LEGISLATIVE MALAPPORTIONMENT AND INSTITUTIONAL PERSISTENCE[*]

Miriam Bruhn   Francisco Gallego   Massimiliano Onorato

This Version: October 2010
First Version: June 2007

Abstract

This paper argues that legislative malapportionment, denoting a discrepancy between the share of legislative seats and the share of population held by electoral districts, serves as a tool for pre-democratic elites to preserve their political power and economic interests after a transition to democracy. We claim that legislative malapportionment enhances the pre-democratic elite's political influence by overrepresenting areas that are more likely to vote for parties aligned with the elite. This biased political representation survives in equilibrium as long as it helps democratic consolidation. We use data from Latin America to document empirically that malapportionment increases the probability of transitioning to a democracy. Moreover, our data show that overrepresented electoral districts are more likely to vote for parties close to pre-democracy ruling groups. We also find that overrepresented areas have lower levels of political competition and they receive more transfers per capita from the central government, both of which favor the persistence of power of pre-democracy elites.

Keywords: democracy, dictatorship, institutions, Latin America, persistence, political economy.

JEL Classification: H1, N46, N10, P16, P48.

1   Introduction

A broad and relatively recent literature investigates the effects of legal and political institutions on long-run economic development. The papers in this literature typically claim that institutions were shaped at some point in history, for example during the colonial era, and that these institutions have persisted over time and influence economic outcomes today. A number of papers illustrate that countries where institutions were shaped by economic and political elites of the past, in order to promote their own interests, tend to be less economically developed today (see Acemoglu, Johnson and Robinson, 2001, 2002 and 2006, and Engerman and Sokoloff, 1997).

A fundamental question about this argument is, why and how do institutions persist? If some institutions benefit only a minority in society (the elite) and hinder economic growth, then why don't they change when the country transitions to democracy? A recent paper by Acemoglu and Robinson (2008) provides an answer to these questions by developing a theoretical model that predicts that transition to democracy does not necessarily lead to a loss of economic and political power of the elite. In this model, the elite can influence democratic decision-making by undertaking several forms of investment, such as lobbying, paramilitary forces, and patronage. This implies that institutions and policies are not necessarily different in a democracy from what they are in a non-democracy[1].

Our paper contributes to this literature by illustrating that legislative malapportionment can also serve as a political tool for pre-democratic elites to preserve their political power and economic interests in a democracy. Legislative malapportionment refers to a *discrepancy between the share of seats and the share of the population* held by each electoral district. Many constitutions explicitly guarantee the legal equality of each citizen's vote, implying that electoral districts should have the same share of lower house representatives as their respective share of the country's population. However, this principle does not always hold in practice and consequently the lower houses in many countries are malapportioned.

The paper first provides a political economy rationale for the emergence and persistence of legislative malapportionment. We base this rationale on the argument that, at the time of transition to democracy, groups that held political power during the preceding dictatorship[2] may have strong

---

[1] Mulligan, Gil and Sala–I–Martin (2004) show empirically that democracies do not necessarily have different public policies than authoritarian regimes. Moreover, Persson and Tabellini (2006) argue that whether democracies perform better economically than non-democracies or not depends on their institutional arrangements.

[2] In this paper we use the term dictatorship to refer to any non-democratic regime.

incentives to manipulate the newly established political institutions in order to protect their political and economic interests.[3] We claim that legislative malapportionment provides these groups with a way of enhancing their *de jure* power in democracies by over-representing certain geographic areas and by favoring certain political parties versus others. This skewed political representation survives in equilibrium as long as it makes democratic consolidation more likely. At the same time, it is associated with lower political competition and distorts public policies, which also helps to preserve the power of the pre-democratic elite.

We then test this theoretical argument using data from Latin America[4]. In contrast to other features of political institutions, such as patronage, corruption or lobbying, malapportionment is clearly defined and measurable, allowing us to test the predictions of our argument empirically. We first rely on within country data to examine the political tendencies of electoral districts that are overrepresented in the sense that they have a higher share of representatives in the lower house than their population share. Consistent with our theoretical argument, we show that in the first election after transition to democracy, overrepresented districts are more likely to vote for parties that are close to pre-democracy ruling groups. As an additional check, we also provide evidence showing that overrepresented districts were more likely to support dictatorships in elections held in pre-democratic times.

We then use panel data for eleven Latin American countries, covering the late XIX century to the present, to show that higher legislative malapportionment makes democratic consolidation more likely to occur, possibly because it helps to safeguard the interests of the groups that held political power before the transition to democracy. Using non-linear models, our results suggest that the positive effect of malapportionment mostly operates through the transition to democracy margin. That is, higher malapportionment is positively associated with the probability of transitioning to democracy. In contrast, we find some evidence that the probability of remaining in a democracy decreases when malapportionment increases in countries that are *already democracies*.

We also examine other political and economic policy variables associated with legislative malapportionment. By using within country data, we find that overrepresented districts have lower levels of political competition. Finally, even though overrepresented districts are not different from underrepresented districts with respect to output per capita and inequality, they receive larger transfers per capita from the central government. This last finding goes against the insights from

---

[3] This argument is closely related to the models developed in Acemoglu and Johnson (2006, 2008) where the elite manipulates institutions to increase their political power after transition to democracy.

[4] We chose to limit the analysis to Latin America for several reasons. First, a long time series of data on legislative malapportionment is available for these countries. Second, the history of Latin American countries is characterized by many episodes of transition from dictatorship to democracy (and vice versa), providing variation for our empirical analysis. Finally, the relatively high degree of historical and institutional homogeneity in this sample of countries allows us to better isolate the relationship between legislative malapportionment and other political and economic outcomes.

traditional models of redistributive politics and confirms that unequal representation can translate into a higher ability to gain monetary benefits.

Although we provide evidence suggesting that malapportioment preserves the political power of pre-democratic elites, we do not show explicitly that this is linked to the persistence of weak property rights or contracting institutions that can affect economic development (see Acemoglu and Johnson, 2005). The reason for this is that we do not have long panel data or within country data on these institutions to test whether they are correlated with malapportionment. The cross-country correlations depicted in Figures 1 and 2, though, show that countries with higher malapportionment have weaker property rights institutions and lower GDP per capita, as we would expect based on the theoretical arguments and empirical evidence presented in this paper. However, we cannot explicitly test whether these correlations are causal or not since we do not have an exogenous source of variation in malapportionment.

The paper is organized follows. Section 2 provides a short discussion of malapportionment and develops our theoretical argument for the emergence and persistence of legislative malapportionment. It also outlines the possible channels through which legislative malapportionment could affect political and economic policy outcomes. Section 3 describes our data. Section 4 includes the empirical analysis, and Section 5 concludes.

2   Motivating Theory

This section first discusses several general features of malapportioment and then lays out our theoretical argument for the origins and consequences of malapportioment.

A long standing literature in political science (Taagepera and Shugart, 1989; Samuels and Snyder, 2001; Snyder and Samuels, 2004) identifies malapportionment as a formal and often deliberate "pathology of electoral systems". Malapportionment – a discrepancy between the share of legislative seats and the share of population held by electoral districts – violates the "one person, one vote" principle that authors like Robert Dahl (1971, 1989) consider to be a basic pillar of fair democratic regimes. Even though this principle is often guaranteed by constitutional charts, in many countries it has been disregarded or implemented only after judicial intervention[5].

As Snyder and Samuels (2004) point out, countries with a bicameral system may display a high level of malapportionment in the upper chamber since this chamber usually represents all the geographical constituencies more or less equally. While upper chamber malapportionment is,

---

[5] For example, with two verdicts, *Baker v. Carr* in 1962 and *Wesberry v. Sanders* in 1964, the US Supreme Court ruled in favor of redesigning electoral districts since they were characterized by high levels of malapportionment. The Supreme Court's motivation for these sentences was the necessity to safeguard the "one man, one vote" principle (see Casper, 1973).

therefore, normatively justifiable, there is no *a priori* reason for weighing the votes of citizens unequally in the lower chamber. This paper thus focuses only on lower chamber malapportionment.

Lower chamber malapportionment can arise spontaneously over time due to migration or different regional patterns of population growth. Western European and North American democracies typically have low levels of malapportionment since they periodically reapportion the number of seats attributed to electoral districts in response to these demographic changes (Snyder and Samuels, 2004).

On the other hand, the data from Samuels and Snyder (2001) reported in Tables 1 show that many of the countries with high legislative malapportionment are newly established or consolidating democracies. In addition, data from Snyder and Samuels (2004) on Latin America reported in Table 2 suggest that malapportionment not only characterizes democracies around the time of their establishment, but that it tends to persist over time in some countries[6]. It therefore seems unlikely that malapportionment is exclusively due to dynamic phenomena such as migration and different regional patterns of population growth.

In this paper, we argue that pre-democratic elites strive to promote malapportionment as a political tool for preserving the political and economic power they had before transition to democracy. This argument builds on the model of transition to democracy developed by Acemoglu and Robinson (2006). We rely on the main insights of this model to study the origins and the persistence of malapportionment.

Acemoglu and Robinson (2006 and 2008) highlight how elite groups that hold power in dictatorships can manipulate *de jure* or *de facto* democratic institutions in order to preserve their political and economic interests. Acemoglu and Robinson (2006)'s model assumes the existence of two groups: (i) the "elite", typically *but not necessarily* the richest fraction of the population[7] that holds political power during a dictatorship, and (ii) the "citizens", typically the poorer fraction of the population. In addition, the model assumes that political contracts are incomplete, meaning that the elite promising benefits to the citizens is not incentive compatible ex-post, and that the citizens can threaten the elite with revolution if they do not receive enough income transfers[8]. In this set-up, redistributive policies are only sustainable and credible if the elite transfer political power, at least in part, to the citizens. The main insight of this model is that, in a Markovian equilibrium,

---

[6] Snyder and Samuels (2004) report that, among the Latin American countries listed in Table 2, only Colombia, Uruguay and Venezuela do not have formal constitutional provisions that guarantee the "one citizen - one vote" principle. The remaining countries (with the exception of Peru, but see footnote 14 for a discussion on this) display high levels of malapportionment despite the fact that their constitutions formally prescribe the equality of each citizen's vote.

[7] In general, the elite do not need to be the richest group in the population. They could be any small group that earns political or economic rents during a dictatorship. These rents could be lost as a consequence of the transition to democracy.

[8] In Acemoglu and Robinson's model, an exogenous shock determines the likelihood that citizens will threaten the elite with revolution.

democratization acts as a credible commitment to pro-citizen policies. In this equilibrium, the elites have to democratize in order avoid strikes, riots or - in the limit - a revolution.

However, it is possible to have a transition toward a distorted or "captured" democracy, where the elite hold proportionally more political power than corresponds to their population share. This is particularly the case when the elite have vested economic interests that can be threatened in the new democratic regime[9]. In fact, the policies preferred by the median voter in a non-distorted democracy (a "citizen") are likely to threaten the elite's economic interests, but, as long as the citizens – for ideological preferences or economic reasons – are still better off in a democracy, they may commit not to harm the elite's interests by accepting a "captured" democracy. Even though this institutional arrangement is costly for the citizens – it may, for instance, limit the scope for redistributive policies – it can make transition to democracy more likely[10] since the elite are more likely to agree to a "captured" democracy than to a non-distorted democracy[11].

Applying this political economy framework to our paper, we view malapportionment as a device that the elite can employ to keep *de jure* political power after transition to democracy[12]. That is, malapportionment could allow a democracy to emerge and persist but in a "captured" form with the elite still being able to influence policy choices. Acemoglu and Robinson (2008) highlight a number of other mechanisms that the elite can use to keep *de facto* power in a democracy, such as lobbying, paramilitary forces, and patronage. These mechanisms may be difficult to implement since they involve collective action problems. Malapportionment, on the other hand, can be put in place at the time of transition to democracy and, as we argue below, can then be self-enforcing over time.

Snyder and Samuels (2004) discuss a number of case studies of Latin American countries that document how military dictatorships redistributed seats in order to over-represent areas with

---

[9] Acemoglu and Robinson (2006) use the example of the Chilean "*democracia protegida*" after the Pinochet dictatorship as an example of a distorted democracy in which the former dictator and its followers held a disproportionate amount of *de jure* political power. In general, their model implies that countries where elite groups hold a larger share of national income are more likely to be characterized by distorted democratic institutions. For the concept of "captured" democracy see also Acemoglu, Ticchi and Vindigni (2008).

[10] Chapter 6 in Acemoglu and Robinson (2006) describes under which circumstances granting larger power to the elite in a democracy makes a transition to democracy more likely.

[11] This argument is also related to Dahl (1971), who states that democracies can be defined in terms of (i) institutionalization and (ii) representation. Successful democracies start with (i) and later move to (ii). In contrast, failures start with (ii) and follow with (i). Malapportionment could thus be present in the early stages of successful democracies and could help their consolidation. In Section 4, we test empirically whether malapportionment fosters transitions to democracy and find support for this idea.

[12] Several other papers investigate the endogenous choice of different democratic institutions. Aghion, Alesina, and Trebbi (2004) focus on the political economy of choosing the size of the minority needed to block legislation and the optimal size of the supermajority necessary to govern. Similarly, Trebbi, Aghion, and Alesina (2008) develop a theoretical model to show how the majority of a population can have strong incentives to manipulate electoral rules as the size of the minority changes. Finally, Ticchi and Vindigni (2010) model the determinants of the choice between majoritarian and consensual democracies. They show that more unequal countries are more likely to choose a majoritarian democracy..

political tendencies more in line with their own. This was the case both in Argentina before transitioning to democracy in 1983 and in Brazil on the eve of the restoration of democratic gubernatorial and federal elections in 1982. In Argentina, 44% of the seats in the Chamber of Deputies are assigned to districts that account for only 31% of the national population. In Brazil, states whose inhabitants amount to 42% of the national population, are endowed with 51% of the Lower Chamber's seats. In Chile, the Pinochet regime (1973-1990) behaved in a similar manner. Before Chile transitioned to democracy, the electoral system was redesigned to guarantee the overrepresentation of areas with more conservative political tendencies. As a result, after the first democratic election in 1989, half of the seats in the Lower Chamber were held by representatives from regions where only 35% of the country's population lived[13]. In Section 4, we investigate this issue empirically in a larger set of Latin American countries. Specifically, we test whether overrepresented areas tend to lend political support to parties that are close to pre-democratic ruling groups.

In sum, we argue that malapportionment is a tool that pre-democratic elites can use to achieve a certain degree of institutional persistence. That is, even after a country formally transitions to democracy, policies can still be shaped by the elite's preferences since malapportionment increases the number of lower house representatives of parties aligned with the elite. Moreover, if malapportionment is indeed a way of preserving power for the elite, then it is basically self-enforcing, such that it persists over time. Since malapportionment is a legal device, any change to it will require a plurality of votes in parliament. However, such a plurality is unlikely to be achieved since malapportionment distorts the allocation of seats in favor of the groups that stand to gain from preserving this distortion.

Malapportionment could also lead to the persistence of the elite's political power by affecting the degree of political competition within electoral districts. For example, Cox and Katz (1999) find strong evidence that a massive redistricting in the US that eliminated substantial levels of malapportionment changed electoral outcomes. In particular, this reapportionment seems to have led to the disappearance of a long lasting pro-Republican bias in the translation of votes into seats in non-southern congressional elections. We test empirically whether malapportionment is correlated with political competition in Section 4.

Finally, malapportioment could foster the persistence of the elite's political power by changing the allocation of public funds to areas in which the members of the elites have more political representation. Several empirical papers establish a link between malapportionment and the distribution of public spending. Ansolabehere, Gerber and Snyder (2002) study the effects of court

---

[13] See Snyder and Samuels (2004): p.145 for Argentina; p. 148 for Brazil; and p. 149 for Chile.

ordered redistricting in the US. They document that reapportionment did not change the overall level of public spending, but significantly affected its distribution among electoral districts within US states. Similarly, Horiuchi and Saito (2003) analyze the consequences for public spending of the reapportionment that took place in Japan in 1994. They find that this reform was associated with the equalization across municipalities of public transfers per capita. Other studies such as Gibson, Calvo and Falletti (2004) for Latin America and Knight (2004) for the US Senate highlight that overrepresented areas get a larger share of federal funds. Aghion, Boustan, Hoxby, and Vandenbussche (2006) show that members of the appropriation committee in the US legislature are able to channel more resources to electoral districts located in areas they represent. Although these papers document empirically that the political representation of a region can influence the allocation of public resources, in Section 4, we test whether this relationship is also present in our dataset.

3   Data description

This section describes the measures of legislative malapportionment used in the empirical analysis, as well as our outcome and control variables. Summary statistics for these variables are reported in Table 3. Both our panel data and our within country data only include Latin American countries. The data used in this paper comes from a number of different sources, and, as shown in Table 3, not all variables are available for all countries.

3.1   Measures of legislative malapportionment

This paper uses two main measures of lower chamber legislative malapportionment. The first measure is an index of malapportionment at the country level provided by Samuels and Snyder (2001) and Snyder and Samuels (2004). Their measure is a slight modification of the Loosemore–Hanby index of disproportionality for electoral systems. Country i's overall level of lower house malapportionment is given by:

$$MAL_i = \frac{1}{2}\sum_{j=1}^{N}\left|s_j - v_j\right| \tag{1}$$

where s_j is the share of all seats allocated to district j and v_j is the share of the overall population that resides in district j[14]. The difference $s_j - v_j$ represents district j's deviation from perfect apportionment. Equation 1 sums over all N electoral districts in country i. The index MAL_i thus

---

[14] The original Loosemore – Hanby's index is meant to capture dis-proportionality, which arises when political parties are endowed with a share of legislative seats different from their share of votes. Therefore, in the original index, v_j and s_j denote respectively the share of votes and of seats going to a political party (see Monroe, 1994).

denotes the share of seats allocated to districts that would not have received those seats if there were no legislative malapportionment.

A score of zero corresponds to the case of a perfectly apportioned lower chamber where no citizen's vote weighs more than another's. Full malapportionment corresponds to a score of one and denotes a situation where a single district with only one voter has the right to choose all the legislators. Or, in an intermediate example, a value of 0.25 of the index means that one fourth of the seats are allocated to districts that would not have them in the absence of legislative malapportionment.

We also use a within country variant on the measure of malapportionment in our empirical analysis. To measure electoral district j's degree of over- or under-representation we follow the existing approach in the literature (see Ansolabehere et al., 2002) and adopt the following measure:

$$rep_j = \frac{s_j}{v_j} \tag{2}$$

where s_j is the share of seats allocated to the district j and v_j is district j's share of the population. Values greater than one denote overrepresentation of district j, and the opposite is true for values smaller than one. The data needed to compute (2) come from Samuels and Snyder (2001) and Snyder and Samuels (2004), as well as from national sources (the Appendix lists these data sources).

3.2 Cross-country panel data

We use data on democracy for a panel of eleven Latin America countries[15], covering the period from 1870 to 2000. Our measure of democracy is the variable *polity2* from the 2007 Polity IV Project dataset. This indicator is coded taking into account several features of a country's political institutions, such as the openness and competitiveness of executive recruitment, the constraints placed on the chief of the executive, and the competitiveness and regulation of political participation. It ranges from –10 to +10 with higher values corresponding to better democratic institutions[16]. We normalize the measure so that all its values fall between zero and one.

Some of our cross-country regressions control for per-capita GDP, which we take from Maddison (2005) for all countries but Chile. For Chile, we use data from Díaz et al. (2008) since they provide data for more years than Maddison (2005).

---

[15] The countries included in the panel dataset are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Honduras, Peru, Uruguay and Venezuela.
[16] See Marshall, Gurr and Jaggers (2010).

3.3 Within country data

Our source for Latin American within country data is Bruhn and Gallego (2010). This source provides data on income per capita, the Gini index, temperature, rainfall, and altitude, as well as a landlocked dummy, for different regions within fourteen Latin American countries[17]. We collected additional within-country information on political parties, electoral outcomes, and on transfers from the central government from several national sources and documents (listed in the Appendix).

4 Empirical evidence

This section provides empirical evidence for our theoretical argument from Section 2. We map the theory into the following three empirical tests. First, a key element of our argument is that legislative malapportionment can provide the pre-democratic elite with political influence after transition to democracy. In particular, the historical examples in Section 2 suggest that the pre-democratic elite can deliberately allocate lower house representatives to over-represent electoral districts that are aligned with the elite. If this is indeed the case, we should observe that overrepresented electoral districts are more likely vote for parties associated with the pre-democratic regime. Section 4.1 empirically examines the correlation between a district's level of representation and vote shares for parties that are close to non-democratic regimes in six Latin American countries.

Second, Section 2 argues that the fact that malapportionment can preserve some of the pre-democratic elite's political power may make transition to democracy more likely (since the elite feels less threatened by a democracy and is more likely to agree to a transition to democracy). We investigate this mechanism in Section 4.2, by studying the cross-country, cross-time relationship between malapportionment, transition to democracy, and democratic consolidation.

Third, Section 2 suggests that overrepresented electoral districts may be characterized by a lower degree of political competition and may receive larger transfers from the central government, both of which may help to explain the persistence of the elite's political power after a transition to democracy. We test whether overrepresented districts are subject to less political competition in Section 4.3 and whether they receive higher transfers from the central government in Section 4.4.

4.1 Malapportionment and political representation of pre-democracy elites

This section examines whether, in line with the theoretical argument and historical evidence in Section 2, regions in Latin America that have a larger share of representatives in the lower house

---

[17] The countries covered in this within country dataset are Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Uruguay, and Venezuela.

than their population share are more likely to vote for the political parties closest to the most recent non-democratic regime. We identify these parties based on the information provided by the Economist Intelligence Unit's country reports and other national sources. For each state or region, we compute the vote shares that these political parties received in the first lower house election after transition to democracy.

We collected data for 118 regions in six Latin America countries that have transitioned to democracy since the 1980s and that have political groups close to the previous non-democratic regime (Bolivia, Brazil, Chile, Mexico, Paraguay, and Uruguay)[18]. The model we estimate is:

$$s_{ij} = \alpha + \beta rep_{ij} + \phi x_{ij} + \delta_i + \varepsilon_{ij} \tag{3}$$

where for each country i, s_{ij} is the share of votes in the elections for the lower house going to the parties close to the pre-democracy regime in region j, rep_{ij} is the log of the measure of district j's over or under-representation described in Section 3.1, x_{ij} a set of climate (rainfall and temperature) and geography (elevation and a landlocked dummy) controls, and the δ_i's are a full set of country fixed effects.

The results in Columns 1 and 2 of Table 4 document that overrepresented electoral regions are more likely to vote for representatives belonging to the political parties close to former non–democratic regimes in the first election after transitioning to democracy. Our estimates imply that a one-standard deviation increase in the log of overrepresentation is associated with an increase of between 6.4 and 10 percent in the vote share going to parties close to pre-democracy regimes (equivalent to between 26 and 40 percent of a standard deviation of the vote shares going to these parties). We interpret this finding as evidence that malapportionment can provide political influence to pre-democracy elites after transition to democracy.

Next, we conduct a robustness test in which we run regressions similar to the Equation 3 but using data for elections that took place *during* non-democratic times. This is the case for the 1978

---

[18] We consider the following years for the low chamber elections and the following parties to be closest to the former non-democratic regime:
- Bolivia, 1989, the A.D.N. party.
- Brazil, 1990, the P.D.S. party.
- Chile, 1989, the Alianza coalition.
- Mexico, 2000, P.R.I.
- Paraguay, 1996, the Colorado party.
- Uruguay, 1984, the Colorado party.

The case of Peru is also interesting, but we do not include it here because, since the 1991 reform, Peru has a lower chamber with only one nationwide electoral district and therefore it is not possible to compute the degree of over-representation for each region. This reform was implemented during the Fujimori dictatorship, and in the 1990 election the degree of over-representation was negatively correlated with the percentage of support for Cambio 90, the political group closest to Fujimori in the 1990 elections. Therefore, the 1991 Fujimori reform can also be explained with our theory.

elections in Brazil, the 1988 plebiscite in Chile, and the 1991 parliamentary elections in Mexico. For these elections, we computed the share of votes supporting the regime in each electoral region[19]. The results in Columns 3 and 4 of Table 4 show a positive correlation between overrepresentation in democratic times and support for the elites in pre-democratic times. The economic significance of these results is similar to the first two columns. A one standard deviation rise in overrepresentation translates into an increase of between 38 and 56 percent of a standard deviation of votes supporting the regime.

Table 5 provides an indication of how large the additional political influence is that pre-democracy elites can gain after transition to democracy due to malapportionment. The table shows that the percentage of seats that went to parties associated with pre-democratic elites in the first election after transition to democracy was quite a bit larger than the percentage of votes that went to these same parties, in all countries other than Brazil. On average, parties associated with pre-democratic elites received 33.5 percent of all votes, but due to malapportionment this translated into 39.5 percent of seats in the lower house.

Overall, the evidence in Tables 4 and 5 supports our argument that malapportionment can provide political power to pre-democracy elites since malpportionment tends to give more political representation to parties that are aligned with the pre-democracy elite.

4.2   Malapportionment and democratic consolidation

Our finding from the previous section that malapportionment may allow pre-democracy elites to sustain their political power in a democracy could imply that malapportionment may make transition to democracy and democratic consolidation more likely. This is because elites have fewer incentives to block a transition to democracy or to overthrow democratic regimes if they can exercise political power even in a democracy. This section provides empirical evidence for a positive relationship between legislative malapportionment and the probability of transitioning to a democracy.

Our empirical strategy closely follows Acemoglu, Johnson, Robinson, and Yared (2005 and 2007). The first estimating equation is:

$$d_{it}^{+} = \alpha d_{it-1} + \beta mal_{it-1} + \gamma y_{it-1} + \delta_i + \mu_t + \varepsilon_{it-1} \tag{4}$$

where d_{it} is country i's *polity2* score of democracy at time t, normalized between 0 and 1 and $d_{it-1}^{+} = \max\{d_{it}, d_{it-1}\}$. This specification, therefore, examines only upward trends in the democracy

---

[19] For Brazil, we look at support for the ARENA party, for Chile at the SI option in the 1988 plebiscite, and for Mexico support in favor of the PRI party.

score. Equation 4 includes the lagged value of democracy to capture persistence in this variable and the lag of the logarithm of legislative malapportionment (mal_{it-1}). Since an extensive literature dating back to Lipset (1959) claims that economic prosperity has a positive impact on democracy and democratic consolidation, and given that malapportionment is correlated with income[20], we also include the log of lagged income as an additional control variable (y_{it-1})[21]. Finally, we control for country and time fixed effects. The observations, going from 1870 to 2000, are taken over five year intervals, and standard errors are clustered at the country level.

Column 1 of Table 6a reports OLS estimates of Equation 4. The estimate of the coefficient of interest β is positive and statistically significant, suggesting that higher legislative malapportionment promotes democratic consolidation for the Latin American countries included in our sample. The democracy score shows high persistence over time and income per capita is positively correlated with the democracy score[22].

As a robustness check, Column 2 of Table 6a displays the estimates of the Equation 4 using a GMM procedure, to address the potential biases that can arise when estimating a quasi-dynamic panel with country fixed effects. The results confirm the positive effect of malapportionment on democratic consolidation. However, the size of the coefficient on lagged malapportionment increases in magnitude, suggesting that the estimates in Column 1 may indeed by biased. In the GMM regression, the lagged value of income is no longer statistically significantly correlated with the democracy score, which is consistent with Acemoglu et al. (2007).

The effect of malapportionment on democratic consolidation is also economically significant. Using the GMM estimates from Column 2, we find that a one standard deviation increase in log malapportionment is associated with an increase of 0.73 standard deviations in the democracy index in the short-run. Taking into account that the democracy index is persistent over time, the long-run effect of malapportionment on democratic consolidation is even larger. In the long-run, a one standard deviation increase in log malapportionment leads to a one standard deviation increase in the democracy index.

Next, we estimate the same equation but for downward trends in democracy by using $d_{it-1}^- = \min\{d_{it}, d_{it-1}\}$ as the dependent variable. Columns 3 and 4 of Table 6a display OLS and GMM estimates, respectively. The point estimates are negative but statistically and economically

---

[20] In a panel regression for our sample of Latin American countries, controlling for country and time fixed effects, the results suggest that the lagged level of malapportionment Granger – causes income, but not the opposite. These results are available from the authors upon request.

[21] Acemoglu et al. (2007) provide a critical reexamination of the empirical evidence for the modernization hypothesis.

[22] This last finding is not in line with Acemoglu et al. (2007). Using a sample much larger than ours, they find no statistically significant correlation between income and improvement in the democracy score.

insignificant, suggesting that malapportionment does not play a role in explaining the deterioration of democratic institutions.

In addition, and following Acemoglu et al. (2007), we estimate two non-linear equations that try to account for the fact that the countries that transition to and exit from democracy may be endogenously selected. First, we consider a double hazard model expressed in terms of two functions for the probability of transitioning to democracy and the probability of remaining in democracy:

$$\Pr\left(D_{it} = 1 \mid D_{it} = 0, mal_{it-1}, y_{it-1}, t\right) = \Phi\left(\lambda^T mal_{it-1} + \varphi^T y_{it-1} + \mu^T t\right) \tag{5}$$

$$\Pr\left(D_{it} = 1 \mid D_{it} = 1, mal_{it-1}, y_{it-1}, t\right) = \Phi\left(\lambda^R mal_{it-1} + \varphi^R y_{it-1} + \mu^R t\right) \tag{6}$$

where $D_{it} = \mathbf{1}(polity2_{it} > 0)$ – i.e., D_{it} is a transformation of the continuous *polity2* variable into a dichotomous variable[23] and $\Phi(.)$ is the Normal CDF. Due to the incidental parameters problem that arises in most non-linear models, we cannot include country fixed effects in these regressions. In order to address this issue, we assume a functional form for the country fixed effects, following Acemoglu et al. (2007) and Chamberlain (1980), such that:

$$\delta_i^n = \omega^n \overline{mal}_i + \theta^n \overline{y}_i \quad \text{for } n = T, R. \tag{7}$$

where δ is the country fixed effect and over-lined variables denote averages of the variables for each country *i*. Adding (7) to Equations 5 and 6 we get the following equations:

$$\Pr\left(D_{it} = 1 \mid D_{it} = 0, mal_{it-1}, y_{it-1}, t\right) = \Phi\left(\lambda^T mal_{it-1} + \varphi^T y_{it-1} + \mu^T t + \omega^T \overline{mal}_i + \theta^T \overline{y}_i \right) \tag{8}$$

$$\Pr\left(D_{it} = 1 \mid D_{it} = 1, mal_{it-1}, y_{it-1}, t\right) = \Phi\left(\lambda^R mal_{it-1} + \varphi^R y_{it-1} + \mu^R t + \omega^R \overline{mal}_i + \theta^R \overline{y}_i \right) \tag{9}$$

Table 6b contains the results for the marginal effect estimates of the non-linear models. The hazard model (Equation 5, reported in Column 1) suggests that malapportionment has a positive and significant effect on the probability of transitioning to democracy. The estimates imply that a one standard deviation in the log of malapportionment increases the probability of transitioning to democracy by about 28 percent. This is a sizeable effect given that the average probability of transitioning to democracy for all countries and years in our sample is 26 percent.

When we estimate the Chamberlain model (Equation 8, reported in Column 2 of Table 6b), to control for country fixed effects, malapportionment loses statistical significance. This may be because we include both the lag of malapportioment and average malapportionment as regressors and these two variables are highly correlated (since malapportionment is highly persistent over

---

[23] This dichotomous classification is based on Persson and Tabellini (2009). We use the dichotomous version of the *polity2* index to (i) be consistent with our previous linear models and (ii) to maximize the time coverage of the dataset.

time). The coefficients on both of these variables are positive and relatively large, suggesting that they may be imprecisely estimated due to collinearity. To examine this issue in more detail, we estimate the model without including lagged malapportionment (Column 3 of Table 6b). This specification shows a positive and statistically significant coefficient on average malapportionment, implying that a one standard deviation increase in log malapportionment increases the probability of transitioning to democracy by 26 percent. This is almost the same magnitude as estimated in the harzard model in Column 1 of Table 6b. Taken together, the results in Tables 6a and 6b suggest that malapportionment has a positive and significant effect on the probability of transitioning to democracy.

Columns 4 through 6 in Table 6b display non-linear estimates of the correlation between malapportionment and the probability that a country remains a democracy. We find that malapportionment negatively affects the probability of remaining in a democracy. This effect is statistically significant, but its economic significance is smaller than for transitions to democracy: a one-standard-deviation increase in malapportionment decreases the probability of remaining in a democracy by between 16 and 19 percent. For comparison, the average probability of remaining in a democracy in our sample is about 52 percent.

This last finding indicates that increasing malapportionment in a country that already is a democracy does not promote democratic consolidation. On the contrary, increasing malapportionment after transition to democracy can endanger the democracy and can lead the country back to a non-democracy. Taken together with the fact that we do not find a statistically significant negative effect of malapportionment on the democracy index in Columns 3 and 4 of Table 6a, this implies that the negative impact of malapportionment on democracy does not correspond to small changes in the democracy index, but to discrete changes in democracy (i.e. transitions from democracy to non-democracy).[24]

Overall, the results in this section are consistent with our hypothesis that malapportionment can make transition to democracy more likely. In addition to our results from Section 4.2, this provides further evidence for our argument that malapportionment may allow pre-democracy elites to sustain their political power in a democracy, which is why the elites are more likely to agree to a transition to democracy. As mentioned above, malapportioment is highly persistent over time, implying that the pre-democracy elite's political power can potentially also persist over time in a democracy. The following two subsections investigate two features of malapportionment that could further allow pre-democratic elites to maintain political influence over time in a democracy.

---

[24] A decrease in the democracy index in the linear model does not necessarily imply that the country left the democratic state in the non-linear model (depending on the size of the decrease in the democracy index).

4.3 Malapportionment and political competition

This section uses within country data for a number of Latin America countries to study the relationship between legislative malapportionment and political competition. We rely on *within* country data since our theoretical argument suggests that malapportionment shifts the distribution of political power across regions within countries, which may also affect the degree of political competition.

Our measure of political competition is the Herfindahl-Hirschmann index of political concentration (HH index). We calculate this index using the share of votes going to different political parties (or coalitions of parties) in different regions[25]. An increase in this index denotes an increase in the degree of political concentration. The first two columns of Table 7 display the results of running regressions similar to Equation 3 but using the HH index as the dependent variable. Columns 1 and 2 include regressions without and with controls, respectively. The results show a positive relationship between malapportionment and the degree of political concentration. However, the coefficients in the regression with controls are only marginally statistically significant (p-value of 0.15). In terms of economic significance, a one standard deviation increase in overrepresentation leads to an increase of about 0.09 standard deviations of our measure of political concentration.

To further study this mechanism and to relate it to the results in Table 4, we examine the effect of malapportioment on an interaction term between the HH index and the vote share going to parties associated with pre-democracy regimes. The idea here is to study whether political concentration in overrepresented areas favors parties that are closer to former non–democratic regimes[26]. Columns 3 and 4 of Table 7 display the results without and with controls. The estimates in both columns are positive, statistically significant and economically relevant. A one standard deviation increase in overrepresentation is associated with an increase in the dependent variable by between 0.35 and 0.50 standard deviations.

All in all, these results imply that the degree of political concentration, particularly in favor of parties that benefit from overrepresentation after transition to democracy, increases when overrepresentation increases, as suggested by our motivating theory.

---

[25] We constructed the HH index for Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guatemala, Honduras, Mexico, Panama, Paraguay, Uruguay, and Venezuela, using as many years of voting data as are available for each country.

[26] The interaction term can be interpreted as the probability that two random voters vote for a party that is associated with a former non-democratic regime, because it is the probability that two people vote for the same party (the HH index) times the probability that a person votes for a party associated with a former non–democratic regime (the vote share going to this party).

4.4 Malapportionment and government transfers

Our theoretical discussion and the previous literature also suggest that malapportionment could affect the distribution of public transfers across regions. We estimate the relationship between malapportionment and transfers per capita using within country data[27] and a model similar to Equation 3, where the dependent variable is transfers per capita from the central government to region *j*. We use two alternative measures of transfers. "Total transfers" includes all transfers that the central government makes to a region, including transfers to state and municipal governments, social transfers, direct expenditures and investment by the central government, as well as transfers to public universities. The categories included vary from country to country, depending on availability. A more uniform variable is "transfers to sub-national government" which includes only transfers to state and/or municipal governments within a region.

The results in Columns 1 and 2 of Table 8 confirm the previous findings in the literature that overrepresentation translates into higher transfers per capita from the central government. In terms of economic significance, these results imply that a one standard deviation increase in malapportionment at the local level increases transfers per capita by about ten percent of a standard deviation.

Columns 3 and 4 of Table 8 check whether overrepresented areas are either poorer or more unequal than underrepresented areas. If this were true, then the higher transfers to these regions could be due to a welfare criterion in which poorer regions or poorer people receive more transfers. However, Columns 3 and 4 show that overrepresented areas are neither poorer nor more unequal than underrepresented areas. We thus interpret the results in Table 8 as providing evidence that stronger legislative representation translates into more political influence for overrepresented regions. Moreover, since overrepresented regions are more likely to vote for parties associated with pre-democratic regimes (as shown in Section 4.1), voters living in these regions may associate the higher transfers with these parties and may continue voting for them, thus re-enforcing and extending the political influence of pre-democratic elites.

5 Concluding Remarks

In this paper, we argue that pre-democratic elites can strategically create malapportionment in the electoral system during the transition to democracy in order to safeguard their economic interests in a newly established democracy. Our results show that higher levels of malapportionment

---

[27] Our data on government transfers covers Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Paraguay, and Uruguay.

foster transition to democracy, presumably because it makes pre-democratic elites feel less threatened by the policies that might be implemented during the new democratic regimes.

Using within-country data, we find – in line with the argument we propose – that overrepresented electoral districts are more likely to vote for parties that are close to former non-democratic regimes. Moreover, we highlight two political and economic policy features of malapportionment. First, malapportionment is associated with an increase in political concentration particularly for parties close to former non-democratic regimes. Second, overrepresented districts receive larger transfers per capita from the central government, despite the fact that they are not poorer or more unequal. This contrasts with traditional models of redistributive political economy and highlights that larger legislative representation induces greater political influence.

In future research, we plan to investigate the effects of malapportionment on economic development. The decrease in political representation or miss-allocations of public transfers we document in this paper may have negative effects on regional development. The big challenge with identifying these effects though is to find a source of exogenous variation in malapportionment at the state level. Finally, we believe that looking at specific features of democratic regimes, such as legislative malapportionment, can help to better understand why different democracies adopt different policies and how this may be related to historical factors and institutional persistence.

REFERENCES

Acemoglu, Daron, and Simon Johnson (2005) "Unbundling Institutions", *Journal of Political Economy*, 113 (5): 949-995.

Acemoglu, Daron, Simon Johnson, and James Robinson (2001) "The Colonial Origins of Comparative Development: An Empirical Investigation", *American Economic Review*, 91 (5): 1369-1401.

Acemoglu, Daron, Simon Johnson, and James Robinson (2002) "Reversal of Fortune: Geography and Institutions in the Making of the Modern World Income Distribution", *The Quarterly Journal of Economics,* 117 (4): 1232-1294.

Acemoglu, Daron, Simon Johnson, and James Robinson (2006) "Institutions as the Fundamental Cause of Long-Run Growth", in P. Aghion, and S. Durlauf (eds.), *Handbook of Economic Growth*; Amsterdam: Elsevier.

Acemoglu, Daron, Simon Johnson, James Robinson, and Pierre Yared (2005) "Income and Democracy", *NBER Working Paper 11205*.

Acemoglu, Daron, Simon Johnson, James Robinson, and Pierre Yared (2007) "Reevaluating the Modernization Hypothesis", *NBER Working Paper 13334*.

Acemoglu, Daron, and James Robinson (2006) *Economic Origins of Dictatorship and Democracy;* New York: Cambridge University Press.

Acemoglu, Daron, and James Robinson (2008) "Persistence of Power, Elite and Institutions", *American Economic Review*, 98 (1): 267-293.

Acemoglu, Daron, Davide Ticchi, and Andrea Vindigni (2008) "Emergence and Persistence of Inefficient States", *Journal of the European Economic Association*, forthcoming.

Aghion, Philippe, Alberto Alesina, and Francesco Trebbi (2004) "Endogenous Political Institutions", *The Quarterly Journal of Economics,* 119 (2): 565-611.

Aghion, Philippe, Leah Boustan, Caroline Hoxby, and Jerome Vandenbussche (2006) "Exploiting States' Mistakes to Identify the Causal Impact of Higher Education on Growth", Manuscript, Harvard University.

Ansolabehere, Stephen, Alan Gerber, and James Snyder (2002) "Equal Votes, Equal Money: Court-Ordered Redistricting and Public Expenditures in the American States", *The American Political Science Review,* 96 (4): 767-777.

Arellano, Manuel, and Stephen R. Bond (1991) "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *The Review of Economic Studies*, 58 (2): 277-297.

Bruhn, Miriam, and Francisco Gallego (2010) "Good, Bad and Ugly Colonial Activities: Studying Development Across the Americas", *The Review of Economics and Statistics*, forthcoming.

Casper, Gerhard (1973) "Apportionment and the Right to Vote: Standards of Judicial Scrutiny", *The Supreme Court Review*, 1973: 1-32.

Chamberlain, Gary (1980) "Analysis of Covariance with Qualitative Data", *Review of Economic Studies,* 47: 225-238.

Cox, Gary W., and Jonathan N. Katz (1999) "The Reapportionment Revolution and Bias in U.S. Congressional Elections", *American Journal of Political Science,* 43 (3): 812-841.

Dahl, Robert (1971) *Polyarchy: Opposition and Participation*; New Haven: Yale University Press.

Dahl, Robert (1989) *Democracy and its Critics*; New Haven: Yale University Press.

Díaz, José, Rolf Lüders, and Gert Wagner (2008) "La Republica en Cifras: Chile 1810–2000", Economic History and Cliometrics Laboratory, Pontificia Universidad Católica de Chile.

Engerman, Stanley L., and Kenneth L. Sokoloff (1997) "Factor endowments, institutions, and differential paths of growth among new world economies", in S. H. Haber (ed.), *How Latin America Fell Behind*; Stanford: Stanford University Press.

Gibson, Edward L., Ernesto F. Calvo, and Tulia G. Falleti (2004) "Reallocative Federalism: Territorial Overrepresentation and Public Spending in the Western Hemisphere" in E. L. Gibson (ed.), *Federalism and Democracy in Latin America*; Baltimore: The Johns Hopkins University Press.

Horiuchi, Yusaku, and Jun Saito (2003) "Reapportionment and Redistribution: Consequences of Electoral Reform in Japan", *American Journal of Political Science,* 47 (4): 669-682.

Knight, Brian (2004) "Legislative Representation, Bargaining Power, and the Distribution of Federal Funds: Evidence from the U. S. Senate", *NBER Working Paper 10385*.

Lipset, Seymour M. (1959) "Some Social Requisites of Democracy: Economic Development and Political Legitimacy", *American Political Science Review,* 53 (1): 69-105.

Maddison, Angus (2005) *The World Economy. Historical Statistics*; Paris: The OECD.

Marshall, Monty G., Ted Robert Gurr, and Keith Jaggers (2010) "Polity IV Project. Political Regime Characteristics and Transitions, 1800 – 2009", *Center for Systemic Peace*.

Monroe, Burt L. (1994) "Disproportionality and Malapportionment: Measuring Electoral Inequity", *Electoral Studies,* 13 (2): 132 – 149.

Mulligan, Casey B., Richard Gil, and Xavier Sala-i-Martin (2004) "Do Democracies Have Different Public Policies than Nondemocracies?", *Journal of Economic Perspectives*, 18 (1): 51-74.

North, Douglass C. (1990) *Institutions, Institutional Change, and Economic Performance*; New York: Cambridge University Press.

Persson, Torsten, and Guido Tabellini (2006) "Democracy and Development: The Devil in the Details", *American Economic Review* 96(2): 319 – 324.

Persson, Torsten, and Guido Tabellini (2009). "Democratic Capital: The Nexus of Political and Economic Change," *American Economic Journal: Macroeconomics* 1(2): 88-126.

Samuels, David, and Richard Snyder (2001) "The Value of a Vote: Malapportionment in Comparative Perspective", *British Journal of Political Science,* 31 (4): 651-671.

Snyder, Richard, and David Samuels (2004) "Legislative Malapportionment in Latin America: Historical and Comparative Perspectives", in E. Gibson (ed.), *Federalism and Democracy in Latin America*; Baltimore: The Johns Hopkins University Press.

Taagepera, Rein, and Matthew S. Shugart (1989) *Seats and Votes: The Effects and Determinants of Electoral Systems*; New Haven: Yale University Press.

Ticchi, Davide, and Andrea Vindigni (2010) "Endogenous Constitutions", *The Economic Journal,* 120(543): 1-39.

Trebbi, **Francesco**, **Philippe Aghion, and Alberto Alesina (2008)** "Electoral Rules and Minority Representation in U.S. Cities", *The Quarterly Journal of Economics*, 123 (1): 325-357.

Figure 1: Malapportionment and GDP per Capita across Countries
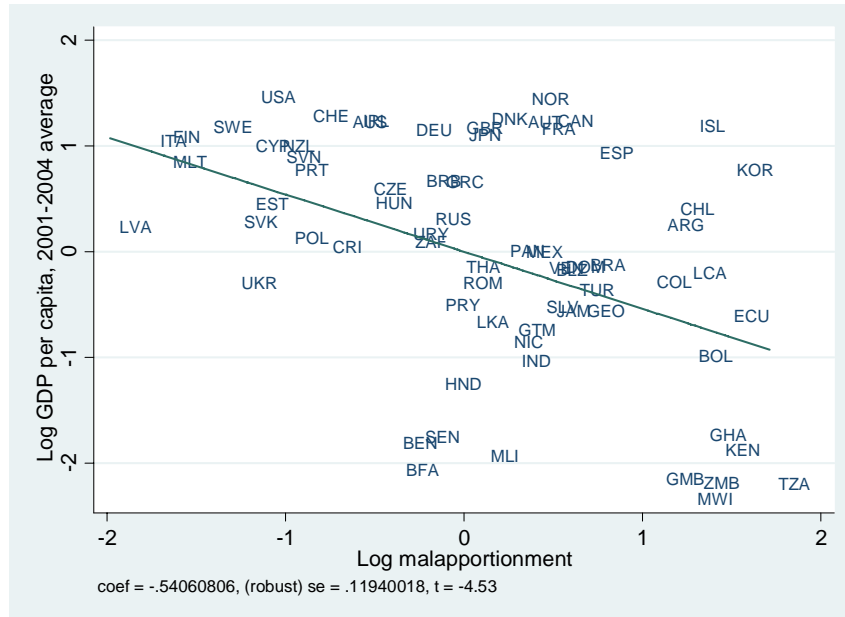
SOURCES: World Development Indicators for GDP per capita and Samuels and Snyder (2001) for the measure of malapportionment

Figure 2: Malapportionment and Institutions across Countries
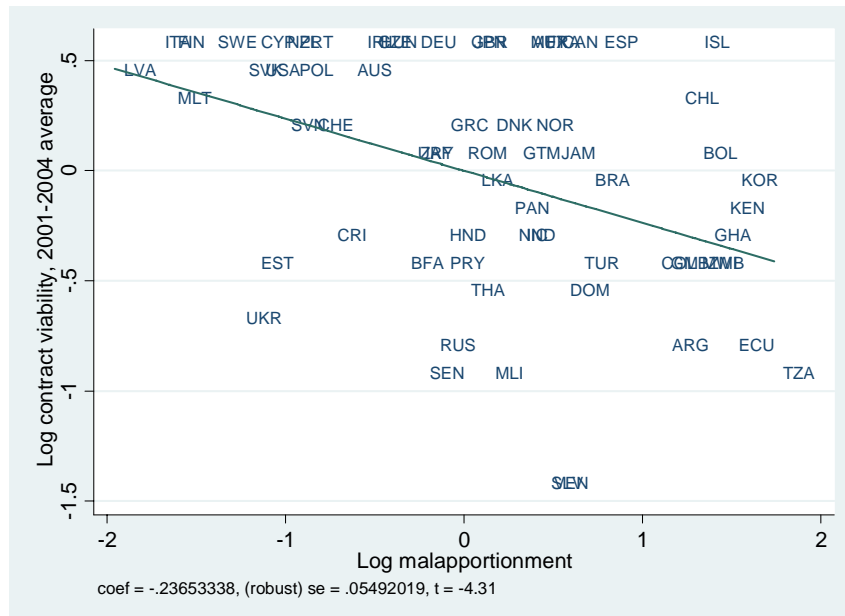
SOURCES: International Country Risk Guide (ICRG) for contract viability and Samuels and Snyder (2001) for the measure of malapportionment
NOTES: Contract viability is an index that measures property rights enforcement, with higher values indicating stronger property rights

Table 1: Most Malapportioned Countries and Transition to Democracy

Country	Malapportionment (Lower Chamber)	Transition to democracy (Year)
Tanzania	0.2619	2000
South Korea	0.2075	1987
Ecuador	0.2040	1979
Kenya	0.1946	2002
Ghana	0.1782	1996
Zambia	0.1725	1991
Iceland	0.1684	1944
Bolivia	0.1677	1982
Malawi	0.1659	1994
Chile	0.1509	1989

SOURCES: Samuels and Snyder (2001) for the measure of malapportionment and POLITY IV database (2007) for coding transition to democracy.

NOTES: Transition to democracy is defined as the first year where the variable *polity2* assumes a value greater than zero with no subsequent reversal to below zero. The year of transition to democracy in Iceland is the year in which the country became an independent Republic (CIA – The World Factbook).

Table 2: Malapportionment and Transition to Democracy in Latin America

Country	Transition to democracy	Malapportionment at transition to democracy	Malapportionment in 2000
Argentina	1983	0.15 (1985)	0.14
Bolivia	1982	0.23 (1985)	0.17
Brazil	1985	0.10 (1985)	0.09
Chile	1989	0.15 (1990)	0.15
Colombia	1957	0.15 (1960)	0.13
Ecuador	1979	0.15 (1980)	0.20
Honduras	1980	0.07 (1980)	0.04
Peru	1993	0 (1995)	0
Uruguay	1985	0.07 (1985)	0.03
Venezuela	1958	0.06 (1958)	0.07

SOURCES: Snyder and Samuels (2004) for the measure of malapportionment and POLITY IV database (2007) for coding transition to democracy.

NOTES: Transition to democracy is defined as the first year where the variable *polity2* assumes a value greater than zero with no subsequent reversal to below zero.

Table 3: Summary Statistics

	Obs.	Countries	Mean	Std. Dev.	Min	Max
Cross-country panel data						
Malapportionment	140	11	0.078	0.049	0.010	0.230
Log of Malapportionment	140	11	-2.552	0.688	-4.605	-1.470
Polity2 measure of democracy	140	11	0.652	0.274	0.05	1
Log GDP per capita	140	11	8.073	0.656	6.520	9.275
Within country data						
Share of seats/share of pop	260	14	1.772	2.854	0.556	28.024
Log(seats/pop)	260	14	-11.100	0.982	-13.007	-8.139
Vote share for pre-democratic elite						
- After transition to democracy	118	6	0.362	0.246	0	1
- Before transition to democracy	70	3	0.544	0.122	0.197	0.776
Herfindahl-Hirschmann (HH) index of political concentration	246	13	0.343	0.120	0.102	0.697
Log total transfers per capita	230	12	4.167	4.772	-2.995	13.710
Log transfers per capita to sub-national governments	177	9	3.869	5.312	-2.995	13.710
Log GDP per capita	230	12	8.506	0.652	7.13	10.608
Log Gini index	166	9	-0.695	0.162	-1.146	-0.462

Table 4: Malapportionment and Political Representation of Pre-Democracy Elites

	Dependent variable: Vote share for the pre-democratic elite			
	After transition to democracy		Before transition to democracy	
	(1)	(2)	(3)	(4)
Log(seats/pop)	0.064**	0.100**	0.070**	0.047*
	(0.026)	(0.041)	(0.031)	(0.026)
Controls	No	Yes	No	Yes
Observations	118	118	70	70
R-squared	0.47	0.56	0.49	0.60

NOTES: Region level OLS regressions with country fixed effects and robust standard errors in parenthesis. Region level controls: landlocked dummy, average yearly temperature and temperature squared, total yearly rainfall and rainfall squared, altitude and altitude squared (for sources see Bruhn & Gallego, 2010). The sample in Columns 1 and 2 includes data for Bolivia, Brazil, Chile, Mexico, Paraguay, and Uruguay. The vote share, as well as the measure of over- or under-presentation, is for the first election after transition to democracy in these countries. Columns 3 and 4 include data from Brazil, Chile, and Mexico. Robust standard errors in parenthesis. Significance levels: *10%, ** 5%, ***1%.

Table 5: Discrepancy between Votes and Seats for Pre-Democratic Elites

Country	Votes received	Seats received
Bolivia	42.3%	54.6%
Brazil	8.9%	8.3%
Chile	31.2%	40.0%
Mexico	36.9%	44.0%
Paraguay	41.6%	48.8%
Uruguay	40.3%	41.4%
Average	33.5%	39.5%
Median	38.6%	42.7%

NOTES: Votes shares refer to the vote shares received by parties associated with pre-democratic elites, in the first election after transition to democracy. In many countries, these parties receive a higher share of seats than votes due to malapportionment.

Table 6a: Malapportionment and Democratic Consolidation: Linear Models

	Dependent variable: *Polity2* measure of democracy			
	Upward democracy sample		Downward democracy sample	
	(1)	(2)	(3)	(4)
Log malapportionment $_{t-1}$	0.033*	0.260***	-0.007	-0.097
	(0.016)	(0.089)	(0.048)	(0.090)
Log GDP per capita $_{t-1}$	0.153***	0.145	0.085	-0.163
	(0.020)	(0.152)	(0.097)	(0.086)
Democracy$_{t-1}$	0.751***	0.281*	0.618***	-0.165
	(0.104)	(0.172)	(0.195)	(0.136)
Observations	103	103	100	100
R-squared	0.879	-	0.795	-
Implied cumulative effect of	0.12	0.36	-0.02	-0.08
malapportionment	[0.15]	[0.02]	[0.88]	[0.27]
Estimation method	OLS	GMM	OLS	GMM
AR (2) (p-value)		0.770	-	0.238
Sargan test (p-value)		0.108	-	0.298

NOTES: Data covers eleven Latin American countries from 1870 to 2000, over five year intervals. The OLS regressions in Columns 1 and 3 include country and year fixed effects and have the error term clustered at the country level. The specifications in Columns 2 and 4 include year fixed effects. The instruments for income and malapportionment in the first differenced equation are the lags of these variables. In all columns, the implied cumulative effect of malapportionment is the coefficient estimate of malapportionment divided by one minus the coefficient on lagged democracy. The p-value from a non-linear test of the significance of this cumulative effect is in square brackets. Robust standard errors in parenthesis. Significance levels: *10%, ** 5%, ***1%

Table 6b: Malapportionment and Democratic Consolidation: Non-Linear Models (Marginal Effects)

Dependent variable:	Transition to democracy			Remaining in democracy		
	(1)	(2)	(3)	(4)	(5)	(6)
Log malapportionment $_{t-1}$	0.410**	0.127		-0.284**	-0.190	
	(0.184)	(0.179)		(0.115)	(0.167)	
Log GDP per capita $_{t-1}$	0.112	0.481	0.580	0.316**	0.505	0.503
	(0.223)	(0.477)	(0.437)	(0.129)	(0.353)	(0.354)
Log mean GDP per capita		-0.635	-0.877		-0.285	-0.226
		(0.566)	(0.639)		(0.497)	(0.496)
Log mean malapportionment		0.364	0.497**		-0.166	-0.332**
		(0.234)	(0.218)		(0.202)	(0.140)
Observations	27	27	27	96	96	96
Estimation Method	Hazard	Chamberlain		Hazard	Chamberlain	

NOTES: Data covers eleven Latin American countries from 1870 to 2000, over five year intervals. The dependent variable in Columns 1, 2 and 3 is equal to one if there is a *Transition to Democracy*, and equal to zero otherwise; it is equal to one in Columns 4, 5 and 6 if a country *Remains in Democracy*, and equal to zero otherwise. This classification is based on a dichotomous democracy variable that equals one if the *polity2* measure is above zero, and zero otherwise (Persson and Tabellini, 2009). All regressions in include year fixed effects. Standard errors in parenthesis. Significance levels: *10%, **5%, ***1%.

Table 7: Malapportionment and Political Competition

	Herfindahl-Hirschmann (HH) index of political concentration		HH index times share of votes for parties close to former dictatorships	
	(1)	(2)	(3)	(4)
Log(seats/pop)	0.016***	0.005	0.032**	0.046**
	(0.007)	(0.007)	(0.013)	(0.019)
Controls	No	Yes	No	Yes
Countries	13	13	6	6
Observations	246	246	166	118
R-squared	0.77	0.78	0.44	0.54

NOTES: Region level OLS regressions with country fixed effects and robust standard errors in parenthesis. Region level controls: landlocked dummy, average yearly temperature and temperature squared, total yearly rainfall and rainfall squared, altitude and altitude squared (for sources see Bruhn & Gallego, 2010). Significance levels: *10%, **5%, ***1%.

Table 8: Malapportionment and Transfers from the Federal Government

	Dependent variable:			
	Log total transfers per capita	Log transfers per capita to sub-national governments	Log GDP per capita	Log Gini index
	(1)	(2)	(3)	(4)
Log(Seats/Pop)	0.461***	0.528***	0.038	0.005
	(0.060)	(0.079)	(0.065)	(0.038)
Countries	12	9	12	9
Observations	230	177	230	166
R-squared	0.99	0.99	0.55	0.78

NOTES: Region level OLS regressions with country fixed effects and robust standard errors in parenthesis. Regressions include the following region level controls: landlocked dummy, average yearly temperature and temperature squared, total yearly rainfall and rainfall squared, altitude and altitude squared (for sources see Bruhn & Gallego, 2010). The variable "total transfers" includes all transfers that the central government made to a region, including transfers to state and municipal governments, social transfers, direct expenditures and investment by the central government, as well as transfers to public universities. The categories included vary from country to country, depending on availability. A more uniform variable is "transfers to sub-national government" which includes only transfers to state and/or municipal governments within a region. This variable is not available for Chile, Ecuador, and Honduras. Significance levels: *10%, ** 5%, ***1%.

Appendix: Data Sources

Country	Political Outcomes	Transfers
Argentina	Samuels and Snyder; Cámara Nacional Electoral	Ministerio de Economía y Producción
Bolivia	Samuels and Snyder; Corte Nacional Electoral	Ministerio de Economía Y Finanzas Públicas
Brazil	Samuels and Snyder; Tribunal Superior Eleitoral	IBGE, diretoria de Pesquisas, Coordenação de Contas Nacionais
Chile	Samuels and Snyder; Tribunal Calificador de Elecciones	SINIM
Colombia	Samuels and Snyder; Consejo Nacional Electoral	Departamento Nacional de Planeacion
Ecuador	Samuels and Snyder	Ministerio de Economía y Finanzas
El Salvador	Samuels and Snyder	Ministerio de Hacienda
Guatemala	Samuels and Snyder;Tribunal Supremo Electoral	Ministerio Finanzas Públicas Guatemala
Honduras	Samuels and Snyder; Tribunal Supremo Electoral	CEPAL: "Honduras: El Papel de los municipios en el combate a la pobreza."
Mexico	Samuels and Snyder; Mexico Electoral 1970-2003 Banamex CD	Secretaría de Hacienda y Crédito Público (SHCP); Consultora Aregional.com; Cuenta de la Hacienda Pública Federal año 2000
Panama	Samuels and Snyder; Tribunal Electoral	-
Paraguay	Samuels and Snyder; Tribunal Supremo de Justicia Electoral	Ministerio de Hacienda. Sub Secretaria de Estado de Administracion Financiera
Uruguay	Samuels and Snyder; Corte Electoral	Tribunal de Cuentas Uruguay
Venezuela	Samuels and Snyder; Consejo Nacional Electoral	-