研究論文

The Malapportionment-Generating Process in Latin America:

A Decomposition Analysis of Electoral Inequality in Argentina, Brazil, and Chile

Yuta Kamahara（鎌原勇太）

1. Introduction

Democratic ideal is incompatible with deficient political equality (e.g., Dahl 2006). Although representative democracies generally pursue political equality via the "one person, one vote" principle, such a principle cannot be achieved unless legislative seats are distributed in at-large nationwide electoral districts. Political scientists have conceptualized the violation of this principle as malapportionment, which is defined as "the discrepancy between the shares of legislative seats and the shares of population held by geographical units" (Samuels and Snyder 2001: 652). This means that when malapportionment exists, politicians in some geographical units represent a disproportionately smaller or larger number of people than those in other units. In that case, elections can be judged as unfair since electoral equality is not achieved.

Because malapportionment is attributed to demographic shifts, periodic policy interventions, namely, reapportionment and redistricting, must be implemented. However, malapportionment is not just institutionally unavoidable without reapportionment and redistricting but also either neglected or generated intentionally in worse cases. Political leaders and

incumbent representatives exploit malapportionment for their political survival because it functions as a covert and "deliberate institutionally engineered discrimination" for their parties or against their opposition (Snyder and Samuels 2004: 135). Therefore, malapportionment can favor geographical units that serve as the support bases of certain parties *before* elections; therefore, such a favorable condition for incumbents influences their electoral strategy of combining blatant fraudulent measures such as ballot stuffing and electoral violence *during* elections (Higashijima 2021). Kamahara, Wada, and Kasuya (2021) termed the development of malapportionment the malapportionment-generating process (MGP).

From a comparative and quantitative perspective, Latin American countries suffer a worse degree of malapportionment in lower-house elections (Samuels and Snyder 2001; Kamahara, Wada, and Kasuya 2021).[1] Snyder and Samuels regard the state of malapportionment in Latin America as a "formal pathology" (2004: 134). Hence, this article asks the simple question: *Why?* Like other studies, I focus on the lower-house malapportionment in Latin America. Snyder and Samuels *qualitatively* describe the *history* of malapportionment-ridden countries in Latin America from a long-term perspective and clarify that political elites have deliberately produced malapportionment. This article aims to investigate whether this political factor continues to influence electoral inequality in *recent* elections. I employ the *quantitative* approach developed by Kamahara, Wada, and Kasuya (2021), which would help us precisely understand the degree of contribution of certain political factors.

The remainder of this article is organized as follows. Section 2 summarizes the MGP in three Latin American countries (Argentina, Brazil, and Chile) as illustrated by Snyder and Samuels (2004). In Section 3, I briefly explain the decomposition analysis proposed by Kamahara, Wada, and

1 Samuels and Snyder (2001) and Kamahara, Wada, and Kasuya (2021) employ different malapportionment measures. I discuss both in Section 3. The situation in Africa is complicated in a sense because this region has many missing values pertaining to the malapportionment measure because of fewer available data (see Kamahara, Wada, and Kasuya 2021: 6).

Kasuya (2021). Using their approach, Section 4 analyzes the MGP of these three countries. The last section concludes this study.

2. Qualitative Description of the MGP in Latin America

Snyder and Samuels (2004) classified the general concept of malapportionment into two, "natural malapportionment" and "unnatural malapportionment," in terms of the MGP. While the former is generated by demographic changes such as migration and the changing population structure, the latter is caused by reapportionment and redistricting, which are unfairly advantageous for incumbents. Kamahara, Wada, and Kasuya (2021) also call the former type "demographic-driven malapportionment" and the latter type "politically engineered malapportionment."[2] Moreover, Snyder and Samuels (2004: 139–40) define "progressive reapportionment" (i.e., periodical reapportionment and redistricting) as reapportionment policies that ameliorate demographic-driven malapportionment and "regressive reapportionment" (e.g., the manipulated distribution of seats) as policies that generate politically engineered malapportionment.[3]

Snyder and Samuels (2004) examine how and why Latin America is a malapportionment-ridden region. Specifically, in their historical case studies on Argentina, Brazil, and Chile, they find that these countries have exploited malapportionment as an instrument to remain in power through overrepresentation in rural and conservative areas and underrepresentation in urban areas because the former areas generally support incumbent elites and the latter ones support challengers. I summarize Snyder and Samuels's brief explanation of malapportionment in lower houses as a strategic tool for political survival.

Between the 1940s and 1970s in Argentina, President Juan Perón

2 Snyder and Samuels originally term the latter type of malapportionment "politically engineered malapportionment" (2004: 138), while Kamahara, Wada, Kasuya (2021: 3) term it "politically-engineered malapportionment." This article employs Snyder and Samuels's usage.

3 In their terminology, reapportionment includes redistricting (Snyder and Samuels 2004: 139–40).

first introduced malapportionment into electoral strategies to strengthen the influence of rural voters because rural areas supported his party; the subsequent military regimes then continued his malapportionment strategy to reduce the intimidating urban clouts. The current democratic regime has inherited the disproportionate seat distribution that underrepresents urban areas (Snyder and Samuels 2004: 141–45).

Brazil has suffered from electoral inequality since the 19th century. Notably, in 1977, a military regime (1964–1985) introduced the maximum number of seats distributed to each state with the following purpose (Snyder and Samuels 2004: 147):

> [T]his new ceiling only affected São Paulo, the center of student and labor activism in the 1960s and 1970s, and thus increased the relative weight of the legislative delegations from the poorer and rural regions of the country, where government supporters were stronger.

Furthermore, in 1982, this military regime changed the ceiling and floor of seats for states before Brazil's democratization. Even after its democratization, Brazil maintains this ceiling and floor clause in its constitution (Snyder and Samuels 2004: 145–148).

Meanwhile, between 1937 and 1973, Chile adopted no measures (e.g., reapportionment) against demographic-driven malapportionment.[4] President Augusto Pinochet, at the end of his government (1973–1990), left an electoral system that accommodated rural areas that provided more support for conservative and right-wing parties (Snyder and Samuels 2004: 148–50). Chile continued to use his legacy, that is, the binomial system, where two major party alliances, center–left and right-wing, obtained one seat each in a district. Other parties or party alliances had extremely low chances to win seats, and the seat distribution was unfair; thus, this system favored conservative right-wing parties because their alliance was usually placed at

4 Kamahara, Wada, and Kasuya (2021: 3) refer to such a behavior as "inaction."

the second forces in Chile's Lower House (Nohlen 2005: 255; Gamboa and Morales 2016: 127).[5] Snyder and Samuels (2004: 152) conclude their case studies as follows:

> [The past] regimes left a strong *institutional legacy* of rural bias in legislatures that has persisted in the contemporary democratic period (*emphasis added*).

Meanwhile, Snyder and Samuels also explore malapportionment panaceas in Latin America (e.g., independent redistricting authority).[6] Among political solutions to make elections fair, Snyder and Samuels propose several electoral reforms such as the introduction of at-large nationwide electoral districts (2004: 158–61).

In 2015, Chile dramatically reformed its electoral system. Until the 2013 election, Chile had adhered to the binomial system that had 60 districts and selected 120 representatives using the D'Hondt formula. In 2015, however, Chile passed a new electoral law and, since the 2017 election, has utilized the more proportional system with 28 multi-member districts and 155 selected representatives using the same formula. In this article, I summarize the brief history of the 2015 reform in Chile described by Gamboa and Morales (2016). In the previous system, each party coalition fielded only two candidates in each electoral district. When each coalition consisted of more than two parties, inter-party negotiations within a coalition must take place to decide which two parties would field their own respective candidates before the electoral campaign. Thus, the pre-electoral negotiations would inevitably lead to exhausted parties when selecting candidates. In the

5 For detailed explanations of the historical developments in the Argentine, Brazilian, and Chilean electoral systems, see Jones, Lauga, and León-Roesch (2005), Lamounier and Neto (2005), and Nohlen (2005).

6 Snyder and Samuels value a policy through which Mexico established an independent redistricting authority, namely, *Instituto Nacional Electoral* (since 2014), which replaced *Instituto Federal Electoral* (1990–2014). Snyder and Samuels (2004: 157) consider this "IFE model" as a judiciary substitute since judiciaries, which are generally regarded as independent, are not autonomous in Latin America. Today, it is more appropriate to refer to this model as the "INE model."

new system, however, the number of seats (i.e., district magnitude) in the 28 districts ranges from 3 to 8, and each party alliance can field the district magnitude +1 candidate.[7] In each alliance, parties can reduce pre-electoral negotiation costs, and small parties other than the two alliances have a greater opportunity to win a seat (Gamboa and Morales 2016: 127). Therefore, although the new system is more proportional than the previous one, Gamboa and Morales conclude that the main factor of this reform for the governing alliance, *New Majority*, was the reduction of electoral costs and not that of malapportionment.

Our summary of the long-term MGP in Latin America described by Snyder and Samuels (2004) states that Argentina, Brazil, and Chile continued to suffer from malapportionment for the political survival of their governing elites until 2000. However, Snyder and Samuels show malapportionment data between 1870 and 2000.[8] Does such a legacy of electoral inequality still prevail in Latin America, especially Argentina, Brazil, and Chile, after 2000? Is regressive reapportionment still employed to decrease the voice of urban citizens after 2000? Do these countries still display inactivity against demographic shifts? After Chile's election reform in 2015, did the MGP in the country change? To answer these questions, this article utilizes the measurement method that quantifies demographic-driven and politically engineered malapportionment. Using this method with time-series cross-sectional data for Argentina, Brazil, and Chile, we can identify which malapportionment subtype is more significant for the overall degree of malapportionment.

3. Decomposability

Samuels and Snyder's (2001) *MAL* is the most frequently used measure of

7 Four candidates from one alliance can run in a given electoral district where the district magnitude is 3. For a comparison between the previous and new electoral systems, see Table 2 in Gamboa and Morales (2016: 130).

8 See their Table 4.2 (Snyder and Samuels 2004: 142–43).

malapportionment. In a given country, let N_i be the number of registered voters and n_i be that of seats in district i $(1,\ldots,K)$. Total voters and total seats are denoted by N $(\sum_{i=1}^{K} N_i)$ and n $(\sum_{i=1}^{K} n_i)$, respectively. p_i represents the share of registered voters in district i $(p_i=\frac{N_i}{N})$ whereas q_i indicates the share of distributed seats in district i $(q_i=\frac{n_i}{n})$. Thus, *MAL* is formulated as $\frac{1}{2}\sum_{i=1}^{K}|p_i-q_i|$.

Meanwhile, this article employs D^0 (Kamahara, Wada, and Kasuya 2021), also known as the Kullback–Leibler divergence in information geometry, which quantifies the *discrepancy* between the theoretical and empirical probability distributions (Amari 2009), or the mean log deviation in economics, which measures income *inequality* (Wada 2010), because of its decomposability.[9] Malapportionment is interpreted as either the *discrepancy* between voter-share and seat-share distributions or political *inequality*; thus, we can use D^0 as the malapportionment measure. D^0 can be written as the first line of Equation (1):[10]

$$\begin{aligned} D^0 &= \sum_{j=1}^{k}\sum_{i=1}^{k_j} p_{ji}\log\frac{p_{ji}}{q_{ji}} \\ &= \underbrace{\sum_{j=1}^{k} p_j \log\frac{p_j}{q_j}}_{apportionment} + \underbrace{\sum_{j=1}^{k} p_j \sum_{i=1}^{k_j} p_{i|j}\log\frac{p_{i|j}}{q_{i|j}}}_{districting} \end{aligned} \qquad (1)$$

Let $j(1,\ldots,k)$ be notated as the administrative unit (e.g., state, province, or prefecture). Assume that a given country initially distributes its legislative seats to administrative unit j; each unit is then generally divided into same- or different-sized districts $i(1,\ldots,k_j)$, and registered voters finally cast their own ballots in each district i. N and n represent total voters and total seats, respectively. p_{ji} is $\frac{N_{ji}}{N}$, and q_{ji} is $\frac{n_{ji}}{n}$. We then reformulate D^0 as the sum of

9 Mathematically, D^0 is superior to Samuels and Snyder's (2001) measure. For details, see Wada and Kamahara (2018). In political science, Theil and Schrage (1977) first introduced this measure.

10 I rewrote Equations (1), (2), and (3) using notations that are simpler than the original ones that Kamahara, Wada, and Kasuya (2021) employed.

two components described as the last line of the right-hand side of Equation (1). p_j and q_j each represent the share of registered voters ($\frac{N_j}{N}$) and that of seats ($\frac{n_j}{n}$) in state j. Let $p_{i|j}$ denote the share of registered voters in district i within each administrative unit j (i.e., $p_{i|j}=\frac{N_{ji}}{N_j}$) whereas $q_{i|j}$ signifies the share of distributed seats there (i.e., $q_{i|j}=\frac{n_{ji}}{n_j}$). The overall degree of malapportionment, D^0, is decomposed into the degree of apportionment-stage malapportionment ($\sum_{j=1}^{k} p_j \log \frac{p_j}{q_j}$) and the degree of districting-stage malapportionment ($\sum_{j=1}^{k} p_j \sum_{i=1}^{k_j} p_{i|j} \log \frac{p_{i|j}}{q_{i|j}}$). From the decomposition of D^0, we can identify which malapportionment stage determines the overall state of malapportionment in a given country. In the absence of districting, the overall degree of malapportionment is equal to the degree of apportionment-stage malapportionment.

$$
\begin{aligned}
\Delta D^0 &= D_t^0 - D_{t-1}^0 \\
&= \underbrace{\sum_{j=1}^{k} \overline{\left(\log \frac{p_j}{q_j}\right)} \Delta p_j + \sum_{j=1}^{k} \overline{\left(\sum_{j=1}^{k} p_j \sum_{i=1}^{k_j} p_{i|j} \log \frac{p_{i|j}}{q_{i|j}}\right)} \Delta p_j}_{\textit{demographic-driven change}} \\
&+ \underbrace{\overbrace{\sum_{j=1}^{k} \overline{p_j} \Delta \left(\log \frac{p_j}{q_j}\right)}^{\textit{apportionment-driven}} + \overbrace{\sum_{j=1}^{k} \overline{p_j} \Delta \left(\sum_{j=1}^{k} p_j \sum_{i=1}^{k_j} p_{i|j} \log \frac{p_{i|j}}{q_{i|j}}\right)}^{\textit{districting-driven}}}_{\textit{politically engineered change}} \qquad (2)
\end{aligned}
$$

As Kamahara, Wada, and Kasuya (2021) demonstrate, we can understand the MGP by decomposing the trend of D^0 between two elections. Because we can calculate the difference of the degrees of malapportionment in two consecutive elections t and $t-1$ (i.e., $\Delta D^0=D_t^0-D_{t-1}^0$), we observe that political inequality worsens from the previous election to the current one when $\Delta D^0>0$. As discussed in Section 2, malapportionment is aggravated by demographic and/or political factors, which can be reconceptualized as demographic-driven malapportionment and politically engineered malapportionment, respectively. Decomposing ΔD^0 enables us to identify these two factors. If and only if the number of administrative units, k, is

fixed, ΔD^0 can be decomposed into four terms in Equation (2). The respective terms are composed of $\overline{(\cdot)}$, which represents the intertemporal weighted average of the quantities of interest between elections t and $t-1$, and $\Delta(\cdot)$, which stands for the change in the quantities of interest from election $t-1$ to election t. Δp_j is defined as the demographic change from one election to the next across state js. $\Delta\left(\log \frac{p_j}{q_j}\right)$ can be interpreted as a politically driven change due to apportionment,[11] and $\Delta\left(\sum_{j=1}^{k} p_j \sum_{i=1}^{k_j} p_{i|j} \log \frac{p_{i|j}}{q_{i|j}}\right)$ is the difference in the degree of the districting-stage malapportionment between two elections.

Therefore, when the sum of the first two terms with Δp_j (i.e., a demographic-driven change) is more than zero, demographic-driven malapportionment exists. Meanwhile, when the sum of the last two terms concerning seat distribution policies (i.e., a politically engineered change) is more than 0, a given election is plagued by politically engineered malapportionment because of regressive reapportionment; when this summed-up term of politically engineered change is less than 0, remedial measures such as progressive reapportionment were implemented. Moreover, we can interpret that the change in malapportionment from one election to the next was mainly due to demographic-driven malapportionment when the sum of the first two terms (i.e., demographic-driven changes) is larger than the sum of the last two terms (i.e., politically engineered changes).

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11 $\Delta\left(\log \frac{p_j}{q_j}\right)$ is defined as the difference between two logarithmic deviations from election $t-1$ to election t as follows: $(\log p_{j,t} - \log q_{j,t}) - (\log p_{j,t-1} - \log q_{j,t-1})$. As Kamahara, Wada, and Kasuya (2021: 10fn.22) define, we can construe $(\log p_j - \log q_j) \neq 0$ as the disproportionate apportionment of seats in state j (q_j) that does not reflect the population count there (p_j). Moreover, though Kamahara, Wada, and Kasuya do not explicitly formalize, it can be rewritten as $(\log p_{j,t} - \log p_{j,t-1}) - (\log q_{j,t} - \log q_{j,t-1}) = \Delta(\log p_j) - \Delta(\log q_j)$. This difference represents whether the authority changes the seat apportionment ($\Delta(\log q_j)$) in response to the demographic change in state j ($\Delta(\log p_j)$).

$$\Delta D^0 = \underbrace{\overbrace{\sum_{j=1}^{k} \overline{\left(\log \frac{p_j}{q_j}\right)} \Delta p_j}^{cross\text{-}state} + \overbrace{\sum_{j=1}^{k} \sum_{i=1}^{k_j} \overline{\left(\log \frac{p_{i|j}}{q_{i|j}}\right)} \Delta p_{ji}}^{cross\text{-}district}}_{demographic\text{-}driven\ change} + \underbrace{\overbrace{\sum_{j=1}^{k} \overline{p_j} \Delta \left(\log \frac{p_j}{q_j}\right)}^{apportionment\text{-}driven} + \overbrace{\sum_{j=1}^{k} \sum_{i=1}^{k_j} \overline{p_{ji}} \Delta \left(\log \frac{p_{i|j}}{q_{i|j}}\right)}^{districting\text{-}driven^*}}_{politically\ engineered\ change} \quad (3)$$

However, Kamahara, Wada, and Kasuya (2021) acknowledge that a decomposition formulated by Equation (2) enables us to capture only the impact of demographic movement across states (i.e., the first and second decomposed terms with Δp_j). Thus, as Kamahara, Wada, and Kasuya also demonstrate, if and only if the number of districts in respective states, k_j, is fixed between two consecutive elections, we can further decompose Equation (2) into Equation (3) and thus identify the impact of demographic movement across districts, denoted by the second term with Δp_{ji}.[12] Using the Kamahara–Wada–Kasuya approach, we can quantitatively explain the MGP that Snyder and Samuels qualitatively described.

4. Analysis

To quantitatively describe the MGP of lower houses in Latin America, I select Argentina, Brazil, and Chile, which were qualitatively analyzed by Snyder and Samuels (2004). Argentina and Brazil have multi-member districts and proportional representation systems (hereafter MMD-PR), whereas Chile transitioned from its binomial system to MMD-PR after the 2015 electoral reform. Specifically, Argentina has two election cycles for four-year terms of representatives; that is, 127 and 130 of its 257 repre-

12 The last term includes $\Delta\left(\log \frac{p_{i|j}}{q_{i|j}}\right)$. Following the interpretation of $\Delta\left(\log \frac{p_j}{q_j}\right)$ (see fn. 11), the last term represents a political factor of whether the authority revises the electoral districts ($\Delta(\log q_{i|j})$) in a manner that is proportional to the demographic changes in district i for each state j ($\Delta(\log p_{i|j})$).

sentatives are elected alternately every two years. To calculate the degree of malapportionment, this study employs the number of registered voters instead of the total population even though all three countries use the latter as their population figure.[13] Table 1 describes the data sources collected from official statistics and personal websites. Figure 1 visualizes the results of the calculations using Equations (1) and (2). Gray horizontal lines in the upper panels of Figure 1 represent the mean value of the Kamahara–Wada–Kasuya malapportionment database (Kamahara, Wada, and Kasuya 2021).

Country	j	k	n_{ji}	Election	Electoral System	Data Source
Argentina	Province + Buenos Aires	24	2~35	1989, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021	1. MMD-PR 2. Of 257 seats, elections for 127 and 130 members are held alternately.	Dirección Nacional Electoral (n.d.)
Brazil	State + Distrito Federal	27	8~70	1990, 1994, 1998, 2002, 2006, 2010, 2014, 2018	1. MMD-PR 2. Constitution stipulates the ceiling and floor of the distributed seats.	1990~1994: Tribunal Superior Eleitoral (n.d.); 1998~2018: Álvarez-Rivera (n.d.)
Chile	Region + Región Metropolitana (Santiago)	1993~2005: 13 2009~2017: 15 2021: 16	1993~2013: 2 2017~2021: 3~8	1993, 1997, 2001, 2005, 2009, 2013, 2017, 2021	~2013: binomial system 2017~: MMD-PR	1993~2017: Álvarez-Rivera (n.d.) 2021: Carr (n.d.)

Table 1 Descriptive Information of Argentina, Brazil, and Chile

Notes: j is the administrative unit, k is the maximum number of js, and n_{ji} is either district magnitude in j (Argentina, Brazil, and Chile after the introduction of its new electoral system) or in district i (Chile before the introduction of its new electoral system).

In Argentina, provinces are used as districts for proportional representation. Thus, the upper panel of Figure 1(a) illustrates that the overall degree of malapportionment is equated to the degree of apportionment-stage

13 The Argentine and Brazilian constitutions stipulate that total population is used when seats are redistributed (Snyder and Samuels 2004: 163). Specifically, see Article 45 of the Constitution of Argentina and Article 45§1 of the Constitution of Brazil (see Constitute Project n.d.). Moreover, Chile had no legal clause regarding which population figure was used before the introduction of the new electoral system. After its introduction, a reapportionment that is proportional to the population is conducted every 10 years (Snyder and Samuels 2004: 163; Gamboa and Morales 2016: 135).

malapportionment. A gray horizontal line indicates that Argentina suffers from a more severe state of malapportionment compared with other countries. The upper panel also shows the downward trend in the degree of malapportionment except for the 2017 election. The lower panel suggests that this decline is constantly caused by demographic-driven change. Meanwhile, the number of seats is different across biennial elections (i.e., 127 and 130). Thus, black bars in the lower panel, which represent a politically engineered change, demonstrate that the difference in the number of seats mechanically produces the fluctuation of apportionment-driven changes between elections. From a demographic perspective, Argentina has enjoyed a decline in malapportionment, whereas from a comparative perspective, it has also continuously faced a higher degree of malapportionment. This means that, during the sample period, Argentina leaves a legacy of malapportionment without implementing appropriate policy interventions such as reapportionment.

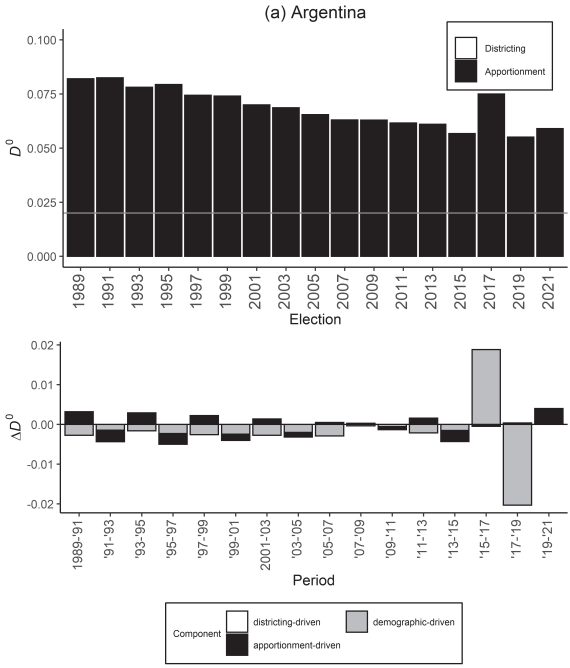

Figure 1 Decomposition Analyses of Degrees of and Changes in Malapportionment in Argentina, Brazil, and Chile

In Brazil, the upper panel of Figure 1(b) shows that the overall degree of malapportionment corresponds to the degree of apportionment-stage malapportionment because the country uses states as multi-member districts. Brazil has been constantly plagued with a higher degree of malapportionment. The lower panel indicates that the changes between elections can be attributed to demographic changes even though no reapportionment was implemented during the sample period. Therefore, as shown in Argentina, malapportionment by neglect exists in Brazil.

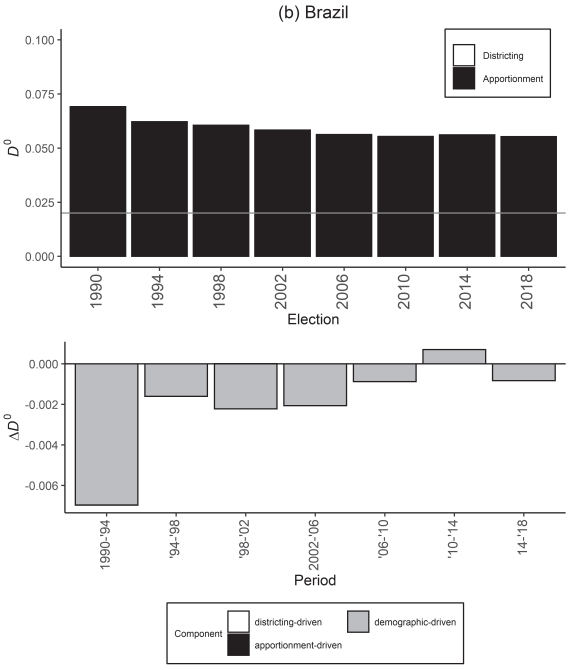

Figure 1 (*continued*)

In the case of Chile, Figure 1(c) illustrates that the country's binomial system caused both apportionment-stage and districting-stage malapportionment. In its new electoral system, meanwhile, regions are used as multi-member districts; thus, as with Argentina and Brazil, the overall degree of malapportionment is equated to apportionment-stage malapportionment. In the 2013 election, we can observe that malapportionment temporarily and abruptly worsened. The lower panel of Figure 1(c) suggests that the degradation of political inequality in Chile was influenced by demographic- and districting-driven changes. During the 2009 and 2013 elections, the number of districts in each region was unchanged. Thus, using Equation (3) allows us to extract the impact of demographic migration across districts from districting-driven changes.

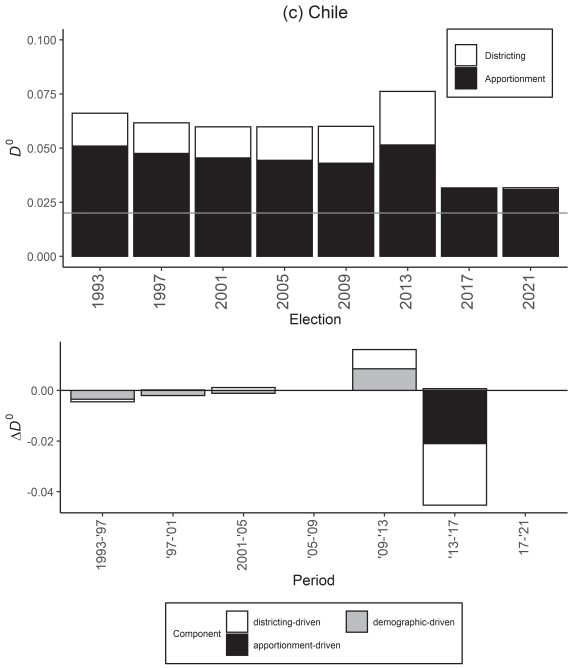

Figure 1 (*continued*)

Notes: Gray horizontal lines are drawn at 0.02, namely, the mean value of the overall degree of malapportionment calculated by Kamahara, Wada, and Kasuya (2021). *Apportionment* and *Districting* in the upper panels of Figure 1 represent the decomposed terms in the last line of Equation (1). In the lower panels, *demographic-driven* indicates the sum of the two terms for demographic changes expressed in Equation (2). Meanwhile, *apportionment-driven* and *districting-driven* are the third and fourth terms in Equation (2), respectively. In the lower panels of the chart for Chile, the period with no bar represents a case that we cannot calculate using Equation (3) because the number of regions changed between two elections. See the k column in Table 1.

Figure 2 shows that the difference in malapportionment between the 2009 and 2013 elections can be attributed to demographic migrations across states and districts (*cross-state* and *cross-district* in Figure 2, respectively). Chile adopted the 2012 reform and changed its registration system from voluntary to compulsory, or automatic, since the 2013 election.[14] In the previous system, eligible voters, once registered, were continuously registered in the electoral roll. However, Chile had a lower registration rate for the

14 Moreover, the 2012 reform replaced the compulsory voting system with a voluntary one. Barnes and Rangel (2014) analyze the impacts of the combination of the automatic registration system and the voluntary voting system on Chilean representative democracy.

younger electorate. Thus, "young cohorts of voters became severely *under-represented* in the electorate" (*emphasis added;* Barnes and Rangel 2014: 571). Meanwhile, the 2012 reform boosted the registration rates of younger voters. As a result, the composition of registered voters approximates that of eligible voters (Barnes and Rangel 2014). Thus, we can presume that this system change provided an anomalous bump in malapportionment because the number of registered voters is used to calculate malapportionment. The reform of the registration system changed the demographic composition of states and districts. Moreover, as illustrated by the lower panel of Figure 1(c), the 2015 electoral reform significantly reduced the degree of malapportionment because of the dramatic decline of the apportionment-driven component and the disappearance of the districting-driven component. The new MMD system is more proportional than the old binomial system. As a result, the degree of malapportionment in Chile becomes relatively closer to the global average than that in Argentina and Brazil.

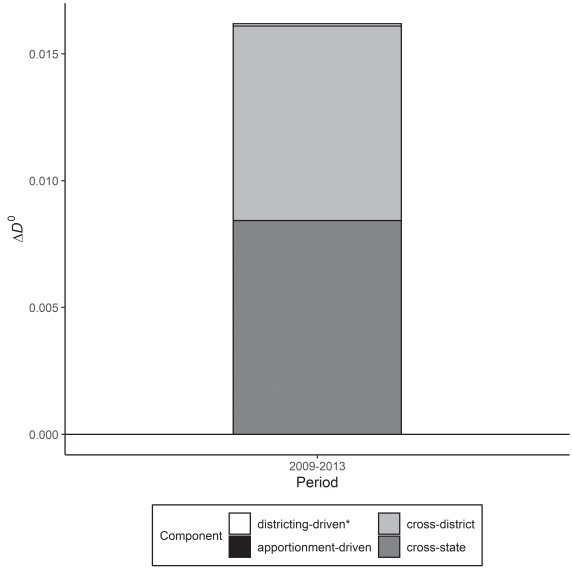

Figure 2 Decomposition Analysis between the 2009 and 2013 Elections in Chile Using Equation (3)
Notes: Four components are calculated using the respective decomposed terms in Equation (3).

The findings from the decomposition analyses are summarized as follows. First, all three countries experienced no explicit regressive re-apportionment. Meanwhile, in the sample periods, Argentina and Brazil continued to suffer from relatively higher degrees of malapportionment because they did not implement appropriate policy interventions against electoral unfairness and thus maintained electoral inequality. Therefore, we can presume that "institutional legacies" still matter in Argentina and Brazil. Second, Chile overcame its institutional legacy by introducing a more proportional electoral system, which eliminated districting-stage malapportionment and caused a dramatic decline in apportionment-stage malapportionment in the postreform period.

5. Conclusion

Latin America continues to be a malapportionment-ridden region. Snyder

and Samuels (2004) qualitatively explain that the historical roots of such a regional characteristic are the exploitation of malapportionment for the political survival of political elites who favor their support base, namely, rural and conservative areas, and argue that the malapportioned system as a "legacy" continues to afflict the recent elections in Latin American countries. Using the decomposition analysis proposed by Kamahara, Wada, and Kasuya (2021), this study clarifies that such a negative legacy remains a concern for citizens in Argentina and Brazil because both countries have no policy intervention to ameliorate this issue even though they do not actively employ regressive apportionment policies that confound their respective degrees of malapportionment. Thus, the same MGP persists in the two countries. Meanwhile, the decomposition analysis also demonstrates that Chile is extricating itself from a malapportionment-ridden region by introducing a more proportional electoral system. In summary, the decomposition analysis is promising but is not enough to capture the whole picture of the MGP. To understand the *quantitative* findings, one must possess a *qualitative* background knowledge of electoral history.

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議員定数不均衡の生成過程に関する分析
ラテンアメリカ3か国を事例として

鎌原勇太

一票の格差、または議員定数不均衡は、代議制民主主義における政治的平等を侵害している状態の一つである。議員定数不均衡が生じる過程（malapportionment-generating process）は、(1) 州や選挙区間の人口移動や若年層の都市部への移動による人口構成の遷移といった人口動態の変化と (2) 各州への

議席配分や選挙区の区割り変更、さらには選挙制度の抜本的な変更といった政策上の変化とに大別される。ラテンアメリカ諸国は、他国と比較して一票の格差が大きい。そこで、Snyder and Samuels (2004) は、ラテンアメリカ諸国のなかのアルゼンチン、ブラジル、そしてチリにおける政治過程の歴史を定性的に分析した。その結果、議員定数不均衡が権力維持を目的とした選挙戦略として政治エリートによって生み出され、それが2000年代においても「遺産」として残っていることを明らかにした。本稿は、Kamahara, Wada, and Kasuya (2021) が提唱した議員定数不均衡指標が有する分離可能性を利用した寄与度分解分析（decomposition analysis）を用い、上記3か国の議員定数不均衡生成過程に変化があるのか否かを定量的に明らかにする。分析の結果、アルゼンチンとブラジルは、人口動態の変化に対応した政策介入を実施しないことによって、一票の不平等という歴史的に生み出された負の「遺産」を放置している。その一方で、チリでは、有権者登録方法の変更に伴う一時的な不平等の悪化は生じたものの、その後導入された選挙制度の結果、議員定数不均衡が劇的に改善したことが明らかとなった。

（都市イノベーション研究院・准教授）

Abstract

Malapportionment is considered a type of political inequality. The malapportionment-generating process (MGP) can be divided into demographic and political processes. Previous studies have conceptualized the malapportionment caused by the demographic process as demographic-driven malapportionment and the one caused by the political process as politically engineered malapportionment (Snyder and Samuels 2004; Kamahara, Wada, and Kasuya 2021). Compared with other regions, Latin America is plagued with a more severe state of malapportionment. Snyder and Samuels (2004) *qualitatively* clarified that malapportionment in Latin America, especially in Argentina, Brazil, and Chile, is perennially caused by political elites because they exploit it as an electoral strategy for their political survival. Meanwhile, this article *quantitatively* analyzes the MGP in the recent Argentine, Brazilian, and Chilean elections by employing a new malapportionment measure (and its decomposition property), proposed by Kamahara, Wada, and Kasuya (2021). The decomposition analysis demonstrates that Argentina and Brazil continued to suffer from a relatively higher degree of malapportionment because they did not adopt appropriate policy interventions against electoral unfairness. Chile, meanwhile, overcame its severe state of malapportionment by introducing a more proportional electoral system, leading to a dramatic decline in the degree of malapportionment in the postreform period.

（Associate Professor, Institute of Urban Innovation）