece (Conley and Stevens 2011). Specifically, using those eligible to vote as the benchmark, while one congressman represented about 33,000 people who

[1] Stoll (2013) calls this the "theoretical electorate" to differentiate it from what is often called the "electorate" in the United States: the former consists of all individuals eligible to vote (on the basis of factors such as their sex, age, and race), whereas the latter is the subset of those individuals who have actually registered to vote. In all other advanced industrial democracies, where eligible voters are automatically registered instead of being given the choice of doing so, the theoretical electorate is equivalent to the electorate. Unfortunately, statistics on registered voters are not available at the national level prior to the mid-1960s. All of these statistics regarding the population and electorate are based on data in Stoll.

were eligible to vote in 1860, by 2006, one congressman or -woman was representing about 500,000 eligible voters.

Similarly, there is great variation cross-nationally in the size of legislatures relative to their electorates today. For example, in Nauru, the legislature has only eighteen seats, but because of its small population, a mere 317 persons are represented by each legislator---the smallest figure among today's minimally democratic countries. In Austria, with 183 seats in its legislature, the persons-to-seat ratio is 34,607, close to the median value. At the higher end of the spectrum, the 460 seat Polish legislature means that 66,876 persons are represented by each legislator, the third quartile of our observed data. Yet at the extremely high end of the spectrum, 501,274 persons are represented by each legislator in the United States, as just mentioned. And in India, the seemingly large 552 seat legislature actually yields a huge persons-to-seat ratio of 1,320,415---the largest figure among all of the contemporary minimally democratic countries that we study.[2]

This observed variation in the size of democratic legislatures relative to the populations they are intended to represent begs the question: what are the consequences? In the last few decades, the size of the legislature has largely dropped off of the radar of comparative research on electoral systems, party systems, and representation. Instead, scholars of party systems have focused on the restrictiveness of the electoral system, which operationally has been defined by the district structure in combination with the electoral formula. Scholars of representation have additionally focused upon other electoral institutions, such as the existence of quota systems. The size of the legislature, by way of contrast, is nowhere to be found. Yet we believe that this recent neglect is unfortunate. Relative legislative size should matter a great deal for a number of political outcomes. Our overarching argument in this paper is accordingly that we need to bring legislative size back into the electoral systems and representational literatures. In this paper, to help make this point, we focus upon one important outcome: representation. Our specific argument is that relatively larger legislatures should deliver better descriptive representational outcomes.

To test our hypothesis, our empirical strategy is multi-pronged: we study two different types of traditionally underrepresented social groups, women and racial minorities, and we combine a within-case study of the United States with a cross-national analysis. Specifically, we undertake an analysis of African American representation at the state level over time in the United States, as well as both a state level analysis of women's representation in the United States and a cross-national analysis of women's representation in minimally democratic countries around 2010 [I used the election closest to 2010]. Notably, in the latter analysis, we compare the effects of relative legislative size to the effects of a variety of institutional mechanisms for facilitating representation, from reserved seats to the existence of quotas, as well as to the effect of electoral system restrictiveness itself. [this is partly true, in that the studies that have done it before, particularly Tripp and Kang 2008, do not make a very sophisticated operationalization of electoral system effects and don't account for different types of quotas.]We find the strongest support for our hypothesis with respect to descriptive representation for African Americans, where relative legislative size has both a statistically and substantively significant effect. We find

[2] These statistics all come from our cross-national data set, which is described in a later section.

suggestive if not statistical support for our hypothesis with respect to descriptive representation for women.

The paper proceeds as follows. We begin by reviewing the past literature and developing our hypothesis, making the case for bringing relative legislative size back into the study of electoral systems, party systems, and representation. We then discuss our research design, first presenting the evidence for the within-case analysis of the United States before turning to the cross-national analysis of women's representation. Finally, we conclude with thoughts for future research.

Literature and Hypotheses

The size of a democratic legislature made some appearances in early political science studies of electoral systems and representation. Perhaps most prominently, Dahl and Tufte (1973) argued that legislative size was an important variable in understanding how democracy functioned. The first major contribution of their work was the elucidation of a relationship between population size and legislative size: they argued and presented evidence that there was a curvilinear relationship between the two, with legislative size generally increasing as the number of citizens increases, but with the number of legislative seats growing more slowly than the population. Yes, this was indeed empirically confirmed, though their sample size was of very limited nature. Their second major contribution was to argue that there is a tradeoff that comes from size: while larger states (and thus larger legislatures) are better able to provide opportunities for representation to members of minorities (broadly defined), it comes at the cost of a lowered ability to effectively govern. However, this second argument was left untested.

More than a decade later, Taagepera and Shugart (1989) formalized the relationship between population and legislative size. They provided empirical evidence of what they called the Cube Root Rule, the proposition that countries attempt to keep the size of their legislature at roughly the cube root of their population size. Of particular interest, they further argued that states in violation of this rule (those whose legislatures are too small compared to their population sizes) will exasperate the negative representational consequences of majoritarian electoral systems.

This argument sparked a number of studies in the 1990s that attempted to link legislative size to representational outcomes. For example, Blais and Carty (1990) found that the log of the legislative size has a small, yet statistically significant negative impact on voter turnout across countries. Another example is Oakes and Almquist (1993), who found that, in a study of 73 countries, the size of the legislature has a weak impact on the representation of women. [Oakes and Almquist operationalize their variable in a very wonky way that I don't quite understand. I'll quote exactly what they say here: "Size of the legislature is assessed by dividing the number of legislature seats per 100,000 voting age population divided by the population aged 20 and older." They find a very weak substantive effect. Again, I'll quote: "The beta (.18) for legislature seats per 1000,000 indicates that for every standard deviation unit increase in legislature seats per 100,000, women's representation in national legislatures increased by only .18 standard deviations." This variable was basically just thrown into a model with a bunch of other variables. They don't talk much about it or the theoretical justifications for it. The whole study is only 10 pages long.] This confirms an earlier finding by Darcy and Choike (1986) that while legislative size

has some impact on the number of women in the legislature at any given time, it has little or no impact on the proportion of women in the legislature or the rate at which women are integrated into the system.

Arend Lijphart has provided perhaps the most recent deep, theoretical discussion about the relationship between legislative size and representational outcomes. In his 1994 work, *Electoral Systems and Party Systems*, Lijphart used legislature size as the fourth major dimension of electoral systems, claiming that "if electoral systems are defined as methods of translating votes into seats, the total number of seats available for this translation appears to be an integral and legitimate part of the systems of translation" (Lijphart 1994, 12). In particular, he argued that "there can be no doubt that assembly size can have a strong influence on proportionality" (Ibid.). While the results of his study were somewhat inconclusive, he was able to find statistically significant relationships between a change in legislative size and both disproportionality and party system size.

In recent years, the few studies that have made use of the size of the legislature as a variable have focused on linking it to policy (as opposed to representational) outcomes, particularly government size and government spending. For example, Gilligan and Matsusaka (2006) found evidence that larger legislatures are more susceptible to a policy bias in favor of non-majority groups, which they claim can slow down government functioning, while Fiorino and Ricciuti (2007) found that in Italian provinces, legislative size is positively correlated with government spending. Another example is Pettersson and Lidbom (2012), who conducted a natural experiment and found an inverse relationship between legislative size and government size, with larger legislatures seemingly leading to smaller governments.

Yet all in all, this is a small literature. Even by 1967, Douglas Rae was bemoaning the treatment of this political institution in empirical political science, calling it a "generally neglected variable" (114-125) in the study of electoral systems.[3] The more recent electoral systems literature certainly bears this out: with the exception of Lijphart (1994), studies of electoral systems almost invariably zero in upon the district structure and electoral formulae. For example, quantitative studies seeking to tap into the distinction between majoritarian and proportional representation electoral systems operationalize the broader concept of 'electoral system restrictiveness' using the logged average district magnitude (e.g., Cox 1997; Clark and Golder 2006; Golder 2006; Hicken and Stoll 2011, 2013), in which legislative size features at best indirectly. And in 1999, Lijphart argued that for legislatures of over 100 members, size becomes relatively unimportant as a variable of interest. In short, while the size of legislatures was a political institutional variable that received some attention in earlier decades, since the 1990s, it has received little---and of the more recent works that incorporate it, the focus has shifted away from democratic representation.

This is surprising, particularly in light of three trends in the literature. First, there has been a recent surge of interest in both the causes and consequences of the extent of democratic representation enjoyed by traditionally underrepresented social groups, such as women and minorities (citations?) [Phillips 1995, Young 2000, Htun 2004, Halpin 2010 – mostly theoretical; work by Bird (2005), Krook (2009) and Kittilson (2008) more in the empirical end] . Descriptive

[3] Yet in the very same work where he made this claim, he neglected to include legislative size in his broader study of electoral system impacts.

representation has naturally been viewed as of particular interest in this respect. However, although the size of the legislature has seemingly obvious representational implications, as suggested by the early literature, these studies have shown little interest in this political institution to date.[4] Second, there has also been a recent surge of interest among scholars, practitioners, and politicians in developing new electoral institutions to facilitate descriptive representation, such as the creation of reserved seats and quota systems (citations?) [for quotas literature, in particular, I would cite Htun 2004 and Bird 2014). If the size of a state's legislature can also facilitate (or hinder) descriptive representation, then it deserves to be discussed alongside of these other electoral institutions. One obviously important consideration is the relative costs and benefits of the different institutional mechanisms; perhaps increasing the size of the legislature is a simpler way to bolster the representation of traditionally underrepresented groups than complex (and controversial) reserved seat or quota systems. Third, several scholars have recently drawn attention to the fact that the details of electoral systems, such as how elections are administered (e.g., Norris 2014), district boundaries are drawn (e.g., Grofman and Handley 2008; Stoll 2013), and district magnitudes are assigned (e.g., Kedar et al. n.d.), have a major impact upon a number of political outcomes. Yet aside from brief remarks by a few scholars,[5] the study of the size of the legislature---which surely should be considered a feature of the electoral system, for the reasons eloquently laid out by earlier scholars such as Lijphart (1994)---has not been resuscitated.

Accordingly, in light of these trends, if the size of the legislature, an oft-overlooked "detail" of the electoral system, indeed has important representational consequences, then surely it is time to bring this institution back into the electoral systems and representational literatures. This is our primary argument here: that we should turn our collective lenses upon the variable of legislative size. As a discipline, scholars of electoral and party systems have made great strides in linking other features of the electoral system---such as the district magnitude---to consequential representational outcomes, such as party system size and descriptive representation. It is understandable that the scholarly focus has been on these other, obviously consequential, electoral institutions for a number of years. But now it is time to study the size of the legislature itself.

In this paper, we attempt to take a first step in this direction by considering how the size of democratic legislatures shapes the descriptive representation of traditionally underrepresented social groups. Our secondary argument, building upon our general "call to action", is that larger legislatures, all else being equal, will lead to better descriptive representational outcomes.

Empirical Analysis of the Effects of Legislative Size on Descriptive Representation

---

[4] In those studies seeking to provide political institutional explanations for descriptive representational outcomes, the focus has instead been upon electoral system restrictiveness itself, as well as upon other electoral rules such as quota systems (discussed below). See, for example, Rule and Zimmerman (1994) and Jones (2009).

[5] See, for example, some of the concluding remarks in Stoll (2013), as well as some blog posts in the mid- to late 2000s by Matthew Shugart.

To empirically explore the effects of legislative size on descriptive representation, we study two traditionally underrepresented social groups: a racial minority, African Americans in the United States, and women. This research design enables us to see if the effect of legislative size might be conditional upon the type of social group. For African Americans, the analysis is a within-case analysis of the United States at the state level, which additionally includes a time dimension. For women, we triangulate our findings by combining a cross-sectional analysis of women's representation in the United States at the state level with a cross-national analysis of women's representation in all minimally democratic countries. A cross-national analysis of minority representation is unfortunately not possible because the identity of minority groups varies from country to country.[6]

Evidence from the United States

For the first part of our empirical analysis, we analyze both women's and African American descriptive representation in state legislatures in the United States. The advantage of this kind of within-case analysis of the United States is that it enables us to control for a variety of cultural and institutional factors. For example, all states have used a restrictive (majoritarian) electoral system during the period studied. At the same time, the within-case analysis provides us with great variation in both the key independent variable of legislative size and the dependent variable of descriptive representation. To zero in on legislative size, there has been a dramatic increase in the persons-per-seat ratio, the measure of the relative size of the legislature discussed earlier, at both the federal and state levels over time, as shown in Figures 1 and 2. There are also dramatic differences from state to state, as Figure 2 also shows for four states selected for the collective variation they display.[7] Moreover, the United States serves as a "tough" test for our hypothesis because of its restrictive electoral system, which the literature has long viewed as unfavorable to minority and women's representation. If legislative size manages to boost the descriptive representation of these groups at the state level in the United States, surely we might also expect it to have a positive impact elsewhere.

Variables and Data: African American Descriptive Representation

Our dependent variable is the percentage of black state representatives.[8] To calculate this variable, we collected data from both primary and secondary sources on the number of blacks

[6] This is why all existing studies of minority descriptive representation consist of single-country case studies (e.g., Rule and Zimmerman 1994); cross-national quantitative analyses are invariably of women's representation.

[7] This data is discussed in greater detail in the following section.

[8] An alternative operationalization, which is more appropriate for use in a regression model because it is unbounded on the real line, is to take the natural log of this percentage, after adding (following convention) 0.5 to cases with a value of 0.0. Because similar results are obtained when using this alternative measure, we report results using the more easily interpretable simple percentage in what follows.

elected to seats in the lower or only chamber of state legislatures.[9] We then divided this number by the number of seats in the lower or only chamber of state legislatures, data for which is taken from Dubin (2007). The resulting percentage ranges from zero (which is also the first quartile and the median, although the mean is 2.1 percent) to a maximum of sixty-five percent in South Carolina following the 1872 election.

Our key independent variable is the relative (to the electorate) size of the lower or only chamber of the state legislature. A natural measure of this concept is to divide the state's theoretical electorate, which is the part of the population that is enfranchised at the time of the election (based on an individual's age, sex, and race), by the total number of seats in the lower or only legislative chamber.[10] In earlier sections of this paper, we have called the resulting statistic the persons-to-seat ratio. For example, a ten seat legislature in a state with 100 people has a persons-to-seat ratio of ten, which means that every legislator (assuming districts that are equal in population) has a constituency of ten persons. It is important to use the legislature's relative size, instead of its absolute size, because it is only the relative size that captures how large any one legislator's constituency is, and hence taps into the theoretical insight that there may be a relationship between how many people a legislator represents and representational outcomes. However, in all of the models that follow, we use the reciprocal of this measure, the seats-to-person ratio, instead due to the sheer magnitude of the numbers involved in the persons-to-seat ratio.[11] Returning to the prior example, there is one seat for every ten persons, yielding a seat-per-persons ratio of 0.10. Data on the number of legislative seats is again taken from Dubin (2007), while data on the theoretical electorate, compiled from census data, is taken from Stoll (2013).

We also incorporate three additional variables in our models. First, the larger the black share of the population eligible to vote (as usual, based on the characteristics of sex, race, and

[9] Our primary sources included publications of state legislatures itself, such as class photos, membership rosters and data compilations; publications by other state agencies, such as the Texas State Library and Archives Commission; and publications of state legislative black caucuses. Secondary sources include publications by the Joint Center for Political Economic Studies, such as the National Roster of Black Elected Officials; the National Conference of State Legislatures; scholarly studies; newspapers; and more. Official state data was privileged over other sources. Where possible, replacements to originally elected members were not counted, but the available data did not always allow for this distinction to be made. These are the same sources used by Stoll (2013), who collected similar data on the black share of the two major parties' legislative contingents, and to whom we refer those who are interested in further details about the data collection process. Our focus is upon the lower chambers of bicameral legislatures because black representation in the upper chambers has always, with the exception of Georgia during the Second Reconstruction, either mirrored or lagged behind it.

[10] Using the resident population instead of the theoretical electorate as the numerator yields even stronger results. However, given our focus upon descriptive representation as a representational outcome, we believe that focusing upon the persons who are actually eligible to vote (and hence usually eligible to hold office) is the most defensible choice.

[11] For example, the largest person-to-seat ratio is found in California in 2006: 329,000. By way of contrast, our other variables measure at most in the thousands. We note that logging this variable to reduce the magnitude and hence the influence of these large numbers yields similar results to the measure that we adopt, the seats-to-person ratio.

age) at the time of a given election, the more blacks should be elected to the state legislature.[12] We therefore control for the black share of the (theoretical) electorate in our first model, which we label Model 1. However, it alternatively seems plausible that the effect of an increase in the relative legislative size on African American descriptive representation will depend upon the African Americans share of the theoretical electorate. Specifically, relative legislative size should have a greater impact where and when African Americans constitute a larger share of the electorate. This suggests that an interactive instead of an additive specification is needed. Accordingly, in a second model, which we label Model 2, we interact the seat-to-persons ratio with the black share of the electorate. Data on the black share of the electorate is again taken from Stoll (2013).

Second, black representation has generally (although not always) increased over time, first with black enfranchisement following the Civil War and later with the Civil Rights Movement. We accordingly control for the election year in both models.

Third, to account for the possibility of a coattails effect running from federal to state elections, we control for the black share of a state's federal representatives (i.e., the percentage of a state's House delegation that is black) in both models. Data for this variable is taken from Stoll (2013).

Fourth, to account for the many unmeasured and relatively stable features of states that might shape African American descriptive representation, such as political culture, we include fixed effects for states in all models. We note that F-tests for the nested models support the inclusion of state fixed effects.

The cases are all state legislative sessions of the only or lower chamber resulting from elections between 1860 and 2006. For the 50 states, there are 3492 such sessions. We are missing data for a mere six of these sessions, leaving 3486 sessions in total to use for estimating Models 1 and 2.

Variables and Data: Women's Descriptive Representation

Our dependent variable is the percentage of state representatives who are women. As with African Americans, data on the number of seats in the only or lower legislative chamber is taken from Dubin (2007), while data on the number of women representatives in that chamber is taken from the Center for the Advancement of Women in Politics at Rutgers University.

Our key independent variable, relative legislative size, is as before: the seat-to-persons ratio. We include several other control variables. The first is the percentage of a state's federal representatives (i.e., the state's House delegation) who are women. Analogous to the African American models, we include this variable to account for the possibility of a coattails effect running from federal to state elections. The second is a set of dummy variables for region, to account for unmeasured regional characteristics, **particularly related to political history and culture**, that might shape women's representation. Following standard practice, we divide the country into four regions: the west, south, mid-west, and north-east, with the west serving as the omitted (baseline) region.

[12] Controlling for the black share of the population, instead of the black share of the theoretical electorate, yields similar results.

The cases are a cross-section of state legislative sessions of the only or lower chamber. Specifically, we take either the state legislative session that resulted from the 2006 election or the closest preceding election, if there was not an election in 2006. **As data was not available with consistency prior to 1985, and because variations in legislature size after 1985 are few, we chose to use a cross-sectional analysis rather than a time series cross section.** Because we are missing data on three cases, there are a total of 47 cases that are used to estimate our women's representation model, which we label Model 3.

Results and Discussion

Estimation is using ordinary least squares (OLS) regression. For Models 1 and 2, robust Newey-West (1987) standard errors are reported to address both the heteroskedasticity and autocorrelation that is present within the data.[13] Table 1 presents the estimated coefficients and standard errors for the three subnational United States models.

We see in this table that the evidence generally supports our hypothesis that legislative size matters. In the two additive specifications (Models 1 and 3), the sign on the seat-to-persons ratio is positive. This means that as the seat-to-persons ratio increases, i.e., as the number of people represented by a single legislator decreases, the descriptive representation of these two traditionally underrepresented groups---as measured by their share of the seats in the lower or only chamber of the state legislature---is predicted to increase, ceteris paribus. For African Americans, this effect is statistically significant at conventional levels, while for women it only narrowly falls short of conventional levels of statistical significance using the appropriate two-sided test (p=0.060). Moreover, both effects are substantively significant. For example, increasing the seat-to-persons ratio from the observed minimum to the observed maximum is predicted to increase the black share of state representatives by seven percentage points and women's share by nine percentage points. These are certainly substantial real-world effects.

Similarly, the interactive model specification (Model 2) also supports our hypothesis. While the interaction term falls short of conventional levels of statistical significance, it does so only narrowly (p=0.11, two-sided test). Given the prima facie plausibility of the argument that the effect of relative legislative size should depend upon the African American share of the electorate, it is worth taking the interactive model seriously despite this statistical shortfall. Of course, to determine the effect of relative legislative size for this model, we must calculate its marginal effect. Figure 3 presents these estimated marginal effects over the observed range of the conditioning variable, the black share of the electorate. We see from this figure that the estimated marginal effects are always positively signed and statistically significant, providing

[13] Beck and Katz (1995) also raised the issue of cross-country contemporaneous correlation in the context of time series cross-sectional models. However, this problem seems less likely to surface in our *electoral* as opposed to their political economy data. Moreover, it is difficult to obtain a good estimate of the contemporaneous correlation when there are no common time periods across all units, as is the case in our data set. This makes their panel corrected standard errors inappropriate for use here. We do not make use of the increasingly popular country-clustered robust standard errors because Kezdi (2004) has shown this estimator to be biased when the number of clusters (countries) is less than fifty, and we have only fifty clusters (right at the threshold of bias) with which to work. However, we note that when employing the country-clustered estimator, we obtain similar findings.

strong support for the hypothesis. The effects are also substantively significant. As before, using as our yardstick an increase in the seat-to-persons ratio from the observed minimum to the observed maximum, the maximum predicted increase in the black share of state representatives is a whopping thirty-five percentage points, which not surprisingly comes when the black share of the electorate is at its maximum.

[Brief discussion of control variables here]

Cross-national Evidence

Finally, to triangulate this evidence drawn from the United States, we also explore the relationship between relative legislative size and descriptive representation in cross-national perspective. This provides needed external validity. As we earlier noted, this is unfortunately a practically impossible undertaking with respect to minorities. However, it is possible to do with respect to women. Accordingly, below, we provide evidence drawn from a cross-section of recent legislative election results from all minimally democratic countries about how legislative size shapes the representation of women. Of particular note, this analysis includes variables designed to measure other institutional mechanisms that the literature has identified as facilitating representation, such as the existence of mandatory quotas. This enables us to compare the relative importance of these various electoral institutions.

Variables and Data

As before, our dependent variable is the percentage of women in the only or lower legislative chamber, although now our unit of analysis is the national legislature. Data on the number of women legislators **and the number of seats in the lower house** is taken from **Inter Parliamentary Union**, **which provides data on the number of women represented in parliaments across the world reliably from 1997 to the present.**

Our key independent variable of legislative size remains operationalized as the seat-to-persons ratio. To calculate this variable, we take data on the size of each country's electorate from **from International IDEA's Voter Turnout Database**,[14] and data on the number of seats from **Inter Parliamentary Union.**

We also control for alternative institutional mechanisms that might either facilitate or impede women's representation. These features of the electoral system include its restrictiveness; the existence of mandatory quotas; the existence of voluntary quotas; and the existence of reserved seats. Each is discussed in turn.

Beginning with electoral system restrictiveness, restrictive (i.e., majoritarian) electoral systems have long been viewed by the representational literature as unfavorable to women's

[14] We choose to use the registered electorate rather than perhaps more conventional measures such as VAP or actual turnout for two reasons. First, actual turnout numbers were more frequently missing than data on the registered electorate. Second, there were large discrepancies between the registered electorate and the VAP in a number of states. We believe this is due to the method of calculating VAP, which often is demographic in nature and relies on those actually living in the state. In many countries, particularly developing states and post-communist states, diaspora populations living abroad are enfranchised, but seem to be missing from the VAP. As such, it seems more appropriate to use data on the registered electorate.

representation relative to less restrictive (i.e., proportional) electoral systems. We accordingly operationalize electoral system restrictiveness as is conventional in the quantitative literature using the logged average district magnitude (e.g., Cox 1997, Clark and Golder 2006). The greater the logged average district magnitude, the greater we expect women's share of legislative seats to be.

Mandatory quotas can be expected to have a strong substantive impact on the descriptive representation of women in parliament, as they create a minimum number of female legislators that must be present on parliamentary lists (Htun 2004). While the details differ from system to system, generally speaking these mandatory party-based quotas are expected to have a positive impact on the number of women in parliament. Data on mandatory quotas was found in the database of the Quota Project, which collects cross national data on quota systems for gender representation found worldwide. This variable is dichotomous; states which have adopted a mandatory quota system have been given a 1, while all other states have been given a 0.

Voluntary quotas are distinct from mandatory quotas in that parties adopt them without any formal requirement from the state. There is less reason to believe that these institutions should have a strong substantive impact on women's representation, as the details of the list quota are more open to party based interpretation, though studies have shown a statistically significant impact, particularly in Europe (Tripp and Kang 2008). This data was again taken from the Quota Project; this variable is also dichotomous, with a 1 signifying the presence of voluntary quotas in at least one mainstream party, and a 0 indicating no presence of voluntary quotas.

Reserved seats are distinct from list-based quotas in that they functionally reserve seats in parliament for women. These systems are relatively rare for women, and are generally thought to be less democratic than list quotas, though they are the norm for minority representation (Bird 2014). Again, this variable is dichotomous, with 1 indicating the presence of reserved seats and 0 indicating no presence; the data was again from the Quota Project.

Finally, we control for region in order to account for unmeasured regional characteristics (especially cultural ones) that might shape women's representation. We initially used a ten-category regional schema. However, in the name of simplicity, the model presented here only includes dummy variables for the two regions that were statistically significant in the original specification: the OECD countries and Oceania, **which consists of the small island states traditionally associated with the region, and excludes the two OECD members in the region, Australia and New Zealand [We may want to include a footnote here and note that Tripp and Kang (2008) note a very negative correlation between being 'Pacific' and women's representation, and they include Australia and New Zealand. I can't add new footnotes, however].**

Our cases are legislative sessions following the election closest to 2010 in all minimally democratic countries, as identified by Bormann and Golder (2013). There are 117 such legislative sessions, although after deleting three cases with missing data, we are left with 114 observations.

Results and Discussion

Table 2 presents the results from estimating the cross-national model of women's representation, which we label Model 4. White's heteroskedastic-consistent robust standard errors are reported to address the heteroskedasticity present in the data.

Most importantly, we see from Table 2 that there is suggestive but not statistical support for our hypothesis from this cross-national analysis. The coefficient on the seat-to-persons ratio is positive, as before. The interpretation is therefore that an increase in the seat-to-persons ratio, which means that each legislator is representing fewer people, is predicted to increase the percentage of women legislators, ceteris paribus. This finding mirrors that from the United States subnational analysis. However, in contrast to the United States analysis, the variable falls far short of conventional levels of statistical significance. The substantive significance is also limited: increasing the seats-to-person ratio from the observed minimum to the observed maximum is predicted to increase women's share of seats in the lower legislative chamber by only 1.5 percentage points.

Further, Table 2 shows that with one exception, the other institutional variables all have the predicted signs, are statistically significant at conventional levels, and have a substantively significant effect on women's representation. For one, a country possessing a mandatory quota system is predicted to increase women's share of seats in the lower legislative chamber by 6.7 percentage points, while having a voluntary party-based quota system is predicted to yield an increase of only 3.5 percentage points. For another, electoral system restrictiveness itself, the variable that until recently was the literature's primary focus, has only a slightly larger, maximal effect than does instituting mandatory quotas: undertaking the dramatic electoral system reform of switching from first-past-the-post with single member districts to a Ukrainian-style proportional representation system with 450 seats is predicted to increase the percentage of women legislators by 7.9 percentage points. Of course, less dramatic and more plausible reforms are predicted to have a much smaller impact. The exception is the existence of reserved seats, which is statistically insignificant and has an even smaller substantive impact than legislative size does. **This finding is somewhat surprising, but may be an artifact of the fact that only four states in the sample actually have reserved seats for women, and three of the four states are borderline democracies (Bangladesh, Burundi, and Pakistan).**

Conclusion

In this paper, we have argued that the size of the legislature, particularly the number of seats relative to the electorate, is a substantively important variable in understanding issues of representation for women and minorities. We have tested this hypothesis on data from the United States on African American representation and women's representation, as well as on a cross-national data on women's representation. We find supporting evidence for our hypotheses regarding women and minorities in the United States, and while our findings at the cross-national level are not statistically significant, they point in the same direction as our sub-national results, suggesting that the variable may have a similar relationship. We believe that a cross-national test of minority representation would show a stronger relationship, but problems with data availability make this potential test unfeasible at the present time.

At the most basic level, our findings suggest that legislature size is a substantively significant variable that merits re-introduction into the formal study of the impacts of political institutions. The conventional approach at the moment, which focuses discussion on relative

district magnitude at the expense of legislature size, threatens to miss substantively important variation related to legislature size. More importantly, our findings suggest that the size of a legislature matters for representation for historically disadvantaged groups. In light of relatively recent debates about reducing the size of legislatures in the United Kingdom and changes in legislature size over the last 20 years in relatively well-studied democracies (particularly Germany, New Zealand and Taiwan), it is important for the political science field to have an understanding of the potential representational impacts of these changes.

Dependent Variable	African American Representation, TSCS	African American Representation, TSCS	Women's Representation, CS
	Model 1	Model 2	Model 3
Intercept	-65***	-73***	0.28***
	(5.6)	(5.6)	(2.1)
Seat-to-persons Ratio	1772***	1751***	23,029
	(194)	(190)	(14,451)
Electorate, % Black	0.16***	0.11***	
	(0.016)	(0.028)	
Seat-to-persons Ratio X		110	
Electorate, % Black		(69)	
Year	0.034***	0.039***	
	(0.0031)	(0.0029)	
Federal Rep., % Black	0.59***	0.58***	
	(0.056)	(0.05)	
Federal Rep., % Women			0.012
			(0.045)
Northeast			-3.9
			(3.2)
South			-9.3***
			(2.6)
Midwest			-7.0***
			(2.6)
N	3484	3484	47
R2	0.70	0.70	0.35
Root MSE	2.8	2.8	6.4

Table 1. Estimated coefficients and standard errors for the models comprising the United States subnational analysis: Models 1-3. Models 1 and 2 have as their dependent variable the black share of the lower or only state legislative chamber. Model 3's dependent variable is the women's share of the lower or only state legislative chamber. State fixed effects not shown in Models 1 and 2, for which robust (Newey-West) standard errors are reported. Significance codes are for two-sided tests, all calculated prior to rounding to two significant digits: 0.01, ***; 0.05, **; 0.10, *.

Dependent Variable	Women's Representation, CS
	Model 4
Intercept	13***
	(1.2)
Seat-to-persons Ratio	472
	(2302)
Quota	6.7***
	(2.0)
Voluntary Party Quota	3.5*
	(1.9)
Reserved Seats	0.80
	(4.0)
Logged Average District	1.3**
Magnitude	(0.55)
Oceania	-11***
	(2.8)
OECD	10***
	(2.4)
N	114
R2	0.48
Root MSE	8.2

Table 2. Estimated coefficients and robust (White's heteroskedastic-consistent) standard errors for the cross-national model of women's representation: Model 4. Significance codes are for two-sided tests, all calculated prior to rounding to two significant digits: 0.01, ***; 0.05, **; 0.10, *.

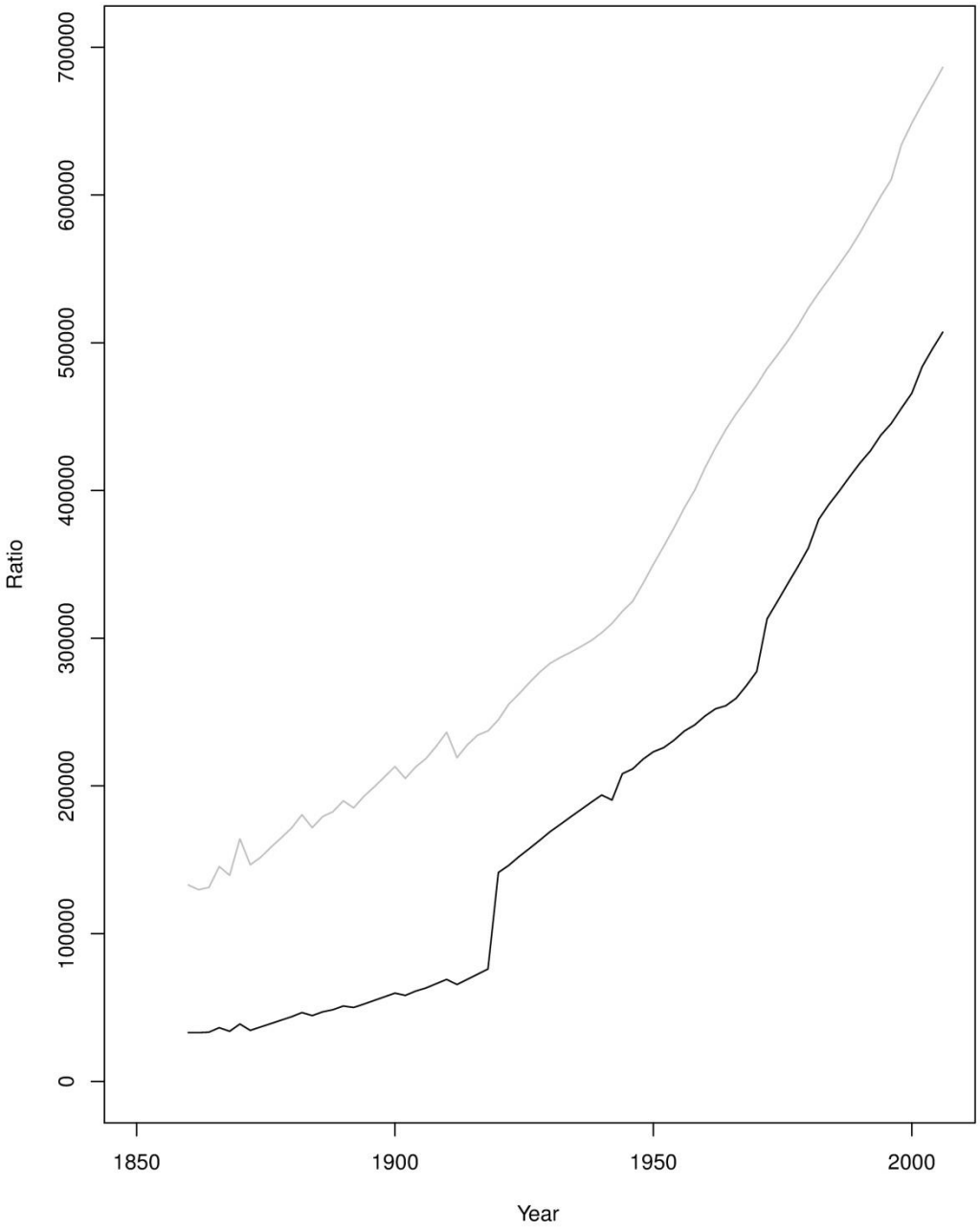

Figure 1. The person-to-seat ratio the United States House of Representatives, 1860-2006. The black line shows the ratio when "persons" are defined as those eligible to vote (on the basis of sex, race, and age) at the time of a given election, whereas the grey line shows the ratio when "persons" are defined simply as the resident population.

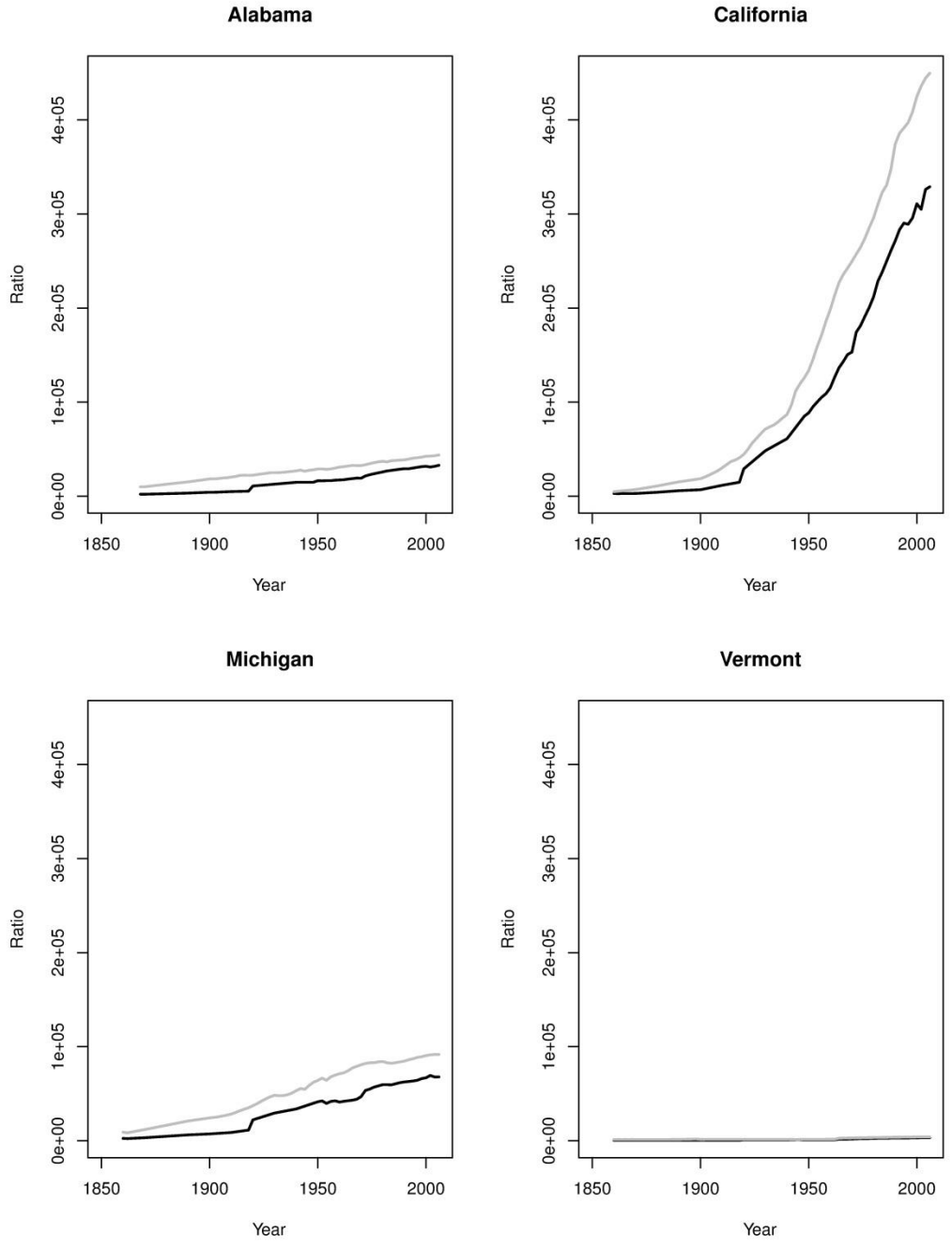

Figure 2. The person-to-seat ratio in the lower or only legislative chamber in four states, 1860-2006. The black line shows the ratio when "persons" are defined as those eligible to vote (on the basis of sex, race, and age) at the time of a given election, whereas the grey line shows the ratio when "persons" are defined simply as the resident population.

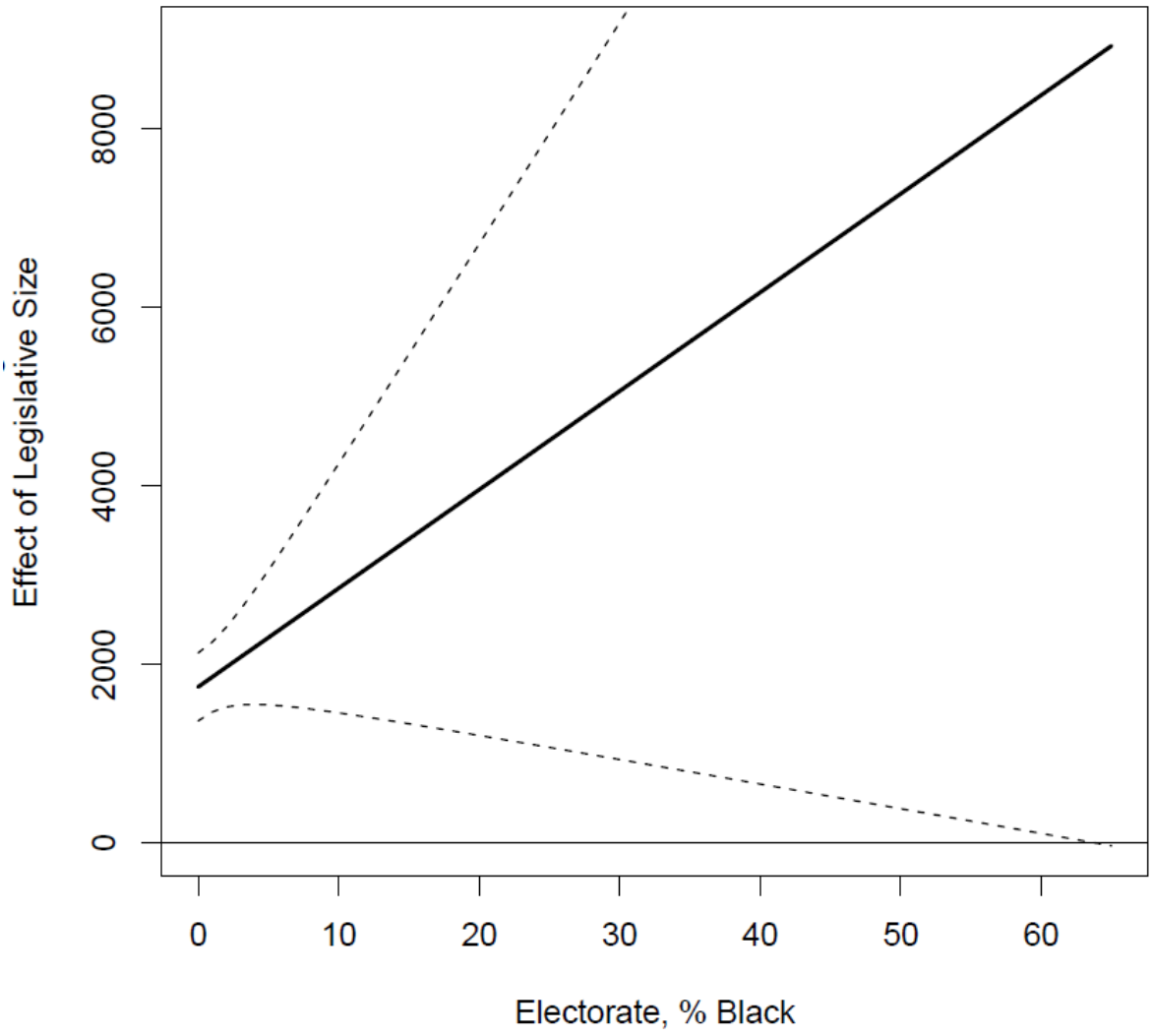

Figure 3. The estimated marginal effects of relative legislative size (Model 3) over the observed range of data of the black share of the electorate. Two-sided 95% confidence intervals shown as dashed lines.

Works Cited

Blais, A., & Carty, R. K. (1990). Does proportional representation foster voter turnout?. *European Journal of Political Research*, *18*(2), 167-181.

Bird, K. (2005). The political representation of visible minorities in electoral democracies: a comparison of France, Denmark, and Canada. *Nationalism and Ethnic Politics*, *11*(4), 425-465.

Bormann, N. C., & Golder, M. (2013). Democratic Electoral Systems around the world, 1946–2011. *Electoral Studies*, *32*(2), 360-369.

Cox, G. W. (1997). *Making votes count: strategic coordination in the world's electoral systems* (Vol. 7). Cambridge: Cambridge University Press.

Dahl, R. A., & Tufte, E. R. (1973). *Size and democracy* (Vol. 2). Stanford University Press.

Darcy, R., & Choike, J. R. (1986). A formal analysis of legislative turnover: Women candidates and legislative representation. *American Journal of Political Science*, 237-255.

Fiorino, N., & Ricciuti, R. (2007). Legislature size and government spending in Italian regions: forecasting the effects of a reform. *Public Choice*, *131*(1-2), 117-125.

Gilligan, T. W., & Matsusaka, J. G. (2006). Public choice principles of redistricting. *Public Choice*, *129*(3-4), 381-398.

Golder, M. (2006). Presidential coattails and legislative fragmentation. *American Journal of Political Science*, *50*(1), 34-48.

Halpin, D. R. (2010). *Groups, representation and democracy: between promise and practice*. Manchester Univ Pr.

Handley, L., & Grofman, B. (Eds.). (2008). *Redistricting in comparative perspective*. Oxford University Press.

Hicken, A., & Stoll, H. (2011). Presidents and parties: How presidential elections shape coordination in legislative elections. *Comparative Political Studies*, *44*(7), 854-883.

Hicken, A., & Stoll, H. (2012). Are all presidents created equal? Presidential powers and the shadow of presidential elections. *Comparative Political Studies*, 0010414012453694.

Htun, M. (2004). Is gender like ethnicity? The political representation of identity groups. *Perspectives on Politics*, *2*(03), 439-458.

Kittilson, M. C. (2008). Representing women: The adoption of family leave in comparative perspective. *The Journal of Politics*, *70*(02), 323-334.

Lijphart, A., & Aitkin, D. (1994). *Electoral systems and party systems: A study of twenty-seven democracies, 1945-1990* (Vol. 159). Oxford: Oxford University Press.

Lijphart, A. (1999). Patterns of democracy: Government forms and performance in thirty-six democracies.

Pettersson-Lidbom, P. (2012). Does the size of the legislature affect the size of government? Evidence from two natural experiments. *Journal of Public Economics*, *96*(3), 269-278.

Phillips, A. (1995). *The politics of presence*. Oxford University Press.

Rae, D. W. (1967). The Political Consequences of Electoral Rules. *New Haven: Yale UniversityPress*.

Stigler, G. J. (1976). Sizes of Legislatures, The. *J. Legal Stud.*, *5*, 17.

Stoll, H. (2013). *Changing societies, changing party systems*. Cambridge University Press.

Taagepera, R., & Shugart, M. S. (1989). *Seats and votes: The effects and determinants of electoral systems*. New Haven: Yale University Press.

Young, I. M. (2000). *Inclusion and democracy*. Oxford University Press.