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Coalition incentives and party bias in Chile

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ABSTRACT

This article revisits the debate over Chile's binomial electoral rules and its consequences and examines how the new electoral system conceived by a democratic congress altered political competition. It utilizes a seat-vote model of multiparty competition to analyze party bias under the binomial rule. This approach differs substantively from prior studies of the Chilean case that focused primarily on the disproportionality of aggregate results. In contrast to earlier analyses, the findings reveal that the allocation of the seats under the binominal resulted in significant party bias benefiting the main parties of the right. This bias, however, was eliminated after the electoral reform. The new rule continues to provide majoritarian benefits to parties receiving larger shares of votes, but this effect is less pronounced than before. It is now easier for small parties to gain seats, which has increased party fragmentation. However, we show that coalition incentives, which were heralded as one of the main advantages of the binomial rule, are also significant under the new rule in use since 2017.

1. Introduction

During the late 1980s, the outgoing military government of Chile designed political institutions with the deliberate goal of influencing the future workings of democratic politics. One central aspect of the dictatorship's design was the electoral system, which structured legislative elections for a quarter-century until a reform changed it in 2015. The rule, which entailed an open list proportional representation system with districts of magnitude equal to two, came to be known as the *binomial*.

The Chilean electoral system received significant attention from the comparative politics literature, which sought to assess its implications for political competition, legislative behavior, and governance (Guzmán, 1993; Magar et al., 1998; Polga-Hecimovich and Siavelis, 2015; Rabkin, 1996; Zucco, 2007). It also generated a heated debate within Chile about its merits and the need to reform it (Auth, 2006; Balbontín, 2005; Carey, 2006; Fuentes and Ríos, 2007; Gamboa, 2009; Nohlen, 2006; von Baer, 2009). One central aspect of this debate revolved around the bias embedded into the system and who benefited from this design. Detractors of the binomial pointed not only at its original sin – being gestated by the military dictatorship that governed Chile between September 1973 and March 1990 – but also at the detrimental consequences for political competition and representation that they associated with the workings of the rule. Defenders of the binomial tended to stress other aspects of political competition, such as its incentives for coalition formation, which they argued contributed to the governability of the country.

Opposition to the binomial reached a critical point following the 2013 parliamentary elections, and after 26 failed attempts, the electoral rule was changed by increasing district magnitude (to an average of 5.5) while retaining the open list (Gamboa and Morales, 2016). The new electoral rule, implemented for the first time in 2017, allocates seats in a peculiar manner: first, it distributes seats to lists based on their vote shares using a d'Hondt formula; second, it distributes seats within lists based on the votes received by each party also using a d'Hondt formula; and third, it assigns seats within parties to the candidates with the most votes. The new electoral rule was expected to enhance proportionality in the allocation of seats, at the cost, some presumed, of increasing party fragmentation and reducing incentives for coalition formation.

In this paper, we revisit the debate over the binomial and its consequences and examine how the new electoral system conceived by a democratic congress altered political competition, including in some apparently unintended ways. More specifically, our contribution to the literature on electoral systems is threefold. First, we utilize a seat-vote

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model of multiparty competition to analyze party bias under the binomial rule. This approach differs substantively from prior studies of the Chilean case that focused primarily on the disproportionality of aggregate results. Our findings reveal that, despite arguments to the contrary, the allocation of the seats under the binominal resulted in significant party bias benefiting the main parties of the right. Second, we show that the new proportional representation rule effectively eliminated party bias. While the new rule continues to benefit parties receiving larger shares of votes, this effect is less pronounced than before. It is now easier for small parties to win seats, which has increased party fragmentation. Finally, we show that coalition incentives, which were heralded as one of the main advantages of the binomial rule, are also significant under the new rule in use since the 2017 election.

The rest of this paper is divided into two main parts and a brief conclusion. The next part addresses the binomial system. After a brief review of previous assessments of the binomial and its implications, two separate subsections analyze coalition incentives and measure party bias. The following part focuses on the new proportional representation rule in place since 2017. A description of the context surrounding the reform is followed by an analysis of coalition incentives and party bias. The last section concludes.

2. The binomial system

In Chile, the idea of setting up uniform two-member electoral districts was first advanced in 1984 by Arturo Marín Vicuña, an advisor to General Augusto Pinochet's former Minister of the Interior, as part of ongoing discussions by a consultative commission established by the government to design a new electoral law (Pastor, 2004). Marín Vicuña (1986)) believed that implementing uniform two-member districts across the country would reduce the fragmentation that had characterized the Chilean party system before the coup and promote moderation among competing parties.[1] He was eventually assigned to help craft the new electoral law shortly before the military government held a decisive national referendum in 1988, which asked Chileans whether Pinochet should extend his rule for another eight years. The share of "Yes" votes in the referendum was 44%, which gave advocates of the binomial greater ammunition to push for its enactment. Since the rule assures one of the two seats for the list receiving one-third of the district vote, it seemed (a priori) an advantageous rule to assure a significant share of congressional seats for the rightist coalition made up of many key supporters and collaborators of the outgoing military government.

It was clear not long after the return to democracy that one of the intended goals of the electoral rule, a reduction in party fragmentation, had not been achieved, or at least not to the degree expected by its designers (Altman, 2006; Cabezas and Navia, 2005). However, the binomial succeeded in restructuring political competition by creating incentives for multiple parties to coalesce into two stable coalitions (Carey, 2006; Siavelis, 2000; Tironi and Agüero, 1999; Valenzuela, 2005). In Chile's multiparty context, reaching the minimum votes necessary to win one seat was very difficult for any party running by itself, as we will show in the next section.

The pattern of alliances that emerged followed partisan positions regarding the referendum on the continuation of the military government. These coalitions, which changed names over time, were commonly referred to as *Concertación* and *Alianza*. The former was a center-left coalition that included the Christian Democratic Party (DC), the Party for Democracy (PPD), the Socialist Party (PS), and the Radical Social-Democratic Party (PRSD). The latter was a rightist coalition formed by the National Renewal Party (RN) and the Independent Democratic Union (UDI). Independent candidates and smaller parties, including the Communist Party (PCCH), also competed in several congressional districts but rarely succeeded in winning seats. In the elections of 2009, the PCCH run candidates on the same list with the *Concertación* parties, and in 2013, the two formally allied under the new banner *Nueva Mayoría*.

The extent to which the binomial rule helped moderate political competition, another purported goal, remains debatable. Despite arguments to the contrary (Guzmán, 1993; Rabkin, 1996), formal analyses of the incentives derived from the binomial rule have demonstrated the absence of centripetal incentives (Dow, 1998; Magar et al., 1998; Calvo and Murillo, 2019).[2] That is, in congressional elections, competition for votes leads parties away from the median voter. Moreover, any moderating effects in the post-1989 party system were likely the result of ideological changes among Chilean parties unrelated to the electoral rule (Alemán, 2009; Carreras, 2012).

A more controversial assertion regarding the binomial electoral system was that it biased results in favor of the right-wing coalition, the heirs of the rule-designers. Several authors claimed that the electoral rule benefited the rightist coalition over the *Concertación* (Borzutzky and Weeks, 2010; Garretón, 2006; Meyer, 2014; Oppenheim, 2007; Rahat and Sznajder, 1998; Siavelis, 1997). Others, however, contested this claim and argued that in translating votes into seats, the rule overrepresented both coalitions similarly (Carey, 2006; Fuentes and Ríos, 2007; Zucco, 2007).[3]

Concerning partisan bias, there is also a lack of consensus. While most analysts agreed that parties running outside of the two main coalitions were systematically hurt, disagreements persist regarding who benefited within the main coalitions. Many identified the DC as the main electoral loser (Fuentes and Ríos, 2007; Scully, 2017; Valenzuela et al., 2016). But according to Boeninger (2008), the DC started as a winner before its advantage dissipated. He also notes that the PS benefited from the support of leftist voters who did not want to waste their votes on candidates outside the two main coalitions. According to Fuentes and Ríos (2007), who look at aggregate results, the parties with the most favorable bias under the binominal were the UDI on the right, and the PPD and the PS on the left.

In the following two sections, we address the incentives to form coalitions generated by the binomial and measure party bias. We show that the binomial electoral system resulted in an allocation of seats that was counter-majoritarian at the coalition level (i.e., for lists). It made it relatively easy for the main coalitions to win one district seat but very hard to win the second, as it required the top list to win more than twice the number of votes as the runner-up list. As a result, single-party lists were discouraged, and the lists formed by the two main coalitions thrived. Our analysis of party bias is conceptually different from the one undertaken by the Chilean literature but consistent with seat-vote models employed by the electoral rules literature (Calvo, 2009; King and Browning, 1987). While studies of the former kind have concentrated on measuring differences in aggregate vote-to-seat shares obtained by each party, we focus on seat differentials derived from comparing a party's seat share with the expected seat share for a party winning the same share of votes.

2.1. Coalition incentives

Saying that the binomial system favored coalitions over single-party lists is an understatement. From 1989 through 2013, 62% of the lists competing in elections to the Chamber of Deputies were composed of multiparty coalitions. However, only 1.3% of elected deputies came

[1] The last elections before the military coup had brought ten different parties to the Chamber of Deputies, with close to 17% of seats going to the far-left Communist Party and close to 23% going to the far-right National Party.

[2] Empirical analyses of legislators' positions derived from congressional votes also revealed two distinct non-centrist coalitions with rather cohesive memberships (Alemán and Saiegh, 2007).

[3] These results applied to the Chamber of Deputies. In the Senate, results appeared somewhat more favorable to the *Alianza*.

from lists that did not include more than one party (i.e., lists composed of a single party or only of independents). Moreover, close to 98% of deputies were elected as candidates of one of the two main lists, the center-left *Concertación* (later *Nueva Mayoria*) or the conservative *Alianza*. For critics of the binomial, the exclusion of minor lists from congress was a major drawback of this rule. For its advocates, coalition incentives were a major benefit.[4]

Consider a two-list election with four parties. A list needs one-third of the district vote to win one seat, but the leading party in the list needs considerably fewer votes to capture that single seat. In this scenario, winning half of the list votes plus one would secure a seat for the leading party's candidate in the list, which means that the actual threshold to win the seat would be located at one-sixth of the district vote. As a result, the leading candidate in a coalition list needs considerably fewer than one-third of the votes to win a seat. By contrast, a list needs over two-thirds of the vote to win the district's two seats. This high threshold was seldom met. Under the binomial rules, 93% of the winning lists elected only one deputy.

The advantage of running two-party coalitions is illustrated in Fig. 1, which presents the empirical seat-vote district level curve to describe the expected number of seats won by candidates (left panel) and lists (right panel). The left panel shows that, on average, deputies were elected with fewer votes than the theoretical one-third cutpoint.

The shifted empirical cutpoint for a winning candidate is the theoretical cutpoint (0.333) weighted by the effective number of within-list candidates (1.53): $0.333 \times \left(\frac{1}{1.53}\right) = 0.218$. That is, a party whose candidates receive more than 21.8% of the vote (on average in the districts where it competes) would be expected to win a share of seats greater than its vote share. The effective number of district lists is, on average, 2.38, thereby shifting the winning cutpoint on the right plot of Fig. 1 to $0.333 \times \left(\frac{2}{2.38}\right) = 0.28$. A list receiving more than 28% of the vote (on average in the districts where it competes) would be expected to win a share of seats greater than its vote share.

Half of the elected deputies coming from lists that won one seat (i.e., the overwhelming majority of winning lists) received less than 30% of the district vote. However, 90% of these lists received more than the theoretical cutpoint of 33% of the district vote. This is illustrated in the right panel of Fig. 1, where the red dots in the middle of the figure indicate the share of votes for lists that won one seat. Consider the case of the DC, which was the largest party in the *Concertación* during the first decade after the transition to democracy. Its median district vote was 25.6%, but 99% of lists winning one seat received more than 27% of the district vote. Going it alone would have been a risky bet for a comparatively large party like the DC and riskier for the other parties that had coalesced into the two main coalitions. To put it bluntly, for the six core parties belonging to the two principal coalitions, dropping out of their respective alliances would have been electoral suicide under the binomial rules.

The punchline here is that most winners benefited from the votes received by their weaker unelected coalition partners, and almost all candidates winning seats competed as members of coalition lists. Running in a coalition was a dominant strategy; parties improved their odds of winning seats by securing votes from their *soon-to-be-known* weaker partners. The distribution of seats within lists was highly majoritarian, benefiting the most popular candidate in the list. In contrast, the allocation of seats to lists was counter-majoritarian, benefiting primarily the list coming second. We elaborate on these points in the next section.

[4] See, for instance, "Sistema Binominal: La Importancia de las Coaliciones" in *Temas Públicos*, N 869, by the Chilean think tank *Libertad y Desarrollo*.

2.2. Who benefited? Party bias and premium seats under the binominal

Most prior works seeking to identify who benefited from the binomial chose to aggregate vote shares by party and compare those numbers to their seat shares (Bellolio and Ramírez, 2011; Carey, 2006; Alvarado Espina, 2015; Fuentes and Ríos, 2007). While this approach is straightforward and intuitive, it raises some problems. First, it aggregates results nationally instead of looking at the district level, where the allocation of seats takes place. Second, and more importantly, the aggregate level of analysis misses most of the behavioral incentives faced by candidates and their campaigns, which are critical to understanding the nomination of party candidates and competition within districts. Indeed, the effective number of candidates at the district level was relatively stable over the years, an empirical regularity explained by district-level features of the binomial. Finally, analyses of partisan bias at the aggregate level wipe out the information on the seat-vote mechanisms that generate the data.

We approach the question of who benefited from the binominal differently. First, we focus on party bias, modeling the performance of parties at the district level. We consider the non-linear allocation of seats to votes, controlling for fragmentation at the district level. This allows us to identify parties that received premium seats – that is, seats beyond what *would be expected by any other party with the same vote share*. Indeed, the question of bias is a counterfactual question that asks whether parties suffer seat losses or enjoy premium seats not because they received more votes than other parties but compared to other parties if they had performed equally well. Therefore, party bias indicates whether the seat-vote curve is different for particular parties.

In Chile, party biases originate from differences in the aggregation of votes at the district and list levels. More precisely, under the binomial rule, party biases may stem from two different processes: the "wasted" votes of the top list in the district vis-à-vis the list coming second, and, within lists, the vote subsidies typically provided by the runner up to the leading candidate.

In the rest of this section, we describe the binomial system's overall seat-vote properties and visually illustrate the expected seat premiums. This exercise allows us to compare differences in premium seat shares, show the area of the seat-vote curve at which premium seats are maximized, and identify at what point the seat allocation no longer exceeded a proportional expectation. We then run a party bias model that evaluates the performance of the main competing parties.

2.2.1. Empirical distributions of seats

The left plot of Fig. 1 described an allocation of seats to votes that under the prevailing binomial rules was majoritarian for any party winning a seat with less than 50% of the district vote. Since a party collecting more than 50% of the district vote was an uncommon occurrence, the counter-majoritarian effect affected lists (i.e., coalitions) rather than individual parties. Under the binomial rules, parties had a low entry cost to win the first seat, but, once they won such a seat, there were no immediate seat benefits from securing more votes, or at least that was the case in the vast majority of cases since "doubling" was unlikely (and the potential beneficiary of such effort was not a fellow partisan).[5]

Consider Fig. 2, which presents the empirical distribution of seats and votes at the district level between 1989 and 2013. The gray dots

[5] By this, we do not imply that there were no future election benefits to parties that performed particularly well (for instance, in terms of future nominations). This is an interesting area are for future research that remains underscrutinized. In our analysis, however, we are focusing only on the immediate mechanical advantages provided by the electoral rule.

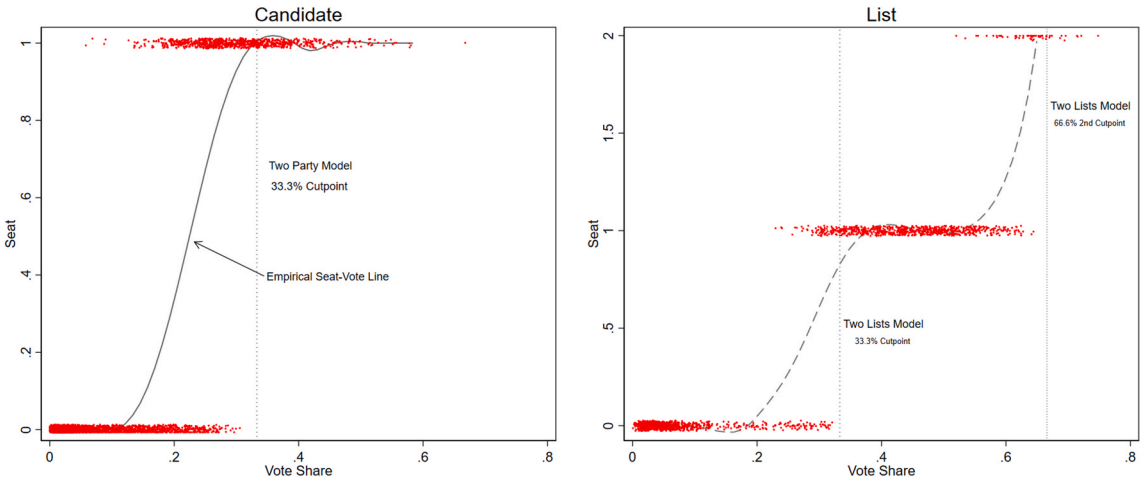
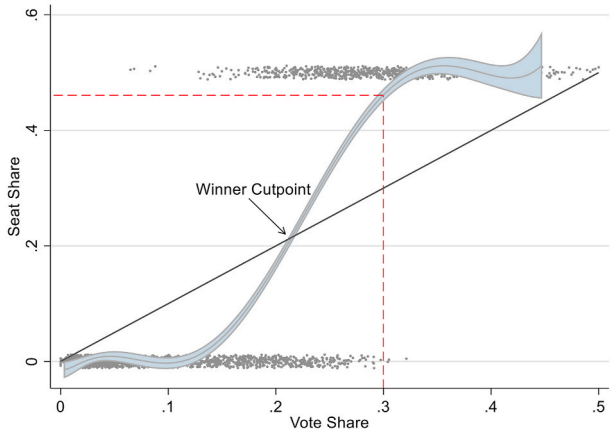


Fig. 1. Empirical Distribution of Seats and Votes by Candidate (left) and List (right) Note: The figure on the left describes the expected seat-vote curve for a candidate. The vertical line indicates the theoretical winning cutpoint with two parties (33.3%), which is to the right of the expected cutpoint for the leading candidate (21.8%). The figure on the right describes the expected seat-vote curve for coalition lists. Vertical lines describe the theoretical winning cutpoints for the first seat (33.3%) and second seats (66.7%). Both cutpoints are to the right of the empirical cutpoint because the effective number of lists was, on average, 2.38.



Note: Individual allocations of seats described by gray dots jittered on the vertical axis to facilitate visualization.

Fig. 2. Empirical distribution of Seats and Votes from 1989 through 2013 Note: Individual allocations of seats represented by gray dots jittered on the vertical axis to facilitate visualization.

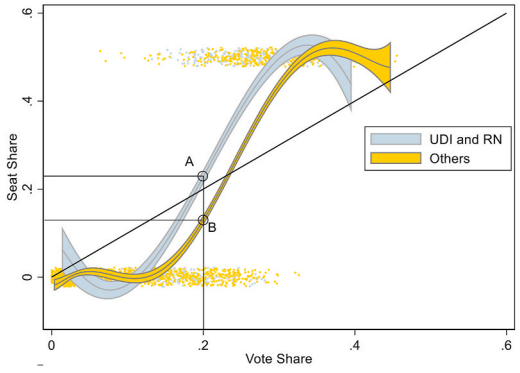
indicate the seat and vote shares for individual candidates, and the gray line shows the prediction of a seat-vote party model (from a fractional polynomial regression of seats on votes without any additional covariates[6]) with the associated 95% confidence intervals. The scatterplot shows a few candidates winning seats with just under 10% of the votes, a rare outcome that occurred only when a list won two seats. The deputies elected with such low vote shares were those coming second in the winning list. Generally, however, a winning party was expected to collect premium seats once it reached more than 21.8% of the vote (this is the "winner cutpoint" shown in Fig. 2). The red lines in this figure show that a party winning, on average, 30% of the district vote would be expected to collect close to 45% of the seats in those districts where it competed, a significant premium.

[6] The fractional polynomial line with four degrees of freedom provides a good approximation to the expected allocation of seats to votes. However, it does not consider important variables such as the difference in the effective number of parties, the effective number of lists, as well as partisan biases throughly analyzed in the complete models presented in Tables 1 and 2.

Fig. 2 also shows that, given the mechanics of the binomial electoral system, parties winning more than 30% of the vote did not improve much on their seat shares. In fact, as the vote share increased above 30%, large parties in dominant coalitions lowered the entry cost for their district opponents. Because of the low cost of entry for the first seat and the very high cost to win the second, winning candidates in dominant coalitions often reduced the share of votes needed by the leading candidate on the runner-up list instead of benefiting their coalition partners. The leading candidate in the runner-up list would typically win a congressional seat with fewer votes than the winning candidate in the top district list, resulting in a separate seat-vote curve.

Before running the full models, consider Fig. 3, which shows the empirical seat-vote model results presented previously but with split samples for RN and UDI (members of the usual runner-up coalition *Alianza*) and all others. This provides a simple, albeit uncontrolled, comparison of the empirical distribution of seats and votes. As in Fig. 2, Fig. 3 plots vote and seat shares at the district level without adding any other covariates.

The descriptive evidence illustrated in this figure already points to different seat-vote curves for UDI and RN. For example, it shows that the two *Alianza* parties would win approximately 23% of the seats by winning, on average, 20% of the vote (illustrated by point A in Fig. 3) compared to around 14% of the seats for others with the same vote share



Note: Individual allocations of seats described by gray dots jittered on the vertical axis to facilitate visualization.

Fig. 3. Partisan bias under the Binomial Seat-Vote Curve, 1989–2013. Note: Individual allocations of seats represented by gray dots jittered on the vertical axis to facilitate visualization.

(illustrated by point B in the same figure). The next step is to present a full model of party bias that considers not only vote shares but also specific party bias parameters and controls for the number of candidates.

Equation (1) describes the standard seat-vote curve for the allocation of seats, S_{id} for party i in district d (Calvo, 2009). The expected seats won by party i in district d are a function of the district level vote shares, v_{id}, the effective number of competing candidates $ln(encc-1)$, and the party specific bias parameters, b_i. In the specification below, the probability of winning seats follows a binomial distribution with a total of K_d seats allocated at the district level. Non-linear modeling of the majoritarian parameter ρ takes as input the log-odds transformation of the parties' vote shares, v_{id}, $ln\left(\frac{v_{id}}{1-v_{id}}\right)$, as in King and Browning (1987):

$$S_{id} \sim Binomial(\pi_{id}, K_d)$$

$$\pi_{id} = \left\{1 + exp\left[- b_i - c \times \ln(encc-1) - \rho ln\left(\frac{v_{id}}{1-v_{id}}\right)\right]\right\}^{-1} \quad (1)$$

The results of the models from the above equation are presented in Table 1. Following King and Browning (1987), we expect a strictly proportional allocation of seats when $\rho = 1$. Estimates of $\rho > 1$ describe majoritarian gains to parties with larger vote shares. By contrast, estimates of $\rho < 1$ describe counter-majoritarian gains for parties with smaller vote shares.

As expected, Table 1 shows large and statistically significant majoritarian biases, in line with the empirical curves in Figs. 2 and 3. For example, the results for the entire binomial era (1989–2013) show that ρ (i.e., ln(v/(1-v))) equals 2.389. The results of models 2 and 3 show that both ρ and the coefficient capturing the effect of fragmentation increased in the period 2005–2013 compared to the period 1989–2001, shifting the vote-share/seat-share line to the left. In short, after 2001, the majoritarian bias becomes larger, and the effect of fragmentation becomes more salient than before. These findings tell us that the cost of accessing the first seat was somewhat lowered by the end of the binominal era.

More importantly, Model 1 in Table 1 shows that both RN and UDI benefitted under the binomial rules, with significant partisan biases that increased their seat share. The benefits were particulalry large for RN during the period 1989-2001 and for UDI during the period 2005-2013. The results also show that none of the coefficients for parties belonging to the *Concertación* are statistically significant.

Table 1
Seat-Vote curve with party-specific bias parameters.

	Variables	(1)	(2)	(3)	(4)
		1989–2013	1989–2001	2005–2013	2017
Party Bias	RN	0.526***	0.581***	0.440*	0.251
		(0.153)	(0.191)	(0.254)	(0.259)
	UDI	0.501***	0.350*	0.620***	0.230
		(0.150)	(0.204)	(0.231)	(0.275)
	PS	−0.049	−0.115	−0.002	0.353
		(0.187)	(0.252)	(0.287)	(0.300)
	PPD	0.048	0.123	−0.056	0.051
		(0.169)	(0.216)	(0.272)	(0.423)
	PDC	0.134	0.265	−0.104	0.089
		(0.150)	(0.184)	(0.260)	(0.327)
	PRSD	0.193	0.053	0.349	0.376
		(0.246)	(0.325)	(0.386)	(0.463)
	PCCH	−0.534	−14.08	−0.173	0.351
		(0.415)	(488.1)	(0.496)	(0.429)
Seat-Vote Curve	ρ	2.389***	2.225***	2.534***	1.567***
		(0.106)	(0.139)	(0.168)	(0.115)
	c	1.220***	1.064***	1.361***	0.542***
		(0.149)	(0.192)	(0.242)	(0.141)
	Observations	2911	1626	1285	960
	LogLik	−935.8	−537	−392.5	−243.9

Note: Coefficients describe marginal changes in the seats won by a party. General linear models with a binomial distribution with K-district magnitude size and a logistic link. Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.

The bias in favor of parties belonging to the *Alianza* coalition was not trivial. For example, according to our model for the period 1989–2013, if the UDI won, on average, 20% of the vote in those districts where it presented candidates (as in Fig. 3), and if those districts had an effective number of competing candidates equal to 5, it would be expected to win close to 24.6% of the seats. This is about the same as the expected share of seats the RN would be expected to win in a similar context. In contrast, if the PS received, on average, the same share of votes in the districts where it competed, it would be expected to win just 16% of the available seats.[7] For the PPD, the expected share of seats in such a context would be 17.2%, and for the DC, it would be 18.4%.

What caused this party bias favoring the *Alianza* parties? Between 1989 and 2013, the *Alianza* list, made up of candidates from the UDI and the RN, was routinely the second most voted in the district. Because there were few instances in which the same list collected two seats, the leading coalition (*Concertación*) tended to elect as many seats as the runner-up. As a result, the top coalition "wasted" more votes than the runner-up coalition to win the same number of seats. Earlier in this article, we mentioned a second potential path: the less dominant the position of the winning list partner vis-à-vis the losing list partner, the more the latter subsidizes the former. However, after analyzing vote shares within lists, we found few within-list differences between the *Concertación* and the *Alianza*.[8]

As a robustness validation, we reestimate the seat-vote model concentrating instead on the effect of list vote share on expected list seats. In this specification, the unit of analysis is the list vote at the district level and the parameter b_i captures coalition bias rather than party-specific ones.

As it is possible to observe in Table 2 Model 1, the bias favorable to the *Alianza* is large and statistically significant when the unit of analysis is the coalition. Further, the effect remains significant when we retain only the vote shares of the *Alianza* and the *Concertación*, as in Table 2 Model 2. In short, the bias in favor of the RN and UDI is not an artifact of focusing on parties as the unit of analysis nor the result of within-list nomination strategies. For those who believe cohesive coalitions rather than parties were the foremost political actors during the binomial era, the results presented in Table 2 should perhaps be more persuasive than those of Table 1 in identifying those who benefited the most from the bias produced by the binomial in the period 1989–2013.

There are a number of alternative specifications to the models presented here that yield substantively similar results while accounting for non-linearities in the relationship between the majoritarian parameter ρ and higher levels of fragmentation. These alternative specifications are interesting future extensions to our analysis but fall outside of the scope of the this article.

In conclusion, the analyses of the binomial rule show two key features worth highlighting. First, in a context of high party fragmentation, coalition making was an optimal strategy for electorally oriented candidates. For the two main coalitions, the entry costs required to win one district seat were relatively low (in terms of vote share, less than the theoretical cutpoint of 33%) but hard to reach for independents or party candidates running outside a multiparty alliance. For parties in the two main coalitions, dropping out and competing alone would have entailed high risks. In the end, none did it while the binomial rule was in place. Second, our results differ significantly from previous analyses of party bias under the binomial. Contrary to the conclusions drawn from

[7] Readers may confirm that $pr(UDI = 1|ENCP = 5) = invlogit(0.501 + 1.220 * ln(5-1) + 2.389 * ln(.20/(1-.20))) = .2461$. Meanwhile, $pr(PS = 1|ENCP = 5) = invlogit(-.04 + 1.220 * ln(5-1) + 2.389 * ln(.20/(1-.20))) = .1597$.

[8] For instance, during the binomial era, the effective number of within-list candidates in the *Alianza* was not higher than the effective number of within-list candidates in the *Concertación*. The effective number of within-list candidates approaches two when the two parties in the same list receive relatively similar vote shares.

Table 2
Seat-Vote curve with coalition-specific bias parameters, 1989–2013.

		(1)	(2)
		1989–2013 All Coalitions	1989–2013 Only Alianza and Concertación
Coalition Bias	Alianza	0.499***	0.341***
		(0.092)	(0.103)
Seat-Vote Curve	ρ	2.099***	1.700***
		(0.116)	(0.155)
	c	0.799***	0.704***
		(0.162)	(0.168)
	Observations	1654	839
	LogLik	−630.5	−596.7

Note: Coefficients describe marginal changes in the seats won by coalitions. General linear models with a binomial distribution with K-district magnitude size and a logistic link. Standard errors in parentheses, ***p < 0.01, **p < 0.05, *p < 0.1.

analyses that relied on aggregating votes, we showed that both *Alianza* parties benefited significantly more than *Concertación* parties from the rules put in place at the end of the dictatorship. As we showed, this bias was not trivial and was rooted in the workings of the binomial at the district level.

3. Competition and coalition incentives after the electoral reform

After two decades of debates and multiple failed proposals to change the electoral rules, the Chilean Congress finally put an end to the binomial system in 2015. According to Gamboa and Morales (2016), a crucial factor propelling the reform was the increasing difficulties faced by the now augmented leading coalition, *Nueva Mayoría*, in selecting two district candidates.[9] The tension arising from complex negotiations between multiple coalition partners with varying degrees of electoral strength had been highlighted by Siavelis (2004), who saw it as a potential reason for the breakup of the *Concertación* long before it materialized. In the Chamber of Deputies, the bill to reform the electoral rules passed with the support of the *Nueva Mayoría*, independents, and small parties and was opposed by both RN and UDI, the beneficiaries of party bias under the binominal.

The new electoral law included several significant changes while at the same time retaining the open list format that requires voters to show a preference for one particular candidate. Under the new rules, the number of districts for elections to the Chamber of Deputies was reduced from 60 to 28, and the number of districts for elections to the Senate was reduced from 19 to 15. District magnitude was increased in both cases. In the Chamber of Deputies, the new districts have a magnitude of between 3 and 8, depending on population size. In the Senate, each of the country's regions became a district, electing between 2 and 5 representatives. As a result of this change, the total number of legislators increased from 120 to 155 in the Chamber of Deputies and from 38 to 50 in the Senate.

The new electoral law also allowed lists to nominate in each district a total number of candidates that exceeded district magnitude by one (i.e., DM+1).[10] Defenders of independent candidacies tried to stop this provision from becoming law, arguing that it would be detrimental to their candidates, but ultimately failed.

The allocation of seats to coalitions was to be conducted using d'Hondt rules, just as before. However, now, d'Hondt rules would also be used to allocate seats to parties within each list. Lastly, the allocation of seats within parties would be based on the total number of votes received by each candidate.

The election of 2017 was also characterized by a new partisan context. The long-lasting alliance between the DC and the left (PS, PPD, and PRSD) came to an end just before the election, and the DC ended up running on a separate list in an alliance with its new smaller partners, Izquierda Ciudadana (IC) and MAS Región (MASR). The rest of the former *Concertación* and the PCCH run together under the label *La Fuerza de la Mayoría*, while the conservative parties RN and UDI run in alliance with two smaller parties – Evolución Política (Evópoli) and Partido Regionalista Independiente (PRI) – under the banner *Chile Vamos.* In addition, a new alliance of six small leftist parties called *Frente Amplio,* and a green coalition with a regionalist focus, called *Coalición Regionalista Verde,* also joined the electoral contest. In the end, seven multiparty lists, two single-party lists, and one list made of independents competed in the 2017 elections for the Chamber of Deputies. The number of competing lists was the largest for a congressional election since the end of the military dictatorship.

3.1. The double D'Hondt effect

Many expected that, by increasing district magnitude, the reform would lead to greater congruence between seats and votes (Gamboa and Morales, 2020; Morales et al., 2004). This expectation was based on the long-held view that increasing district magnitude in proportional representation systems leads to greater proportionality (Gallagher 1991). Increasing district magnitude also carried the risk of increasing party fragmentation (Singer and Gershman, 2018), which at the district level had remained relatively stable throughout the binomial era. Like Carey (2006), some scholars believed that increasing district magnitude would reduce incentives to form electoral coalitions. A lower threshold to win seats would presumably induce many parties to run alone rather than in an alliance with others.

However, as we argue in this section, the workings of the new electoral rule point to a different dynamic. Let us begin by addressing coalition incentives. To this end, we plot the relationship between seats and votes by party and list based on the 2017 Chamber of Deputies election. This is shown in Fig. 4. As before, the results are from a fractional polynomial regression of seats on votes, and a solid diagonal line indicates where the share of votes corresponds to a perfectly proportional share of seats.

The first thing to note is that the curve for parties crosses the diagonal line indicating proportionality at a lower share of votes than the curve for lists. A party wins a share of seats greater than its share of votes once its candidates reach about 8% of the district vote (i.e., on average, across all districts where it competes). But a list wins a share of seats greater than its share of votes once its candidates reach close to 17% of the district vote (again, on average, across all districts where it competes). The region between the party's seat-vote curve and the list's seat-vote curve captures the relative advantage in seats granted to successful

[9] It is also true that public opinion polls showed a majority in favor of the reform. This was the case among those identified with the left as well as among those identified with the right (Centro de Estudios Públicos, CEP, Estudio Nacional de Opinión Pública, Septiembre-Octubre 2013). However, the same polls show that very few considered that the electoral reform should be a top governmental priority.

[10] The reform also included changes to campaign finance and gender quotas. The total amount of money allowed to expend campaigning was reduced, with an increase in publicly financed resources and legal constraints for private spending and donations. New quota rules also required parties to nominate at least 40% of candidates from each gender. However, almost 80% of the candidates elected in 2017 were men, a proportion similar to that of the 2013 election.

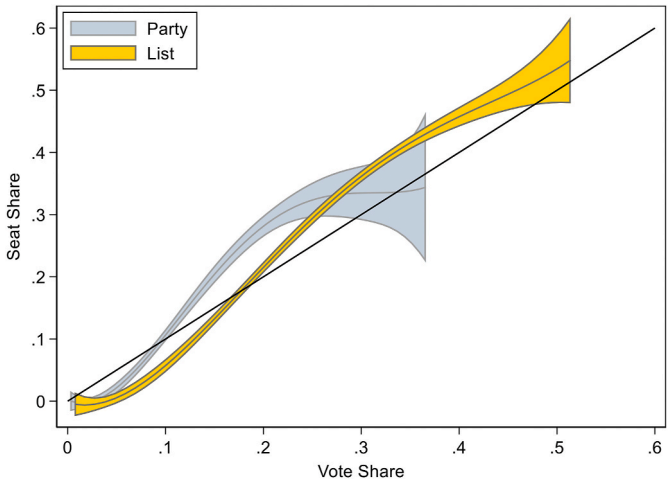


Fig. 4. Seat-vote Curve, 2017.

within-coalition parties. That is, had a party run independently in a single-party list rather than as a member of a multiparty list, it would have performed worse in terms of the share of seats gained. As parties increase their vote share, their seat-vote party curve approximates the seat-vote coalition curve – i.e., the difference becomes statistically indistinguishable from zero.

In short, Fig. 4 illustrates why belonging to a multiparty coalition list still brings individual parties tangible seat benefits. Parties, perhaps unsurprisingly, intuited this before the election. Of the 155 deputies elected in 2017, only one came from a list that did not include multiple parties.

It is also clear that the new electoral rule utilized in 2017 reduced the share of votes needed to enter the Chamber of Deputies. The average percentage of votes received by a winning candidate in 2017 was 9.6%, much lower than the average percentage of votes received by a winning candidate under the binominal, which was 30.7% of the district vote. In the end, the effective number of parties elected to the Chamber of Deputies increased from an average of 5.6 under the binomial to 7.7 after the 2017 election.

While the reform encouraged the entrance of more parties, thereby increasing fragmentation, it did not produce the level of proportionality that some expected. At the list level, the Gallagher index of disproportionality went down slightly, from 8.04 after the election of 2013 to 7.23 after the election of 2017; however, at the party level, the disproportionality index increased from 6.12 in 2013 to 7.5 in 2017.[11] As noted in the prior section, our examination of bias differs from these aggregate analyses and focuses instead on district-level results.

Model 4 in Table 1 is run using data from the 2017 election. The results show that the prior biases in favor of RN and UDI dissipated. Under the new rules, we do not find any significant party bias. None of the coefficients associated with individual parties is statistically significant. This "lack of bias" is a substantial departure from the binomial era brought about by the electoral reform.

As it is possible to observe, the majoritarian parameter ρ is still positive, indicating that the current rules continue to provide majoritarian benefits to parties receiving larger shares of votes. At 1.6, ρ is still considerably higher than under PR systems with medium-sized magnitudes.[12] However, compared to the binomial, the more permissive electoral rule in place for the 2017 election reduced the minimum number of votes needed to win a seat and provided larger rewards to small and medium-sized parties. This is reflected in the seat-vote curves presented in Fig. 4 compared to those from the binomial era (i.e., Figs. 2 and 3).

To sum up, despite the concerns of many, the new rule used in Chile for the first time in the 2017 election did not eliminate incentives for coalition formation. As we have shown, parties enjoy seat benefits from coalescing with others for electoral purposes. Also noteworthy is the finding that the reform succeeded in erasing the long-standing party bias in favor of RN and UDI, the *Alianza* parties. And as expected, the electoral reform increased party fragmentation.

4. Concluding remarks

This article examined the workings of open list proportional representation in Chile, comparing the binominal with its relatively recent replacement. We focused on two aspects of the rules: coalition incentives and party bias. We showed that incentives to form coalitions did not dissipate with the increase in district magnitude introduced by the electoral reform, as some expected. The current rules still provide incentives for parties to run together in multiparty lists. For a considerable range of votes, running in a list with other parties increases the expected share of seats.

Our analysis of party bias is conceptually different from prior studies of the Chilean case, which focused primarily on the disproportionality of aggregate results. Our analysis found that during the binomial era, both UDI and RN were likely to get a larger share of seats than other parties receiving a similar vote share. The difference was substantial. We argued that the bias benefiting *Alianza* parties stemmed primarily from differences in the relative support received by coalition lists at the district level. Our conclusions regarding party bias under the binomial contrast those of earlier works, which for the most part, dismissed systematic advantages for both *Alianza* parties.

Lastly, our study showed that the new electoral rules in place after the 2015 reform have made it easier for small parties to enter the Chamber of Deputies. Moreover, our analysis reveals that the party bias in favor of RN and UDI has withered away. However, the new rules still favor comparatively larger parties over small ones, albeit to a lesser degree than before the reform. Furthermore, fragmentation has gotten worse, which is likely to have detrimental consequences for the workings of legislative politics.

Declaration of competing interest

None.

Data availability

Data will be made available on request.

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[11] The results depend on what you considered a party. For this calculation we followed the classification presented by Chile's Electoral Service (SERVEL), which means that independents running in list are counted as one other party in such list.

[12] Gamboa and Morales (2020) also concluded that larger parties benefited more than small ones.

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