

## Malapportionment and ideological bias in Chilean electoral districts

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May 18, 2015

### **Abstract**

Chile's legislative electoral system has long been criticized for its unique two-member district system, and the sharp seat thresholds it imposed, and for malapportionment. Both characteristics are widely regarded as having been adopted to favor the ideological right over the left. The electoral reform of 2015 replaced almost all the two-member districts with higher magnitudes, but it reduced malapportionment much less, and the Chilean Chamber of Deputies and Senate remain among the most malapportioned legislative chambers in the world. Using a new measure of district-level ideological preferences based on presidential election results since 2000, however, this analysis finds no evidence that malapportionment produced ideological bias in elections since 2000 under the pre-reform system, nor that it will produce any bias in the new, post-reform districts.

## Introduction

Chile completed a landmark electoral reform in May 2015, abandoning its unique system by which all legislators – deputies and senators alike – were elected in two-member (a.k.a. *binominal*) districts. In the new system, district magnitudes range from three to eight in the Chamber of Deputies, and from two to five in the Senate, as shown in Table 1.<sup>1</sup>

Table 1. Chilean Congress – District structure pre- and post-reform

	Chamber		Senate	
	Pre-Reform	Post-Reform	Pre-Reform	Post-Reform
Number of Districts	60	28	19	15
District Magnitude	2	3 – 8	2	2 – 5
Total Seats	120	155	38	50

The *binominal* system's origins in the military dictatorship of General Augusto Pinochet engendered skepticism about its fairness, and critics of the system have long argued that it generated bias in favor of the ideological right (Scully 1997, Fuentes 1999), the main sources of which were regarded to be:

- **Seat Thresholds:** With two-member districts and the d'Hondt formula, the first seat is awarded to the largest list, and the second to the second-largest list, *unless* the largest list more than doubles the vote total of the second list. If the distribution of votes across lists is such that one coalition consistently places first, but rarely doubles the second-place coalition, the second-place coalition can convert its vote support into representation more efficiently than the first-place coalition – a rarity in the world of electoral systems (Rae 1967).
- **Malapportionment:** There was inequality of population across districts, with districts that leaned toward the ideological right initially favored with more legislators per population than districts that leaned left (Rojas and Navia 2005).

Most of the debate over bias in the Chilean system focused on whether and how seat thresholds affect the conversion of votes to seats by the main coalitions that dominated Chilean elections from re-democratization in 1989 through the last elections held under the *binominal* system in 2013. Notwithstanding some contributions that express skepticism about whether the *binominal* system has favored the Chilean right over the left (Carey 2003, Zucco 2007), most analyses conclude that the *binominal* system was adopted to generate exactly such a bias and has been more effective in doing so than any alternative electoral design could have (Scully and Valenzuela 1997, Siavelis 1997, Polga-Hecimovich and Siavelis 2015).<sup>2</sup>

Analyses of malapportionment have been somewhat less contentious. Rojas and Navia (2005) and Polga-Hecimovich and Siavelis (2015) document the connection between

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<sup>1</sup> Lists will remain open, with voters indicating a preference for an individual candidate within party or coalition lists, and each list's vote tally will continue to be converted into seats using the d'Hondt divisor formula.

<sup>2</sup> For the 2013 election, the Communist Party joined the existing *Concertacion* and the coalition re-christened itself the *Nueva Mayoria*.

malapportionment and the motivations of the electoral system designers from the outgoing military government. Districts that supported the Pinochet regime in the 1988 Plebiscite were allocated more Chamber deputies per capita than were districts that supported the "No" vote. Although malapportionment may have favored the right in the early post-transition elections, however, and despite the fact that malapportionment itself grew more pronounced over time, both Rojas and Navia (2005) and Zucco (2007) found that by the early 2000s, changes in voting behavior had eliminated the correlation between the population of a given Chamber district and the vote shares of the two major coalitions. None of these analyses, however, estimate the level of bias in Senate elections, where malapportionment is even more pronounced and where bias from the "original sin" of the system's design might therefore be expected to be more enduring.

By increasing district magnitudes, the 2015 reform raises the number of distinct seat thresholds in most districts, dramatically reducing the prospect that the nationwide distribution of loyalties could translate consistently into bias in seat distributions. The post-reform system remains substantially malapportioned, however, so the matter of bias through malapportionment under the new rules warrants renewed attention. This short analysis first places Chilean malapportionment in international perspective, showing that, even after the 2015 reform, the Chilean Congress remains one of the most malapportioned in the world. Next, I propose a new method of measuring district-level ideology that can be applied to any districts – pre- or post-reform, Chamber or Senate – and use that measure to estimate whether malapportionment produced ideological bias in elections since 2000, as well as whether it should be expected to in future elections. The short answer is that I find no evidence of systematic bias through malapportionment, whether in the Chamber or the Senate, and in neither the *binominal* nor the post-reform districts.

### **Measuring malapportionment**

Malapportionment is the discrepancy between the share of population in a given district and the share of legislative seats the district elects. The standard measure of malapportionment, from Samuels and Snyder (2001) is:

$$MAL = (1/2) \sum |s_i - p_i|$$

where sigma stands for the summation over all districts,  $s_i$  is the share of seats allocated to district  $i$ , and  $p_i$  is the share of the population residing in district  $i$ . Samuels and Snyder (2001) measured MAL for elected national legislative chambers around the world as of the late 1990s. Figure 1 plots Samuels and Snyder's MAL indices for upper and lower chambers for countries with both chambers are popularly elected. Chile ranked as severely malapportioned, with its Senate ninth highest among upper chambers, and its Chamber of Deputies the eleventh most malapportioned among 78 that Samuels and Snyder examined, second only to Bolivia's among legislatures with an elected upper chamber.

Figure 1. Malapportionment across national legislative chambers.

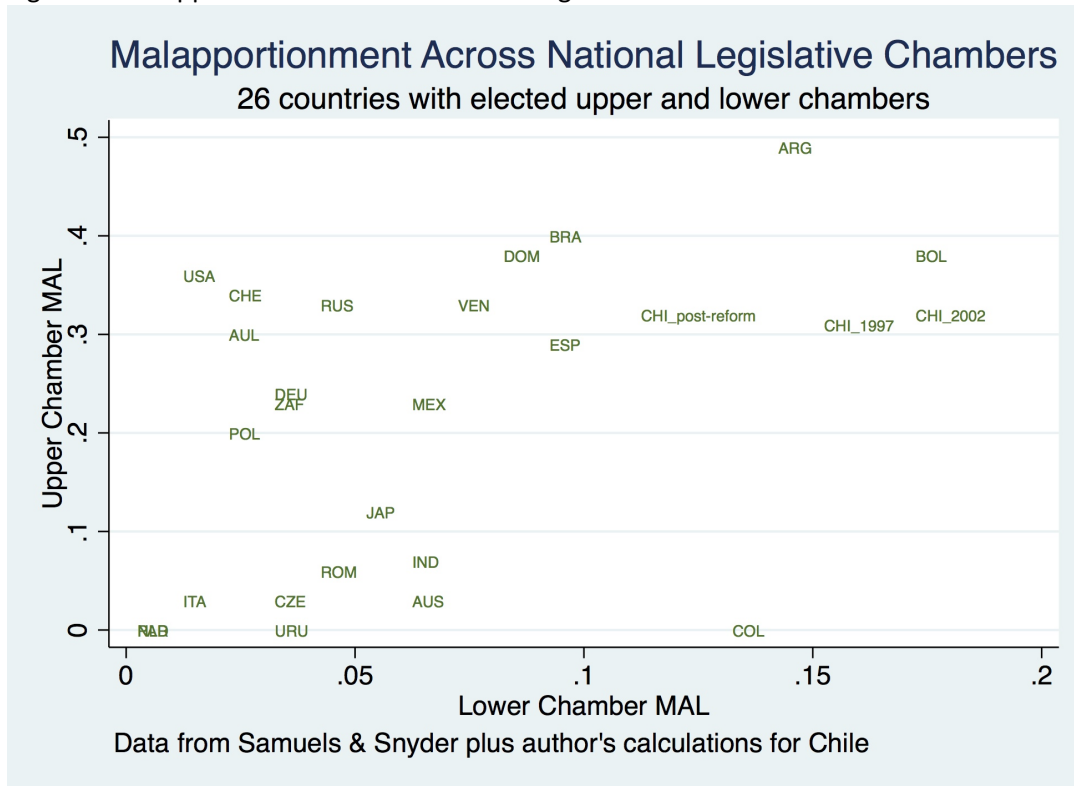
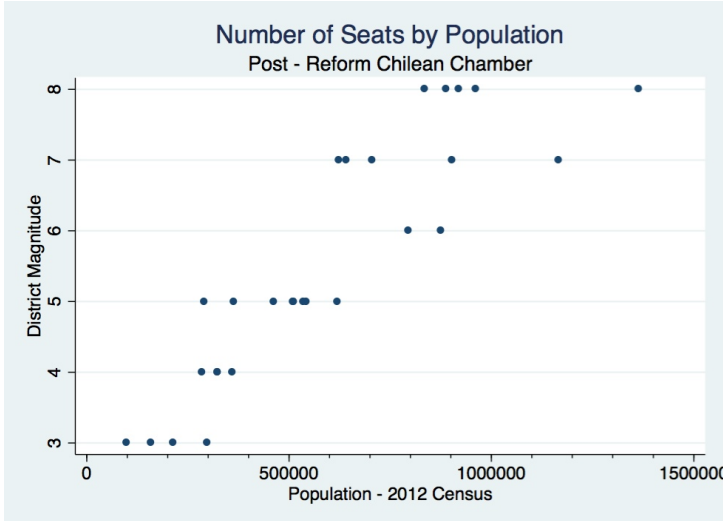


Figure 1 also shows updated MAL indices for Chile, first for the *binominal* districts calculated based on population and voter data from the 2000s, then for the post-reform multi-member districts calculated from population data from the 2012 census.<sup>3</sup> As Rojas and Navia (2005) previously documented, malapportionment increased through the 1990s, as populations in more densely populated, urban districts grew more rapidly than in less populated ones. The 2015 reform substantially reduces malapportionment among Chamber districts, but the Chilean Chamber remains among the most malapportioned in the world. Strikingly, Senate malapportionment is unchanged by the 2015 reform.

Figure 2 plots district magnitude (DM) against population for the twenty-eight new Chamber districts. Note that there are many districts with higher populations but fewer seats than corresponding districts with fewer people and more seats (any dot below and to the right of any other). It is possible to have substantial malapportionment even without such perverse allocations of seats, and it is not clear why such an apportionment should ever occur.

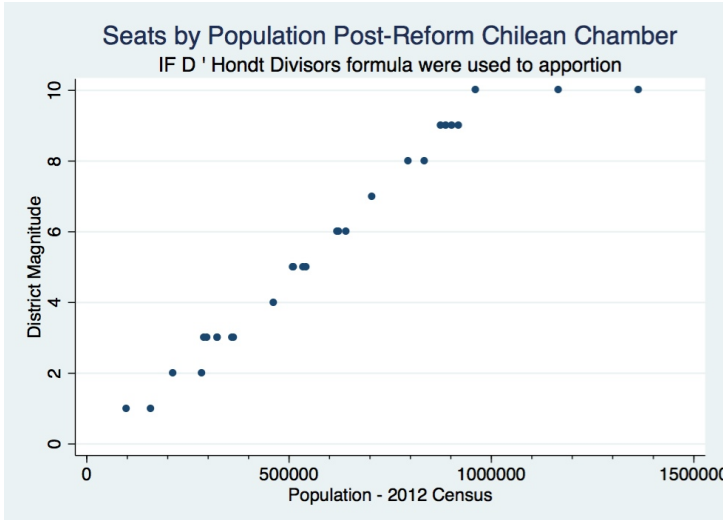
<sup>3</sup> The post-reform figures are calculated from data provided by the Observatorio Politico Electoral at the Universidad Diego Portales, courtesy of Patricio Navia, with population data from the most recent, 2012 national census. The pre-reform Chamber figure is calculated from data drawn from the 2002 census, matched to Chamber districts on Wikipedia ([http://en.wikipedia.org/wiki/Electoral\\_divisions\\_of\\_Chile](http://en.wikipedia.org/wiki/Electoral_divisions_of_Chile)). The pre-reform Senate figure is calculated based on total voters per district rather than population, by aggregating up the total votes cast in each Senate district from the 2001 and 2005 elections as a proxy for the relative district populations.

Figure 2. Seats by population, post-reform Chilean Chamber



For example, Figure 3 plots district magnitude (DM) against population for 155 seats apportioned across the new districts in accordance with population, using the d'Hondt formula of successive divisors.<sup>4</sup> No district with greater population (to the right) of any other has fewer seats. Such a Chamber would still have an element of malapportionment, with MAL=.03, but it would be much more in line with lower chambers in most democracies worldwide.

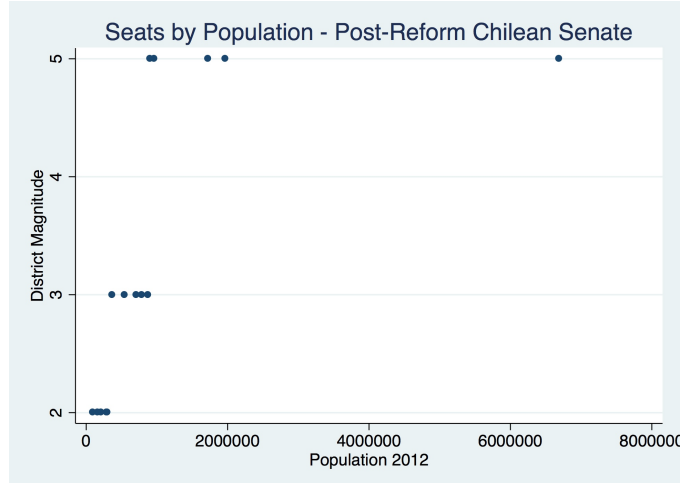
Figure 3. Seats by population, Chilean Chamber apportioned by d'Hondt



Despite the fact that the 2015 reform increased the number of Senate seats, reduced the number of districts, and so increased the magnitude of many districts, the Chilean upper house will be as malapportioned as it was before the reform, and slightly *more* malapportioned than it initially was the 1990s. Figure 4 plots the new district magnitudes against population for the fifteen districts.

<sup>4</sup> D'Hondt is the formula used by the United States (MAL=.014) to apportion seats in the House of Representatives across the 50 states.

Figure 4. Seats by population, post-reform Chilean Senate.



There are no cases of more populated districts being given fewer seats than less populated ones, as in the Chamber, but the Santiago Metro region's nearly 7 million inhabitants are dramatically underrepresented with only five senators, the same number as the Talca or Temuco regions, each with a population under 1 million. Using a pure d'Hondt formula to apportion seats in the post-reform Senate would not be feasible as the districts are currently configured, as each of the least populated four districts would warrant no representation at all. If d'Hondt were modified such that every district were guaranteed a minimum of two seats (as now), however, malapportionment could still be dramatically reduced by redistributing seats from the mid-sized districts to the Santiago Metro region, with the effect of more than doubling the capital's seat total of five.

### Measuring district ideology

To determine whether the apportionment of seats confers ideological advantage, I need a measure of voter preferences at the district level. Legislative election results have been systematically imperfect metrics of district partisan preferences during the *binominal* era because the major coalitions allocated their two nominations within each district in negotiations that involved their multiple component parties, with parties forfeiting the right to nominate in some districts in exchange for favorable slots in others (Carey & Siavelis 2005). Rather than use legislative election results, then, I rely on presidential contests.

Specifically, I look to the four Chilean presidential contests that proceeded to a second round pitting a single candidate from the center-left against one from the center-right. Because minor candidates, who can split the vote one or the other side of the spectrum during a first-round election have been eliminated, the run-off elections provide a simple and clean measure of district preferences on a left-right ideological scale. Four presidential elections resulted in run-offs, listed below with the leftist candidates first and the winning candidate *italicized*:

- January 2000 – *Ricardo Lagos* (Party for Democracy) vs. Joaquin Lavin (Democratic Independent Union)
- January 2006 – *Michelle Bachelet* (Socialist) vs. Sebastian Pinera (National Renovation)

- January 2010 – Eduardo Frei (Christian Democrat) vs. *Sebastian Pinera* (National Renovation)
- December 2013 – *Michelle Bachelet* (Socialist) vs. Evelyn Mattei (Democratic Independent Union)

To measure district ideology, I begin with data on presidential votes at the level of comuna, the smallest administrative sub-unit in Chile.<sup>5</sup> Vote tallies at the comuna level can be aggregated up to the level of the pre-reform, *binominal* districts, and the post-reform, multi-member districts for both the Chamber and the Senate. For each of presidential run-off election, I calculate the vote tallies for each candidate in each comuna, using data from the Chilean Servicio Electoral website (Servicio Electoral de Chile 2015a). Then I match those data with other data on the composition of the pre- and post-reform Chamber and Senate districts to aggregate tallies from the comuna level up to the level of each of the four types of districts (Servicio Electoral de Chile 2015b, Observatorio Político Electoral 2015; Senado de Chile 2015). I tally up all the votes cast in each type of legislative electoral district for all four leftist candidates and all four rightist candidates across the set of run-off elections, then calculate a the overall leftist vote share as a single, district-level measure of ideology. Tallying across elections reduces the potential impact of election-specific idiosyncrasies (e.g., the local appeal of a specific candidate) that might otherwise distort the district-level estimate. Summaries of the district-level leftism statistics across the four elections, three of which were won by the leftist candidate and one by the rightist, are shown in Table 2.

Table 2. Leftist share of two-party vote in presidential run-off elections, 2000-2013

	Chamber Districts		Senate Districts	
	Binominal	Post-Reform	Binominal	Post-Reform
Median	.59	.57	.57	.58
Minimum	.31	.43	.50	.51
Maximum	.72	.65	.65	.65

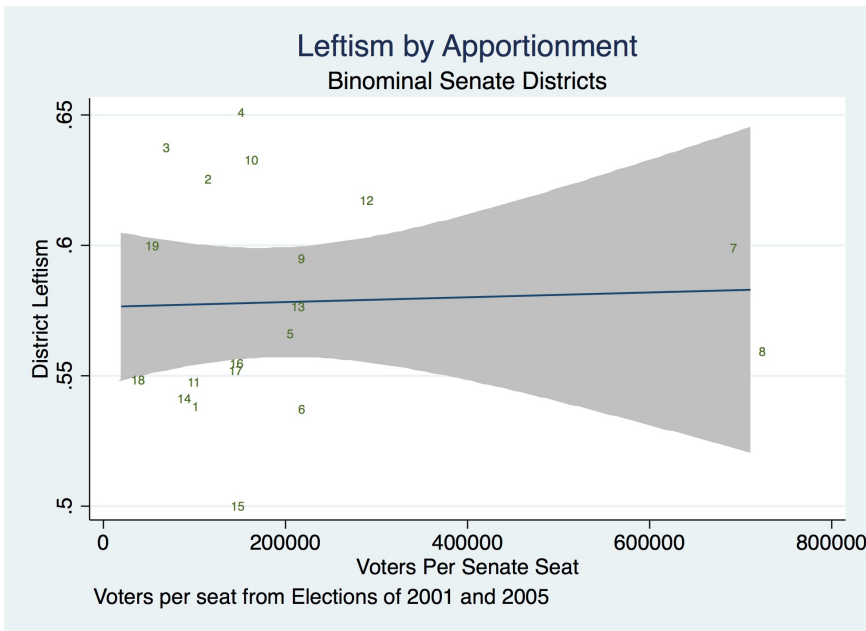
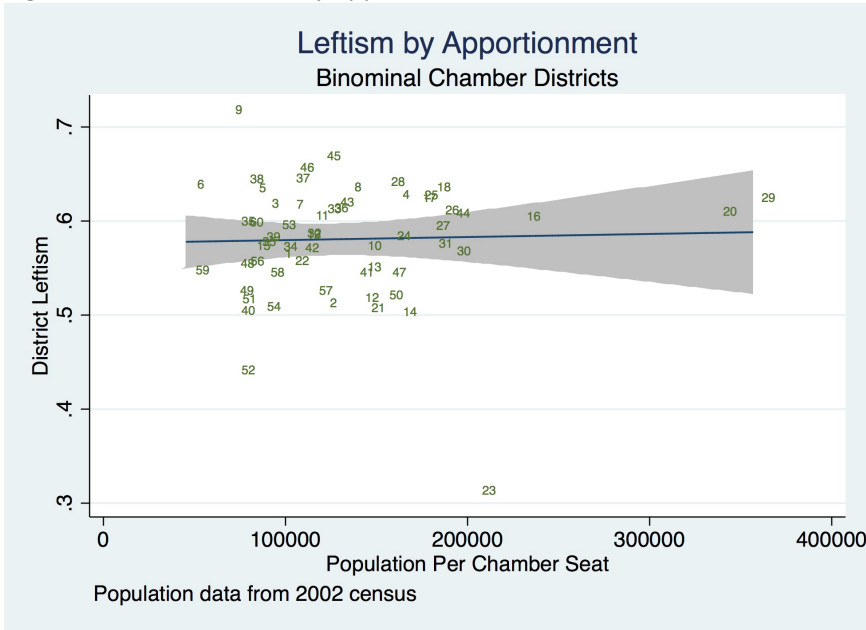
**No evidence of ideological bias**

Figures 5 and 6 plot district leftism, on the Y-axes, against how well represented the district was in the *binominal* Chamber (Figure 5) and Senate (Figure 6) based on population during the 2000s. Best-fit lines with 95% confidence intervals are imposed on the scatters. Districts that are over-represented relative to population are further to the left on the X-axes, and under-represented districts (with greater population per representative) are to the right. Thus, an upward-sloping line would indicate that malapportionment produces bias in favor of the right, and a downward slope would indicate bias in favor of the left.

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<sup>5</sup> There are 346 comunas, grouped into 54 provinces, which themselves are grouped into 15 regions.

Figures 5 and 6. Leftism by apportionment in the *binominal* Chamber and Senate

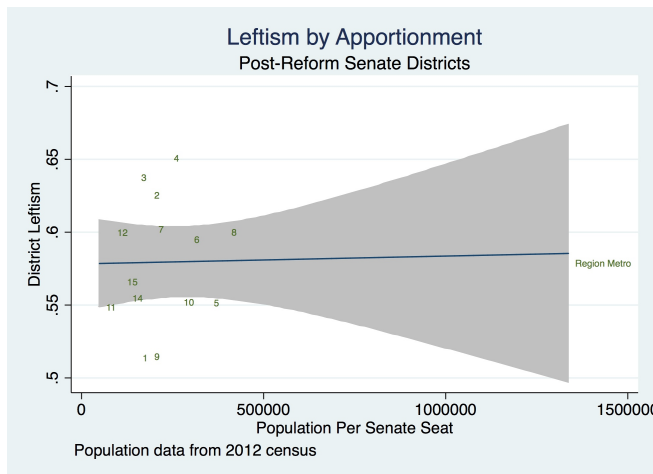
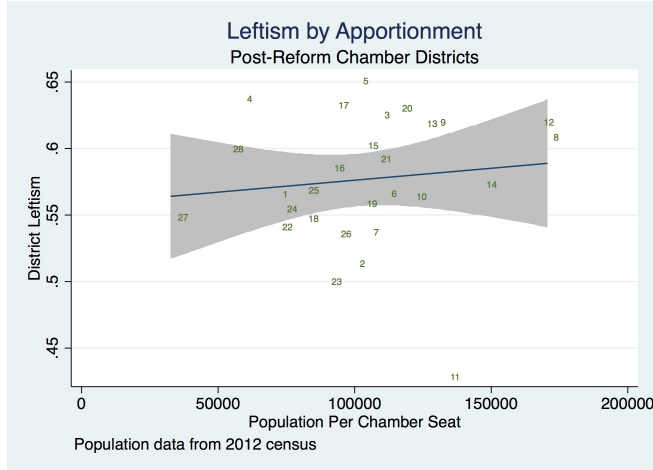


The best-fit lines are flat. Based on the election results since 2000, there is no evidence of any correlation between the ideological preferences of voters in the *binominal* districts and how over- or under-represented the districts were in the Chamber or in the Senate.

Figures 7 and 8 show analogous scatterplots for the post-reform Congress. There is a slight upward slope to the best-fit line for the post-reform Chamber, suggesting a mild pro-rightist bias from malapportionment in the new Chamber districts, but the relationship is not even close to statistically significant ( $p=.56$  in a bivariate regression). For the Senate, the best-fit line is, again, completely flat. Note that the Santiago Metro region continues to stand out for its severe under-representation.



Figures 7 and 8. Leftism by apportionment in the post-reform Chamber and Senate



### Conclusion

Chile's old, *binominal* system was often decried as favoring the right. The 2015 electoral reform eliminated the most controversial source of bias, the unique set of seat thresholds inherent in two-member district competition. It also reduced the second potential source of bias, malapportionment, somewhat, although substantial malapportionment remains in the post-reform system.

Using a measures of district ideology based on presidential elections since 2000, this analysis finds no evidence that malapportionment produced ideological bias under the old system, nor any reason to expect it will produce such bias in the new one. This does not mean malapportionment is innocuous. It is not clear why any Chamber district with greater population than another should be allocated fewer seats. Chile could reduce malapportionment across the new districts dramatically. Nevertheless, the apportionment system adopted in 2015 does not appear to be stacked in favor of either left or right. To sum up, the principle of vote equality – or "one person, one vote" – continues to be violated in Chilean legislative elections, but there is no evidence that malapportionment will skew electoral outcomes across districts according to their ideological predispositions.

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