The Effects of Malapportionment on Cabinet Inclusion: Subnational Evidence from India

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Abstract

Malapportionment doubly penalizes people from relatively large electoral districts or constituencies by underrepresenting them in the legislature and in the political executive or cabinet. The latter effect has not been studied. I develop theoretical reasons for large constituency disadvantage in the cabinet formation process, and test them using a new repeated cross-sectional dataset on elections and cabinet formation in India's states, from 1977–2007. A standard deviation increase in relative constituency size is associated with a 22% fall in the probability of a constituency's representative being in the cabinet. Malapportionment affects cabinet inclusion by causing large parties to focus on winning relatively small constituencies. These effects are likely to hold in parliamentary systems, and in other contexts where the legislature influences cabinet inclusion.

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Malapportionment leads to formal political inequality as the value of people's votes in small electoral districts or constituencies is larger than the value of people's votes in large constituencies.[1] Such disparities are of normative concern because they conflict with a widely held belief that political institutions ought to give all citizens an equal voice, and are of positive concern as political representation is thought to affect socio-economic outcomes.

Following these twin concerns, the scholarly literature has documented the degree to which people are under- or over-represented in *legislatures*, and has examined the effects of malapportionment on various outcomes, including political selection[2] the policy-making process,[3] and the distribution of funds.[4] The effects of malapportionment on representation in the *executive*, which is explicitly drawn from the legislature in parliamentary systems, and is sometimes influenced by the legislature in presidential and semi-presidential systems,[5] has not been explored. This is perhaps not surprising, as many analyses of malapportionment have examined contexts where the executive is not drawn from the legislature.[6] Given the importance of the executive in countries with parliaments,[7] the effects of malapportionment on the composition of the executive is likely to be more consequential in these contexts than the effect of malapportionment on the legislature.

I rectify this gap by advancing two theoretical mechanisms by which malapportionment could affect cabinet formation, focusing on parliamentary systems. One of these is *direct*, as formateurs favor relatively small constituencies for cabinet berths, or as legislators from smaller constituencies attempt to join cabinets more frequently than others. Another is *indirect*, as malapportionment creates more smaller-than-average constituencies, which incentivizes large parties to secure their support.

I test for the effect of malapportionment on cabinet formation using an original repeated

[1] Pitkin 1967.
[2] Baker 1986; Cox and Katz 2002.
[3] Lee 2000; Hauk and Wacziarg 2007.
[4] Lee 1998; Rodden 2002; Pitlik, Schneider and Strotmann 2006.
[5] Neto 2006.
[6] Although the U.S. president is not drawn from Congress, his or her selection is affected by malapportionment in the electoral college.
[7] Laver and Shepsle 1994; Siaroff 2003.

cross-sectional dataset on elections and cabinet composition in India's 17 largest states, from 1977 to 2007. I use archival research to show that the reapportionment freeze—which was the main underlying cause of malapportionment—was not due to reverse causality, and use fixed effects to plausibly control for remaining endogeneity. The analysis allows us to examine the effect of malapportionment on citizens' representation in the cabinet, which is drawn from the legislature. I find that a standard deviation increase in electoral district or constituency size decreases the probability of a representative being in the cabinet by 22%. An analysis of the mechanisms by which malapportionment affects cabinet inclusion suggests that it affects cabinet inclusion *indirectly*, by prompting large parties to focus on securing the support of relatively small constituencies.

India's states are an appropriate context to examine the effects of malapportionment because, although the degree of malapportionment in India is near the world average,[8] the degree of malapportionment across and within the country's states varies substantially. Further, and as I argue below, the main driver of this variance is apolitical, which improves our efforts to isolate the causal effects of malapportionment. Comparisons of the effects of malapportionment between India's states are also appropriate because the electoral and institutional systems for the country's state legislatures and executives are nearly identical,[9] which makes the cases I consider more comparable with one another than cross-country analysis would allow.

This paper furthers the substantial literature on the effects of malapportionment by theorizing about and documenting a hitherto unnoticed effect of malapportionment in parliamentary systems. Due to the importance of the executive in these systems,[10] including in India,[11] the effect of malapportionment on the composition of the executive is arguably more important than the effects of malapportionment on the legislature. It furthers the literature

[8]Samuels and Snyder 2001.

[9]One exception is that a few states have two legislative houses. Upper houses in the states are generally weak to the point of being largely irrelevant, however, and ministers are generally drawn from lower houses. This institutional difference is controlled for in the analysis, by using sub-state-level fixed effects.

[10]Laver and Shepsle 1994; Siaroff 2003.

[11]Forrester 1970; Panandiker and Mehra 1996.

on malapportionment in India, most of which has vigorously called for reapportionment on normative grounds,[12] by considering whether we have additional, positive reasons to be concerned about malapportionment. By examining the effects of malapportionment on cabinet inclusion, the paper improves our understanding of the functioning of Indian democracy, its representativeness, and the roots of policy making. I elaborate on these themes through the course of the paper.

I start with discussing the theoretical reasons why malapportionment might affect coalition formation. In the next section, I describe the causes and extent of malapportionment across India's states; the section after details the data and empirical strategy employed. I then investigate whether malapportionment does indeed affect the political process as hypothesized, present robustness tests and discuss mechanisms, and then conclude.

1 The Political Effects of Malapportionment

The main hypothesis advanced by this paper is that relatively small constituencies are likely to be favored for cabinet inclusion. More formally,

> H_1: Representatives from smaller-than-average constituencies will be cabinet members more often than will representatives from larger-than-average constituencies.

In this section, I detail two broad accounts of why the representatives of relatively small constituencies might be favored for inclusion in cabinets.

The first, *indirect* mechanism by which malapportionment might affect cabinet inclusion is via its effect on political parties. Malapportionment often occurs as formerly relatively equally sized constituencies grow at different rates. Frequently, differential growth occurs as people migrate from many rural areas to few urban areas. In other instances, it may occur as people migrate from old industrial cities to fewer, more dynamic ones. The concentration

[12] McMillan 2000; Sivaramakrishnan 2000.

of people in relatively few areas tends to create more relatively underpopulated areas and fewer overpopulated areas. Cross-national data corroborates this claim. Using data on a broad cross-section of 76 countries between 1832 and 2013, Online Appendix Figure 1 shows that the proportion of overrepresented districts exceeded the proportion of underrepresented districts in 64% of country-years, and further that the proportion of overrepresented districts was increasing in mean country-level malapportionment. 89% of country-years with above-average malapportionment had more overrepresented than underrepresented districts. As I describe below, these patterns also obtain in India's states.

The fact that relatively small constituencies tend to outnumber relatively large constituencies, particularly as malapportionment increases, incentivizes parties to focus their efforts on winning the favor of the more numerous overrepresented constituencies. Parties might be unable to court both relatively small and relatively large constituencies due to resource constraints, and—if the policy preferences of small and large constituencies diverge—due to the perceived or actual need for parties to have coherent policies. Assuming that the largest parties are able to court relatively small constituencies successfully—a pattern that we are able to document in India, and which is a key mechanism that we will test—largest parties will have a disproportionate number of seats from relatively small constituencies. Finally, since cabinets are heavily drawn from largest parties, they will be more likely to be composed of relatively small constituencies. In sum, the first mechanism posits that malapportionment indirectly affects cabinet inclusion through its effect on the composition of the largest party.

The second, *direct* mechanism of how malapportionment might affect cabinet inclusion draws on the literature to argue that the representatives of relatively small constituencies are included in coalitions such as the cabinet more often than others because of formateurs', and/or legislators' own, incentives. Formateurs might prefer to build coalitions with legislators from smaller constituencies since they are cheaper to include than are larger

constituencies.[13] Although not spelled out by the existing literature explicitly, the logic underlying this intuition is that if adding a legislator to coalition "costs" the formateur a limited resource such as pork, if the formateur has some incentive to minimize such a cost, and if the cost of the limited resource is an increasing function of constituency size, we might expect cabinets to form with the smallest possible constituencies. Further, legislators from relatively small constituencies might have a greater incentive to join cabinets since they have fewer constituents to "divide the dollar" amongst, which means they get more of a payoff per dollar and therefore have a greater incentive to join cabinets.[14]

While smaller constituencies could both be cheaper to buy off, and could receive more on a per capita basis than large constituencies, the latter account is somewhat at odds with the former, since if each legislator only got what they "need" (which is what the former account argues), smaller-constituency legislators would not have more of an incentive to enter the coalition than larger-constituency legislators. It is also not clear whether a the "cheapness" of small constituencies can be derived in equilibrium. After all, if each legislative vote is worth the same to the formateur (as is the case in most legislatures), the "price" of each vote should equalize, which would eliminate any small constituency advantage. A last reason to doubt the applicability of the direct mechanism is that a number of other considerations likely trump the relative "cheapness" of small constituencies, including individual politicians' abilities and policy views. Nonetheless, the literature has relied on these arguments to explain the advantage enjoyed by small constituencies in the coalition formation process in a number of contexts. For example, U.S. senators from smaller states are in winning coalitions more frequently than their large-state counterparts.[15] By switching our focus to India's states, we are in a sense asking whether this small-constituency advantage holds in the longer-lasting coalition of the cabinet, which governs states between elections.

[13] Lee 1998, 2000; Ansolabehere, Snyder and Ting 2003; Samuels and Snyder 2001.
[14] Lee 1998, 2000.
[15] Lee 1998, 2000.

To summarize, there are two broad mechanisms by which smaller-than-average constituencies may be overrepresented in cabinets. The first, *indirect* mechanism posits that malapportionment affects cabinet inclusion by inducing the largest parties to focus on securing the support of the more numerous relatively small constituencies, which would increase their likelihood of being included in cabinets. The second, *direct* mechanism argues that legislators from relatively small constituencies might be invited to ruling coalitions more often, or may have a greater incentive to join ruling coalitions.

If constituencies that are small relative to the state mean are indeed more likely to be included in the cabinet, it will mean that people in larger districts suffer from a double exclusion in these contexts: they will be underrepresented in the legislature (simply by the fact that their legislative vote is worth less than the legislative vote of citizens from small districts) and in the executive. Note that their underrepresentation in the executive will hold not only because the executive is drawn from a malapportioned legislature (which is a mechanical, but hitherto ignored, result), but also because this drawing will occur—directly or indirectly, as described above—in a way that is biased against larger constituencies. As I show later, these effects are empirically decomposable.

It is worth noting that H_1 concerns a dependent variable—cabinet inclusion—at the constituency, and not at the party, level. An alternative way to examine the effect of malapportionment would be to ask—as does the coalition building literature—which of the many possible party coalitions form a government,[16] or the degree to which parties get cabinet berths.[17] I eschew party-level analysis in favor of constituency-level analysis, however, mainly since the normative motivation for this paper (that is, to determine whether a factor that is morally irrelevant to whether a person should have equal representation—namely, the drawing of constituency boundaries—affects, via malapportionment, the degree to which that person is represented in the cabinet) calls for such analysis. A similar analysis at the party level would be have no normative implications since party level malapportionment might af-

[16] Martin and Stevenson 2001.
[17] Ansolabehere et al. 2005.

fect party platforms, and people ought to be able discriminate against parties based on their platforms. Also, any analysis of coalition formation by parties would require an understanding of where each party falls an ideological space. The literature, however, emphasizes that political competition in India's states occurs along multiple dimensions, which complicates such analysis.[18]

2 Malapportionment in India

The Indian constitution seeks to guarantee every citizen an equal political voice. Equal political voice is to be secured through, among other things, universal adult franchise and the reapportionment of electoral constituencies every decade. Elections at the national and state levels in India are held on a first-past-the-post basis. All electoral districts or constituencies are single-member. Yet the Indian parliament temporarily froze—until 2008—national (parliamentary) and state-level (assembly) boundaries through a constitutional amendment in 1976. The constitutional amendment passed by Indira Gandhi's authoritarian "emergency" government in 1976 changed several clauses of the constitution. Most, but not all, of this amendment was repealed by the Janata government that followed, but the freeze in reapportionment remained. Unsuccessful attempts were made to lift the freeze in 1990 and 1996. A constitutional amendment, passed in 2003, allowed for the reapportionment of parliamentary and assembly constituencies within states, but mandated that the number of parliamentary

[18]Nikolenyi 2004 conducts such an analysis of national government formation in India, for 1989–1998. The paper uses the ideological party scores for India's national parties constructed by Huber and Inglehart 1995. Unfortunately, no such scores exist for India's many state-level parties. From the perspective of the second mechanism advanced here, there are two additional reasons to conduct this analysis at the level of the constituency. First, and as this mechanism suggests, the cabinet formation process in India's states involves the distribution of limited state resources (Bussell 2012). This is not to say that ideological considerations are unimportant, but rather to note that they are unlikely to be critical to the choice of specific ministers. That ministerial berths provide legislators with opportunities for resource extraction may be seen in the substantial powers that minsters have in comparison to individual legislators (Agrawal 2005), and from the large rents that ministers have been shown to accumulate while in power (Bhavnani 2013; Fisman, Schulz and Vig 2014). Another reason for conducting this analysis at the level of the constituency is that legislators in India's states were notorious for defecting, often specifically for ministerships, for a large portion of the period under study (Kashyap 1970; Kamath 1985). This suggests that treating legislators as unconstrained makes more sense in India than might be the case in legislatures with strong party discipline.

and assembly seats for each state remain frozen at the level determined in 1976 until after 2030. Thus, while malapportionment within states has been eliminated (the first elections using the newly delimited boundaries were held in May 2008), malapportionment between state contingents to the national parliament remains and is expected to worsen.

Over the past thirty years, the freeze in reapportionment resulted in a large degree of malapportionment between state-level constituencies. While the reapportionment freeze is the "deep" cause of malapportionment, proximate causes of malapportionment have included differential fertility rates, death rates and rates of in- and out-migration between constituencies.

I define a constituency's malapportionment score in a given year, which measures the degree and direction of malapportionment, as the number of registered voters in a constituency normalized by the average number of registered voters per constituency in the state ($v_{i,s,t}/\bar{v}_{s,t}$, where v is the number of registered voters in a constituency, $\bar{v}$ is the average number of registered voters, and i, s, and t denote the constituency, state and year, respectively).[19] This is the reciprocal of the commonly used Relative Representation Index (RRI).[20] I use the reciprocal of the RRI for ease of interpretation: larger-than-average constituencies have a malapportionment score greater than 1, and smaller-than-average constituencies have a malapportionment score smaller than 1. A malapportionment score of 1.10 therefore indicates that a constituency is 10% larger than the average constituency in that state-year. People in such a constituency will be underrepresented on the floor of the legislature.

Note that for reasons of data availability, I am using differences in the size of the electorate, rather than population (which is what reapportionment commissions generally use),

[19] I eschew using another common measure of malapportionment—$|1 - v_{s,i,t}/\bar{v}_{s,t}|$—since while it captures the normative concern that we might have for all departures (positive or negative) from average constituency size, we have theoretical reasons to believe that the effects of malapportionment on government formation are likely to depend on whether a constituency is smaller or larger than the average constituency.

[20] See Ansolabehere, Gerber and Snyder 2002. The empirical results presented later are robust to the use of the RRI, rather than the malapportionment score, as the key independent variable, and to the use of the logarithm of the two measures as well.

to measure the extent of malapportionment. The two ways of measuring malapportionment are likely to yield highly correlated measures, however, especially since the country's independent election commission is thought to do a competent and non-partisan job of registering adult resident citizens as voters.[21]

Figure 1 describes the increase in malapportionment across India's state-level constituencies over time, by plotting the probability density function (pdf) of the malapportionment score in the 1970s and the 2000s. Although the mean malapportionment score equals one in each state-year, the pdf for the 2000s has fewer observations with a malapportionment score of around 1. The pdf for the 2000s is more spread out than the one for the 1970s, and its tails—particularly the left tail—is thicker. The leftward shift in the density indicates that malapportionment has produced more small than large constituencies over time, which occurs as people are concentrated into few large constituencies.[22] Note that this corroborates, in the context of India's states, the key assumption of the indirect mechanism by which malapportionment could affect cabinet formation: malapportionment creates more small constituencies than large ones.

Since I focus on the effects of malapportionment in India's state legislatures, I compare the extent of malapportionment across India's states and over time in Table 1. This indicates, for example, that the largest constituency in Andhra Pradesh in 1978 had a malapportionment score of 1.34, while the smallest constituency had a malapportionment score of 0.74. This means that a citizen's vote in the smallest constituency was worth approximately double that of a citizen's vote in the largest constituency. By 2004, a citizen's vote in Andhra Pradesh's smallest constituency was worth eight times as much as that of a citizen's vote in the state's largest constituency. In the case of the worst offender, Gujarat in 2007, an individual's vote in the smallest constituency was worth 25 times a person's vote in the largest constituency. Estimates show that states that experienced rapid economic growth since the 1970s are the

[21] Iyer and Shivakumar 2012.

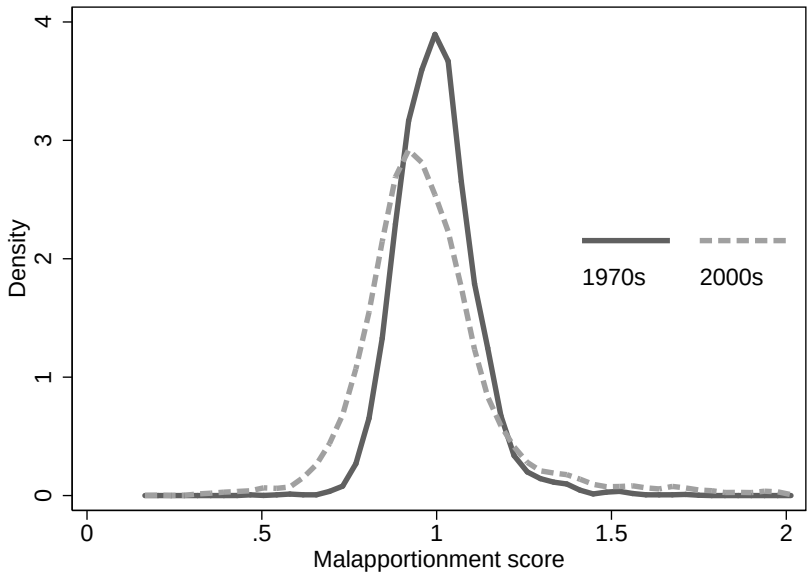
[22] The empirical results presented later are robust to the use of the log of the malapportionment score as the key independent variable.

Table 1: Malapportionment score by state, first and last observations

State	Year	Average	Std. dev.	Max.	Min.	% of obs with Mal < .9	% of obs with Mal > 1.1
Andhra Pradesh	1978	1.00	0.09	1.34	0.74	15.0	12.6
	2004	1.00	0.37	4.32	0.53	40.1	19.4
Assam	1978	1.00	0.13	1.40	0.72	19.0	20.6
	2006	1.00	0.19	2.12	0.68	31.7	23.0
Bihar	1977	1.00	0.12	1.49	0.67	19.1	19.8
	2000	1.00	0.15	1.98	0.66	23.1	17.6
Gujarat	1980	1.00	0.14	1.69	0.71	20.4	13.8
	2007	1.00	0.68	7.93	0.32	53.8	14.3
Haryana	1977	1.00	0.09	1.24	0.70	12.2	10.0
	2005	1.00	0.26	2.38	0.60	32.2	14.4
Himachal Pradesh	1977	1.00	0.15	1.53	0.47	17.6	17.6
	2007	1.00	0.17	1.48	0.34	23.5	20.6
Jammu & Kashmir	1977	1.00	0.16	1.60	0.77	27.6	23.7
	2002	1.01	0.32	2.31	0.20	37.6	28.2
Karnataka	1978	1.00	0.10	1.54	0.77	13.8	13.8
	2004	1.00	0.56	7.99	0.47	46.0	15.6
Kerala	1977	1.00	0.07	1.18	0.85	9.3	10.7
	2006	1.00	0.14	1.33	0.61	26.4	22.9
Madhya Pradesh	1980	1.00	0.13	1.67	0.47	23.1	19.1
	1998	1.00	0.22	2.69	0.49	34.1	18.4
Maharashtra	1978	1.00	0.12	1.38	0.74	19.8	17.0
	2004	1.00	0.48	5.60	0.36	51.4	17.7
Orissa	1977	1.00	0.10	1.23	0.58	11.6	17.7
	2004	1.00	0.18	2.54	0.72	25.9	18.4
Punjab	1977	1.00	0.09	1.31	0.79	12.8	14.5
	2007	1.00	0.29	3.25	0.47	35.0	15.4
Rajasthan	1977	1.00	0.11	1.36	0.55	22.0	20.5
	2003	1.00	0.23	2.56	0.50	31.0	18.0
Tamil Nadu	1977	1.00	0.15	1.69	0.76	23.1	18.8
	2006	1.00	0.43	4.73	0.53	47.0	15.8
Uttar Pradesh	1977	1.00	0.07	1.30	0.80	9.6	8.0
	1996	1.00	0.15	2.29	0.70	19.3	16.5
West Bengal	1977	1.00	0.15	1.72	0.60	27.6	19.4
	2006	1.00	0.21	1.96	0.40	27.2	20.7

Notes: Constituency malapportionment scores are defined as the number of registered voters divided by the average number of registered voters for that state-year.

Figure 1: Malapportionment over time



ones that were the most malapportioned 30 years later.[23] Overall, while a small proportion of state assembly constituencies were 10% smaller or larger than the average constituency size in the late 1970s,[24] 50% of assembly constituencies fell out of the ±10% range of the average constituency size in the 2000s. This table also reconfirms the key assumption of the first mechanism proposed here: malapportionment creates more small than large constituencies. For example, the ratio of constituencies with malapportionment scores ≤ 0.9 to those with malapportionment scores ≥ 1.1 is 2:1 in Andhra Pradesh in 2004, and is 3:2 in Assam in 2006.

3 Data and Empirical Strategy

I use repeated cross-sectional data from India's 17 largest states (which encompass more than 97% of India's population; the country has 28 states) between 1977–2007 to test my

[23]The correlation between state GDP per capita growth rates between 1977–2002 and the proportion of constituencies in each state with malapportionment scores lower than 0.9 and higher than 1.1 in the latest year in the dataset is 0.7.

[24]As the 1976 reapportionment process was conducted using 1971 census data, constituencies were already somewhat malapportioned by the late-1970s.

hypotheses.[25] The dataset draws on the state election data in Bhavnani 2014 and newly collected data on the composition of cabinets for each state approximately one year after every election.[26] 116 state cabinets were formed in this time. As every state constituency enters the dataset after an election in that state (in other words, observations are for constituency-election years), there are over 23,000 observations. The dataset spans 1977–2007 because constituency boundaries were fixed in that period. Table 2 displays summary statistics for key dependent and independent variables.

Table 2: Summary statistics

Variable	Mean	Std. Dev.	Min	Max
Independent variable				
Malapportionment score	0.99	0.16	0.18	2.00
Dependent variables				
Dummy for legislator in cabinet	0.12	0.32	0.00	1.00
Dummy for legislator in largest party	0.56	0.50	0.00	1.00

A potential problem faced by efforts to estimate the impact of malapportionment is that malapportionment might be endogenous to the outcomes of interest, and the direction of the resulting bias in the estimated effect of malapportionment is ambiguous. For example, if those in power seek to perpetuate their hold on it by creating small districts—as was the case with England's "rotten boroughs"—the estimated effect of malapportionment will be inflated. If, on the other hand, the powerful create large constituencies because it pays to represent them, estimates of the effects of malapportionment will be attenuated. Save for Ansolabehere, Gerber and Snyder 2002 and Horiuchi and Saito 2003, which study the effects of plausibly exogenous decreases in malapportionment, most studies leave the problem of

[25]India's three largest states—Bihar, Madhya Pradesh and Uttar Pradesh—were each divided in 2001 into two states. Because these states ceased to exist in their original form in 2001, I drop observations for these states from 2001 onwards.

[26]State cabinet data were coded from a variety of sources including annual "official directories" for the years until 1990, "Who's Who" publications for the years after, state government websites and responses to Right to Information requests. I thank Francesca Jensenius for contributions to the dataset. Data remain missing for the cabinet formed after the 1996 elections in Assam, and the cabinet formed after the 1977 elections in Madhya Pradesh.

the endogeneity of malapportionment unaddressed.[27]

The endogeneity problem might, in principal, be caused by reverse causality, omitted variables and errors in measuring the independent variable. To deal with these issues, I proceed on four fronts. First, I examine the causes of malapportionment in India and rule out the possibility of reverse causality, hypothetical examples of which were listed previously. Second, I employ the fullest possible set of constituency and legislature (that is, state-year) fixed effects to control for omitted variables that might cause the error term to be correlated with malapportionment. Constituency fixed effects control for omitted factors at the constituency level that are fixed or only vary slightly over time, including land area, the proportion of minorities, which is largely stable over time, and the like. Since each of the legislature (state-year) fixed effects is a cabinet formation opportunity, these control for year-invariant, state-invariant and state-year-invariant factors such as patterns of political competition, national and state electoral waves, cabinet size and so forth. They also control for state-level trends, such as levels of economic development. The resulting estimates allow us to recover the effects changing malapportionment within a constituency and over time, while controlling for factors specific to state-years and those that vary at the state level over time. Third, I check to see if the results are robust to dropping observations where politicians have the strongest incentives to influence constituency size (that is, those as redistricting approaches), to replacing malapportionment with lagged malapportionment, which is pre-determined but not exogenous, to controlling for malapportionment and lagged malapportionment, and to controlling for the effective number of parties. Lastly, I employ an alternative research design due to the redistricting of 2008 to better control for omitted variables, although this has drawbacks as well. While none of these methods entirely control for endogeneity, their joint use should help improve inference.

In the rest of this section, I use archival and secondary research to explain why the freeze

[27] As detailed later, these papers address the endogeneity problem while creating a new problem: namely, the "treatment" of interest (a change in malapportionment) is now bundled with a second treatment (a change in constituency boundaries).

in reapportionment was instituted by the Congress party, and why it has been sustained by subsequent governments.[28] I consider both publicly declared aims of the law, and aims that may be imputed to it. This analysis allows us to largely rule out the possibility of reverse causality in the relationship between malapportionment and cabinet inclusion. As I detail below, any remaining marginal influence that politicians could have over the size of their constituencies is controlled for in the analysis.

The officially declared aim of the freeze in political constituencies in 1976 (and this was reiterated in discussions for the partial extension of the freeze in 2003) was to avoid penalizing regions that were effectively curbing their fertility rates. It was thought that regular reapportionment, by reducing the proportion of legislative seats allotted to low population growth regions, would blunt these regions' incentives to implement family planning programs. Surprising as it may seem, it is my contention that the freeze in malapportionment was genuinely instituted and maintained to help fulfill this population control aim.

To see why this is the case, consider the history of the delimitation freeze. The delimitation freeze of 1976 was a part of the infamous 42nd constitutional amendment of India, a 59-clause piece of legislation that was passed by a chastened Indian parliament at the behest of Indira Gandhi's government during the country's authoritarian interlude. All leaders of the opposition were in jail during the constitutionally-declared "emergency," and a number of opposition parties were boycotting parliament. Although the few attending Members of Parliament (MPs) debated the bill over 15 days, specific clauses were hardly discussed, and almost no amendments were made to the bill. The five clauses of the bill that dealt with the decennial reapportionment process in India were only directly referred to by one MP, who, taking the logic of the measures all too seriously, called for apportionment on the basis of the 1951 census.[29]

Several MPs also rose to urge the government to vigorously pursue birth control measures, which the freeze in reapportionment was thought to be a part of. That Sanjay Gandhi,

[28] Iyer and Shivakumar 2012; McMillan 2000; Sivaramakrishnan 2000, 2008.
[29] Parliament of India 1976*a*, October 29:195.

the prime minister's son, led unlawful forced sterilization drives at the time with impunity is indicative of the fixation that people had with population control. Also indicative of this concern were suggestions by MPs to grant women the "right" to deny their husbands more than three children,[30] the dubbing of large families a crime,[31] and the suggestion that politicians with two,[32] or three[33] children be required to sterilize themselves if they wish to run for political office. That the freeze in reapportionment was explicitly mentioned as a "motivational measure" in both the 1976 and 2000 national population policies,[34] which were announced before the 1976 and 2003 constitutional amendment bills were introduced in parliament, is also indicative that the government's intentions were genuine.

Those who dismiss the declared aim of the policy as a foil for something else point to the policy's logical infirmities. They argue, first, that it is doubtful that the freeze would appreciably alter incentives to curb population growth. Second, the modification of the one-man, one-vote principal in the pursuit of one specific policy objective (that is, the reduction is fertility rates) seems suspect. And third, the policy effectively penalizes states (since it leads to their citizens being granted fewer votes in the legislature) that have high population growth rates for reasons (such as improved health and increased economic activity, which lead to a reduction in the death rate and increased in-migration, respectively) other than high fertility. At worst, these criticisms tell us that India's MPs were foolish. They do not tell us, however, whether policy-makers genuinely intended the freeze in malapportionment to help curb population growth rates or not.

There are three other reasons that the reapportionment freeze could have been instituted. First, some have argued that the freeze helps maintain the electoral balance between northern and southern states in India. Southern states, with about one-third of the seats in Indian parliament, are the primary beneficiaries of this freeze since their populations have grown less

[30]Parliament of India 1976*a*, October 26:12.
[31]Parliament of India 1976*a*, October 26:13–14.
[32]Parliament of India 1976*b*, November 8:35.
[33]Parliament of India 1976*a*, October 26:13–14.
[34]Reproduced in Pethe 1981; Chaubey 2001.

rapidly than the populations of northern states.[35] The parliamentary record does not suggest, however, differential support for reapportionment legislation from southern politicians as compared with northern politicians. Moreover, simulations suggest that if parliamentary constituencies were reapportioned today, southern states would lose less than 2% of their seats in parliament.[36] Surely there were other ways for southern states to ensure that their representation was not eroded?[37] And if the only purpose of the freeze in constituencies was to lock in a southern state advantage, why was the redistricting of state assembly constituencies suspended as well? Most importantly, the idea that southern states were trying to lock in an advantage need not concern us here because any such advantage would hold in the national legislature, and not within each of the country's state legislatures. Since this is a study of the effect of malapportionment on government formation across India's states, and not in the country's national legislature, this concern need not detain us further.

Second, the freeze could have been instituted by the Congress party because it thought that it would benefit from the freeze in the future. Yet a close reading of the more than 1,600 pages of parliamentary debates that have occurred over the past 30 years with regard to reapportionment shows that there was not a single accusation of partisan bias leveled against the Congress party. Accusations of partisan bias also seem unrealistic because the various non-Congress governments that have been in power over the past thirty years did not lift the freeze. Also, malapportionment could have only helped the Congress party a decade or two along, and it is doubtful that in 1976 the Congress was looking to lock in an advantage that far ahead, particularly given the uncertainty at the time. Further, it is far from clear whether the Congress party would have had the requisite ability or information to plan that far ahead. That there is no simple relationship between malapportionment and the land area of constituencies, which Figure 2 suggests, supports this argument: if there were such

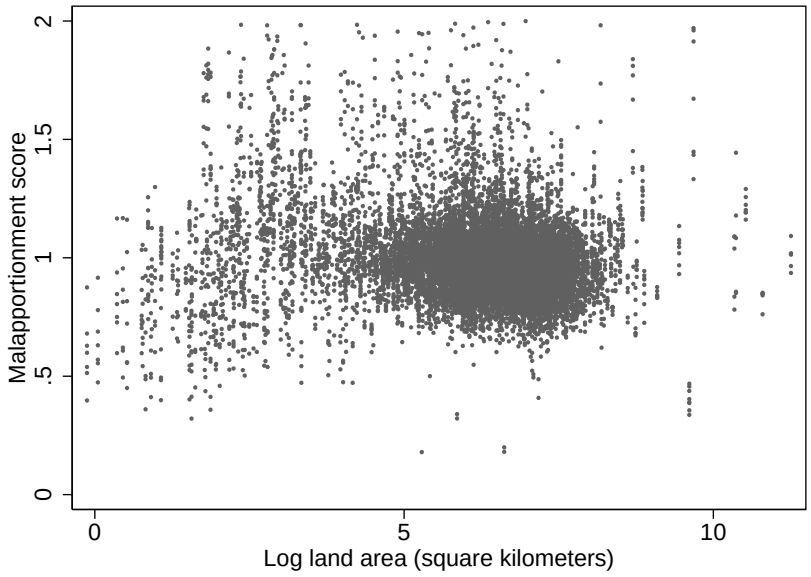
[35] This account is similar to the political equilibrium that Weingast 1998 describes in the antebellum United States, where regions tried to check one another in the legislature.

[36] Sivaramakrishnan 2000.

[37] Altering the composition of the upper house of parliament, which is the "house of the states," would have been a more obvious approach.

a relationship, legislators could have used land area to predict future malapportionment. Lastly, analysis of the partisan bias actually caused due to malapportionment over the past 30 years does not reveal any systematic pro-Congress bias. Table 3 details the partisan bias due to malapportionment calculated using the methodology proposed by Johnston, Rossiter and Pattie 1999.[38] It shows, for example, that malapportionment secured for the Congress party an extra 1.4% of seats in Andhra Pradesh in 2004, while it deprived Bharatiya Janata Party of 4.7% of seats in Karnataka in 2004. This is the first analysis of the partisan effects of malapportionment in India. The table suggests that partisan bias in favor of winning parties, and particularly the Congress, was too small and variable for the parties to have wanted to tamper with the reapportionment process, even if they had perfect foresight.

Figure 2: Malapportionment and land area



Third, it is possible that the freeze in malapportionment was simply instituted by legis-

[38]For each state-year, I first calculate the difference in the seats the first two parties (say A and B) would have won had they received equal vote shares. This measure of partisan bias can then be disaggregated into seats gained or lost due to turnout differences, gerrymandering, and malapportionment. The bias caused by malapportionment can then be given by $[\{f(S/R-1)\}-\{b(R/S-1)\}]/2$, where b = the number of seats in which party A has more votes than party B, f = the number of seats in which party B has more votes than party A, R = the average registered electorate in seats where A has more votes than B, and S = the average registered electorate in seats where B has more votes than A, all when A and B received the same number of votes.

Table 3: Partisan bias due to malapportionment

State	Year	Winning party	Winning party bias, in % of seats
Andhra Pradesh	2004	Indian National Congress	1.4
Assam	2006	Indian National Congress	1.6
Bihar	2000	Rashtriya Janata Dal	0.9
Gujarat	2007	Bharatiya Janata Party	-15.8
Haryana	2005	Indian National Congress	-3.2
Himachal Pradesh	2007	Bharatiya Janata Party	1.0
Jammu & Kashmir	2002	Jammu & Kashmir National Conference	7.5
Karnataka	2004	Bharatiya Janata Party	-4.7
Kerala	2006	Communist Party of India (Marxist)	-0.6
Madhya Pradesh	1998	Indian National Congress	1.3
Maharashtra	2004	Nationalist Congress Party	1.0
Orissa	2004	Biju Janata Dal	-1.3
Punjab	2007	Shiromani Akali Dal	0.0
Rajasthan	2003	Bharatiya Janata Party	1.7
Tamil Nadu	2006	Dravida Munnetra Kazhagam	-4.2
Uttar Pradesh	1996	Bharatiya Janata Party	-1.5
West Bengal	2006	Communist Party of India (Marxist)	-0.6
States where winning party malapportionment bias is positive:			9
States where winning party malapportionment bias is negative:			8

lators due to "a fear of change." [39] While this may be a reasonable rationale for individual legislators to support the freeze in reapportionment once it was proposed, it is not a strong enough reason for Congress party leaders to have introduced the freeze in the first place since it would, by strengthening individual incumbents, weaken party leaders vis-à-vis legislators. In fact, much of Mrs. Gandhi's actions at the time were explicitly designed to undercut individual legislators.[40] This rules out a "fear of change" as a reason why the freeze in reapportionment was proposed, although it might help explain why the freeze has been sustained all these years.

To summarize, I have argued that the freeze in malapportionment—which is the deep cause of malapportionment—was genuinely instituted to curb population growth. It was probably sustained thereafter to further this objective, and due to a fear of redrawing bound-

[39] Sivaramakrishnan 2008.
[40] Frank 2001.

aries on the part of individual legislators. Given this, the precise degree of malapportionment across state constituencies will depend on differences in birth and death rates, and rates of in and out-migration between state-level constituencies. Of these two, the first is likely to be the major cause of malapportionment in India, since poverty levels and caste and linguistic fragmentation constrain the movement of people within the country.[41] Since constituency-level fertility and death rates are not directly manipulable by politicians, I argue that malapportionment is plausibly exogenous to the outcomes that we consider below. That said, and as mentioned, a number of the robustness tests I employ below directly address the possibility that constituency populations are manipulated by politicians at the margin.

4 Evidence

Table 4 presents the results of logistic regressions of the effects of malapportionment on cabinet inclusion. The first regression estimates the bivariate relation between the malapportionment score and a dummy for cabinet inclusion, showing that the two are positively related to one another, which is the opposite of what we would expect. The next regression controls for over 3,500 constituency fixed effects, and thereby estimates the effects of changing malapportionment within constituencies. This controls for a variety of unobserved factors that are fixed or only vary slightly over time, including land area, the proportion of minorities, reservations,[42] and so forth. The estimated effect of malapportionment now takes on its expected negative sign. Being from a larger than average constituency, *ceteris paribus*, reduces the chances of a representative being in the cabinet. As the next regression shows, these results remain robust to the inclusion of 115 legislature (that is, state-year) fixed effects. These fixed effects control for cabinet formation opportunities, and therefore for factors such as patterns of political competition, national and state electoral waves and

[41] Indeed, data suggests migration rates of only 6-10% for Indian males. See Munshi and Rosenzweig 2009.

[42] Some seats are "reserved" for scheduled castes and tribes in India, wherein only members of these groups can run for office from these constituencies. The electorate in these locations remains, as elsewhere, all resident citizens above the age of 18. Scheduled castes and tribes are disadvantaged groups—"lower castes" and aboriginals, respectively—identified as recipients of preferential policies in India's constitution.

cabinet size. They also control for some time-varying factors: specifically, those that vary by state and over time, such as levels of economic development.[43] This is my preferred specification, since it controls for the greatest possible confounds. It indicates that an increase in malapportionment is, as predicted by H_1, associated with a decrease in the chances of cabinet inclusion.

Table 4: Logistic regressions for the effects of malapportionment on cabinet inclusion

Dependent variable:	Legislator in cabinet?			
	1	2	3	4
Malapportionment score	0.666***	-0.832***	-0.715**	-0.797**
	(0.122)	(0.305)	(0.319)	(0.392)
Malapportionment X				0.128
Above avg. effective no. of parties				(0.351)
Constituency fixed effects?	N	Y	Y	Y
State-year fixed effects?	N	N	Y	Y
Observations	23,885	11,375	11,375	11,375
Pseudo R-squared	0.00	0.00	0.05	0.05
Marginal effect of malapportionment	0.068***	-0.176***	-0.162***	-0.177***

Notes: The dependent variable is a dummy for whether legislators are in the cabinet. Standard errors in parentheses. Standard errors for regressions 2–4 are clustered by constituency. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

It worth noting that these regressions deliberately do not control for whether legislators are members of the largest party or coalition, since doing so would lead to "post-treatment bias."[44] Malapportionment could indirectly affect cabinet inclusion *through* its effect on the odds of relatively small constituencies being in the largest party. Indeed, this is what the first mechanism proposed in the theory section argues. This makes controlling for being in the largest party an appropriate way to test for the mechanism by which malapportionment

[43]The only factors not controlled for in this specification are time-varying within-constituency characteristics that are not controlled for by state-year fixed effects. It is not clear what these factors would be, however. For example, the data suggest that education and income are largely controlled for using state-year and constituency fixed effects. (Regressions with measures for education and income—literacy and non-worker rates, respectively—specified as the dependent variable, and constituency and state-year fixed effects as controls, have adjusted R-squareds of 99 and 95%, respectively. For this exercise, data for the dependent variables are from Bhavnani and Jensenius 2015 and are interpolated.) Also, as I report later, the results are robust to controlling for the degree of electoral competition at the constituency level. I do not control for this variable in the main analysis since electoral competition is arguably affected by malapportionment (in other words, it is assigned post-treatment).

[44]King 1991; King and Zeng 2007; King 2010.

affects cabinet inclusion. I conduct this exercise below, when I consider the mechanisms through which malapportionment has its effects.

The estimated impact of malapportionment on inclusion in the cabinet is large: a standard deviation (0.16) increase in a constituency's malapportionment score leads to a 2.6 percentage point fall in the probability that the constituency's representative is in the cabinet. Given that an average of 12% of legislators are in the cabinet, this means that malapportionment reduces the probability of a legislator being in the cabinet by 22%. This effect is non-trivial, particularly given the considerable agenda-setting, supervisory and spending powers that cabinet members have.[45]

The preceding analysis suggests that a citizen from a large constituency faces two distinct, empirically decomposable penalties to his or her representation in the executive due to malapportionment. The first of these is mechanical, and is simply caused by the fact that cabinet members are drawn from a malapportioned legislature. Recall that a citizen's vote in a constituency with a malapportionment score of 1.16 (that is, in a constituency that is a standard deviation larger than the average constituency) is worth $1/1.16 \approx 0.86$ times the vote of a person in a correctly-apportioned constituency. If cabinet members were drawn from the legislature without regard to constituency size, 0.86 would also be the value of this person's vote in the executive. Second, per H_1, we know that large constituency representatives suffer the penalty of not being selected into the cabinet as often as representatives of smaller constituencies. This devalues the vote of a person from a large constituency by a further 22% (this is, per the discussion above, the fall in the probability of a legislator whose constituency has a malapportionment score of 1.16 being selected into the cabinet) to 0.67. In other words, while malapportionment mechanically leads to a person's vote being worth 0.86 in the legislature, the drawing of cabinets from legislatures leads to the further devaluation in the vote of a citizen from a large constituency to 0.67 in the cabinet.

I conclude this section by considering an observable implication of the account described

[45]Forrester 1970; Panandiker and Mehra 1996.

here. In the period under study, the party system across India's states underwent a dramatic change, with the median number of parties increasing from 2.1 parties in 1977 to 3.5 parties in 2007. This increase in electoral competition was accompanied a near-doubling in median cabinet size from 15 to 27 ministers, as more parties were accommodated in state cabinets. The fragmentation of the party system should have blunted the effect of malapportionment, as cabinet positions became less scarce. To test this observable implication, I interact malapportionment with a dummy for observations with above-average effective number of parties. The result of this exercise, reported in regression 4 of Table 4, confirms that the effect of malapportionment on cabinet inclusion is indeed somewhat attenuated (although, not to a statistically significant degree) as the number of parties increases. This suggests scope conditions for the account proposed in the paper: the effects of malapportionment on cabinet inclusion should particularly hold when there are fewer legislative parties and smaller cabinets.

4.1 Robustness Tests

In this section, I check the robustness of the estimated negative effect of the malapportionment score on cabinet inclusion.

The first three robustness tests address the possibility that politicians influence constituency sizes at the margin. First, note that to the degree that politicians influence constituency growth rates, they are particularly likely to have done so in the years leading up to the reapportionment of their constituencies. Since plans for India's new redistricting, which took effect in 2008, started being drawn up in 2001, I rerun the main specification on pre-2001 data. These observations should be even less affected by politician efforts to influence constituency size. The results are robust to this modification (regression 1 of Online Appendix Table 1). Second, I employ lagged malapportionment instead of malapportionment as the key independent variable (regression 2). Although lagged malapportionment is not exogenously determined, it is predetermined. The results remain robust to this change. Lastly,

I include both malapportionment and lagged malapportionment concurrently (regression 3). Although I do not do this in the main specification due to Nickell bias,[46] the result remains robust to this modification.

To account of the long tails of the distribution of malapportionment, I also confirm that the results are robust to the use of the logarithm of the malapportionment score (regression 4), the reciprocal of the malpportionment score (this is the Relative Representation Index; regression 5), and the logarithm of the RRI (regression 6).

The tests for the effects of malapportionment on cabinet inclusion presented previously used the logistic estimator since the dependent variable is binary. For transparency, I also employ the OLS estimator (regression 7). The main result is robust to this change.

Yet another robustness test that I conduct is to examine the effects of malapportionment across India's national parliamentary seats on inclusion in the national cabinet. The results (presented in Online Appendix Table 2) hold up to the use of these data.[47]

Lastly, I consider whether the results are robust to better controlling for possible omitted variables. To do so, I first confirm that the results are robust to controlling for electoral competition, as measured by the effective number of parties (regression 8 of Online Appendix Table 1).[48] Relatedly, it is worth reiterating that, and as reported in footnote 43, the fixed effects employed in the main specification effectively control for education and income. Second, I employ an alternative research design—comparing cabinet inclusion before and after the redistricting of 2008—to examine whether an abrupt change in malapportionment affected cabinet inclusion. Due to the narrow time period considered, this strategy makes it far less likely that omitted variables are driving the results. That said, this exercise has two drawbacks, which is why I simply use it as a check. First, constituency boundaries *and* malapportionment changed in 2008, which means that this analysis estimates the effect of

[46] Nickell 1981.

[47] I do not employ national data in the main analysis since my argument about the plausible apolitical cause of malapportionment across state-level constituencies does not extend to the national level, and since there were just 9 national coalition formation opportunities (i.e., national elections) as compared with 116 such opportunities across India's states.

[48] I do not control for this variable in the main analysis since it is arguably "post-treatment."

both changes rather than just malapportionment. Second, the reapportionment of 2008 was somewhat endogenous, in that it only occurred in select states.[49] In order to implement this research design, I aggregate the data from constituency to the administrative district level, since while the former were changed by redistricting, the latter remained frozen. Having aggregated the data, I use OLS to estimate the effect of district-level malapportionment (the independent variable) on the proportion of district seats included in the cabinet (the dependent variable). The results are robust to this exercise (see Online Appendix Table 3).

4.2 Mechanisms

Recall that there are two mechanisms by which smaller-than-average constituencies could be advantaged in the cabinet formation process. One of these is *indirect*, in that malapportionment alters the types of constituencies largest parties tend to emerge from, and, therefore, the constituencies that cabinets are drawn from. If the effect of malapportionment on cabinet inclusion runs through altering membership in the largest party, including a dummy for being in the largest party in the main specification should attenuate the estimated effect of malapportionment on cabinet inclusion. If, however, malapportionment has a *direct* effect on cabinet inclusion, by altering the incentives of formateurs or legislators for cabinet inclusion, we should continue to expect a statistically significant association between malapportionment and the cabinet inclusion dummy, even after controlling for being in the largest party. Regression 1 of Table 5 conducts this test, showing that controlling for the largest party severely attenuates the estimated effect of malapportionment such that it is not statistically significant. Malapportionment does not have a statistically significant direct effect on cabinet inclusion, after controlling for inclusion in the largest party. This suggests that malapportionment indirectly affects cabinet inclusion through altering the chances of a constituency being in the largest party.[50]

Two further tests corroborate our account of malapportionment affecting cabinet inclu-

[49]New boundaries were not instituted, so as to not alter the within-state balance of power, in the states

Table 5: Logistic regressions to test how malapportionment affects cabinet inclusion

Dependent variable:	Dummy for legislator in cabinet	Dummy for legislator in largest party	Dummy for legislator in cabinet
Observations:	All	All	Members of largest party
	1	2	3
Malapportionment score	-0.387	-1.015***	0.177
	(0.345)	(0.234)	(0.462)
Dummy for representative in largest party	2.026***		
	(0.071)		
Constituency fixed effects?	Y	Y	Y
State-year fixed effects?	Y	Y	Y
Observations	11,375	21,138	6,230
Pseudo R-squared	0.17	0.10	0.12

Notes: Standard errors, clustered by constituency, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

sion through its effect on being in the largest party. First, regression 2 estimates the effect of malapportionment on the proposed mediating variable, the dummy for being in the largest party. The coefficient on malapportionment suggests that relatively large constituencies are less likely to be in the largest party. This further corroborates the indirect mechanism, since we had argued that malapportionment causes parties, and particularly successful parties, to focus on relatively small constituencies (and that this, in turn, affected the composition of the legislators from the largest party, and therefore cabinet inclusion).

The last regression allows us to test and reject the direct mechanism, that malapportionment affects cabinet formation due to the incentives of formateurs or individual legislators (regression 3). It does so by restricting the observations to constituencies represented by members of the largest party, and tests for the effect of malapportionment on cabinet inclusion within this subset of observations. If the direct mechanism is correct, relatively small constituencies within the largest party should be favored for cabinet inclusion due to

of Arunachal Pradesh, Assam, Jammu and Kashmir, Jharkhand, Manipur, and Nagaland.

[50] An observable implication of this mechanism is that there should be more competition to secure party tickets/nominations from the largest parties in smaller-than-average constituencies. Testing this hypothesis would require systematic data on those who wish to receive party nominations. Unfortunately, these data do not exist in India in any systematic manner, since party tickets are given out on a non-transparent basis, without the use of primaries.

the previously outlined cost-minimizing incentives of formateurs and the benefit-maximizing incentives of individual legislators. Malapportionment, however, is not statistically significantly correlated with cabinet inclusion in this subset of observations (in fact, the magnitude of the coefficient is positive, the opposite of what we would expect). This is evidence against the direct mechanism.

There are at least three alternative accounts of the findings above that do not rely on the effects of malapportionment on party strategies. First, small constituency representatives could join winning coalitions more often than their counterparts from large constituencies because they are more moveable, perhaps because they are less ideological or more corrupt. Note, however, that we have no theoretical or empirical reason to suggest that the generalizations underlying this mechanism ("relatively small constituencies elect politicians who are more corrupt and less ideological") are true. In fact, a systematic study of the gains to office accrued by politicians in India suggests that these are not correlated with malapportionment.[51] Similarly, the probability that an independent candidate wins office—and being an independent candidate might be indicative of not having a strong ideology—is not any greater in relatively small as compared with relatively large constituencies.

Second, it is possible that formateurs in India are simply ideologically committed to "taking care of" relatively small constituencies, and that they do so by including small constituencies in their coalitions. This alternative mechanism is hard to disprove since any behavior consistent with a rule could be caused by that rule, or by an underlying willingness to follow that rule. It seems unlikely, however, that politicians, who we often assume to be rational beings in every other regard, would consistently include small constituency representatives in important coalitions out of kindness. Including legislators in a winning coalition is, after all, a particularly expensive way for formateurs to manifest their commitment to small constituencies. Further, if this mechanism is true it should arguably hold even after controlling for whether a representative is in the largest party (or when the sample is

[51] Bhavnani 2013.

restricted to members of largest parties). It does not.

A third possibility is that the formateur, in her bid to form a cabinet of highly skilled technocrats, gives them tickets in smaller constituencies because they are easier to win. This explanation does not make sense, however, since legislators typically have preexisting ties with their constituencies, and cannot be assigned to new constituencies at will. Also, this account assumes that there is a trade-off between someone who is politically competent and a technocrat, which does not have an empirical basis.

5 Conclusions

I have argued and empirically demonstrated—using data from 116 government formation episodes across India's states from 1977–2007—that malapportionment in India doubly penalizes people from larger-than-average electoral districts or constituencies by descriptively underrepresenting them in the legislature and in the executive. The latter newly-uncovered effect is normatively problematic, insofar as malapportionment—which is a morally irrelevant to whether a person should have equal representation—affects the degree to which a person is represented in the cabinet. The effect of malapportionment on cabinet inclusion could have substantive costs for the underrepresented as well, since ministers are typically much more powerful than the average legislator in these and other parliamentary systems.[52]

The paper shows that the advantages shown to be enjoyed by small constituencies in contexts such as the U.S. Senate carry over to winning coalitions in India, albeit through a very different, indirect mechanism. By creating more smaller-than-average constituencies than larger-than-average constituencies, malapportionment incentivizes political parties—particularly large ones that form governments—to focus on relatively small constituencies. Since formateurs' parties tend to be composed of these constituencies, their cabinets are also disproportionately drawn from relatively-small constituencies.

The scope of the findings of this paper are broad. I expect the effects uncovered here to

[52]Forrester 1970; Laver and Shepsle 1994; Panandiker and Mehra 1996; Siaroff 2003.

hold in systems where the composition of the legislature affects cabinet formation. This is most obviously the case in parliamentary systems, since cabinets are drawn from the legislature in these systems. However, it also obtains in some presidential and semi-presidential systems, where the partisan composition of legislatures are thought to influence the composition of the cabinet.[53] Lastly, since the effect of any factor—including malapportionment—is likely to be attenuated when cabinets are larger, malapportionment will likely particularly affect cabinet inclusion in contexts with fewer legislative parties and smaller cabinets.

The findings of this paper suggest a number of avenues for future research. Most obviously, research should focus on examining whether the effects of malapportionment uncovered here do indeed hold in other contexts, particularly those suggested in the previous paragraph. Second, scholarship should examine the downstream effects—via cabinet inclusion—of malapportionment. Although the fact that cabinets dominate parliaments in many parliamentary systems,[54] including in India,[55] suggests that these effects could be large, this is an empirical question that warrants future work. Does malapportionment—in addition to formally over- and under-representing peoples in legislatures and cabinets—also affect spending patterns and socio-economic outcomes?

Investigating the socio-economic impacts of malapportionment is particularly important in the context of India, where the literature on malapportionment has been mainly descriptive. I dwell on some of these possible effects. Recall that while I have shown that malapportionment has not consistently benefited any one party across India's states, I have documented that rural areas, and some slow-growing urban ones, have been overrepresented due to malapportionment. Interestingly, the overrepresentation of rural areas is consistent with India's "rural bias,"[56] the existence of which is puzzling in cross-national perspective since most developing countries favor urban areas due to the security threat that they

[53]Neto 2006 argues that presidents that follow a "statutory strategy" are influenced by the partisan composition of legislatures.

[54]Laver and Shepsle 1994; Siaroff 2003.

[55]Forrester 1970; Panandiker and Mehra 1996.

[56]Bardhan 1984; Varshney 1995.

pose.[57] The overrepresentation of slow-growing urban areas due to malapportionment is consistent with another aspect of India's political economy, namely, the favoring of these areas—oftentimes dominated by parastatals and old industries such as Mumbai's mills—by the Indian state.[58] Of course, research would need to show that malapportionment has a causal impact on these aspects of India's political economy, but the broad patterns are suggestive.

Lastly, this paper draws our attention to an unfortunate and ironic turn in India's politics. The country's founders recognized "the principle of one man one vote and one vote one value," in the constitution, and hoped that an equal politics would be a base from which Indians could challenge the country's crushing socio-economic inequities.[59] However, successive governments have sacrificed the principal of political equality in the symbolic pursuit of a specific (population control) policy. That this has impacted cabinet inclusion means that the political system has not remedied or merely reflected India's inequities, but that it has exacerbated them.

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[57] Bates 1981; Wallace 2014.
[58] Rodrik and Subramanian 2005; Chari and Gupta 2008.
[59] Ambedkar 1949, 979.

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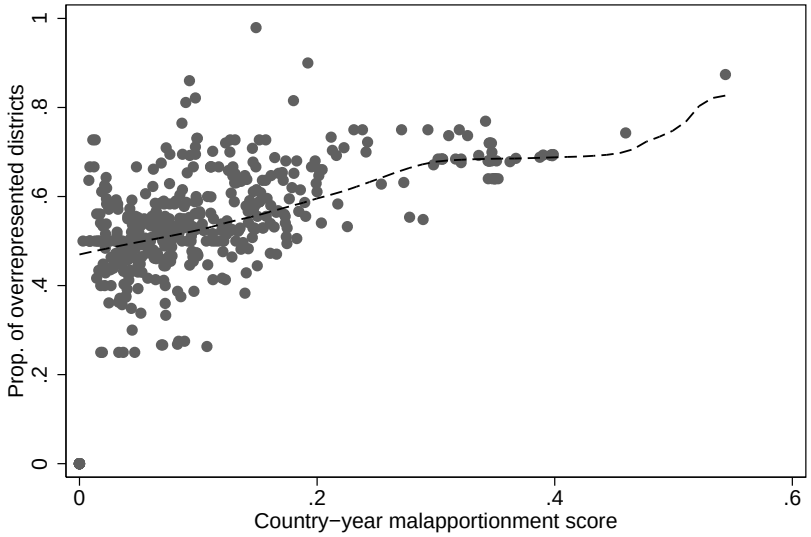
Online Appendix for Bhavnani, Rikhil R. Forthcoming. "The Effects of Malapportionment on Cabinet Inclusion: Subnational Evidence from India," *British Journal of Political Science*.

Online Appendix Figure 1: The cross-national relationship between malapportionment and the proportion of overrepresented districts



Notes: Data are calculated using the Constituency-Level Elections Archive (Kollman et al 2014) and are for 447 country-years. The malapportionment score (M) for each district or constituency is calculated as $v_{i,c,t}/\bar{v}_{c,t}$, where v is the electorate size for a district, $\bar{v}$ is the average electorate size per district, and i, c, and t denote the district, country and year, respectively. An overrepresented district is a relatively small one, with a malapportionment score that is less than 1. The malapportionment score for each country-year is calculated as $(\sum |M-1|)/2$. It may be interpreted as the proportion of legislative votes that would need to be reallocated to ensure equal representation.

Online Appendix Table 1: Robustness tests for the effects of malapportionment on cabinet inclusion

Sample:	Pre-2001	Full	Full	Full	Full	Full	Full	Full
Estimator:	Logit	Logit	Logit	Logit	Logit	Logit	OLS	Logit
	1	2	3	4	5	6	7	8
Malapportionment score	-0.758**		-1.032**				-0.0624*	-0.750**
	[0.384]		[0.466]				[0.0323]	[0.322]
Lagged malapportionment score		-0.662*	-0.0484					
		[0.388]	[0.477]					
Log malapportionment score				-0.608*				
				[0.330]				
Relative Representation Index					0.418*			
					[0.253]			
Log Relative Representation Index						0.608*		
						[0.330]		
Effective number of parties								-0.405***
								[0.0438]
Constituency fixed effects?	Y	Y	Y	Y	Y	Y	Y	Y
State-year fixed effects?	Y	Y	Y	Y	Y	Y	Y	Y
Observations	9,187	9,015	9,015	11,375	11,375	11,375	23,885	11,375
Pseudo R-squared	0.05	0.04	0.04	0.05	0.05	0.05		0.06
Adjusted R-squared							0.02	

Notes: Standard errors, clustered by constituency, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Online Appendix Table 2: Logistic regressions for the effects of malapportionment on cabinet inclusion, national data

	1	2	3
Malapportionment score	-0.126	-1.113	-1.022
	(0.265)	(0.690)	(0.729)
Constituency fixed effects?	N	Y	Y
Year fixed effects?	N	N	Y
Observations	4,820	2,249	2,249
Pseudo R-squared	0.00	0.00	0.09
Marginal effect of malapportionment	-0.01	-0.207***	-0.201**

Notes: Standard errors, clustered by constituency, in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Online Appendix Table 3: District-level OLS regressions for the effects of district-level malapportionment on cabinet inclusion, using pre- and post-reapportionment data

	1	2	3
District malapportionment score	0.396	-1.139*	-1.077**
	(0.371)	(0.649)	(0.480)
District fixed effects?	N	Y	Y
State-year fixed effects?	N	N	Y
Observations	875	875	875
Centered R-squared	0.00	0.55	0.57

References

Kollman, Ken, Allen Hicken, Daniele Caramani, David Backer, and David Lublin. 2014. Constituency-Level Elections Archive. Produced and distributed by Ann Arbor, MI: Center for Political Studies, University of Michigan.