CHAPTER VIII

STATISTICAL ANALYSIS OF ELECTORAL DATA

This chapter analyses two decades of Bolivian electoral data—from 1985 through 2005—to test whether any statistically significant relationships exist between various measures of electoral political stability and two of the key explanatory variables considered in this study:

1. The change from list proportional representation (list-PR) to mixed member proportional (MMP) electoral system.

2. Regional cleavages between Andean and *media luna* departments.

The general methods employed in this chapter are straightforward (relying on linear regression models) and are meant to support the qualitative observations developed in the three preceding chapters. These methods include a combination of cross-sectional and time-series analysis of electoral data from three different electoral levels:

1. Bolivia's nine departments.

2. A representative sample of thirty-two municipalities drawn from across each of the country's departments (for a full list of the municipalities, see Table 8.2).

3. Disaggregated district-level data for uninominal and plurinominal party vote shares in each of the country's uninominal districts since 1997.[1] Similarly, the 2005 data include comparisons of prefectural election data disaggregated by *circunscripción* (the electoral districts used to elect uninominal deputies).

[1] The number of uninominal electoral districts has changed from 68 in 1997-and 2002, to 70 in 2005. The expansion was driven by the reapportionment of seats before the 2005 election based on recent census data.

All of the data used in this chapter came primarily from two sources. The first was the National Electoral Court (CNE), whose staff kindly provided plurinominal (1997, 2002, 2005) and prefectural (2005) data disaggregated by *circunscripción*. The CNE also provided municipal-level data for the 2002 and 2005 elections. Municipal-level data for the 1985-1997 elections came from a FUNDEMOS (1998) volume that lists general election results disaggregated down to the village level.[2]

Using Disaggregated Data

Most comparative studies that have included Bolivia as a case have relied extensively on aggregate, national-level data.[3] While such studies have been fruitful—particularly when the Bolivian case was included into multivariate studies—such studies may also hide some of the complexities of Bolivian electoral politics. This study has instead focused extensive attention on the main sub-units of Bolivian politics: the departments. But Bolivian electoral politics can be further disaggregated to other levels, which has the added methodological benefit of increasing the number of units of observation (producing a "larger *N*"). In this section I wish to briefly outline the procedures used to analyze electoral data disaggregated to the municipal and *circunscripción* level.

Municipal Level Data

In addition to cross-departmental comparisons, this study further disaggregates Bolivian electoral data to the municipal level. This has the benefit not only of allowing an increase in the number of units of observation for each election (to a potential maximum of

[2] FUNDEMOS (Fundación Boliviana para la Capacitación Democrática y la Investigación) is a German-funded democratic assistance non-governmental organization with links to the Hanns Seidel Stiftung.

[3] For some examples, see Jones 1995, Conaghan and Malloy 1995, Deheza 1998;, amd Gamarra 1996.

more than 300 units), it also allows us to control for the potentially over-determining effects of large metropolitan cities in departments; conversely, limiting the number of municipalities (rather than using all municipalities) protects from the over-determining effect that a large number of small, rural municipal units would have on a universal sample size. A disproportionate share of the country's population lives in three metropolitan areas (La Paz-El Alto, Cochabamba, and Santa Cruz). Likewise, a disproportionate share of each department's population resides in the administrative capital. Although the figures have changed slightly as Bolivian society has become more urban in the past two decades, the figures for 2005 are useful for comparison (see Table 8.1).

Table 8.1

Votes cast in "capital" cities and their share of department and national votes, 2005

City	Valid votes	% of department valid votes	% of national valid votes
Sucre (Chuquisaca)	90,601	58.2	3.2
La Paz	399,656	41.6	13.9
El Alto (La Paz)	306,144	31.8	10.7
Cochabamba	227,684	44.0	7.9
Oruro	100,102	62.9	3.5
Potosí	58,538	30.2	2.0
Santa Cruz	394,340	63.0	13.7
Trinidad (Beni)	34,584	33.7	1.2
Cobija (Pando)	11,634	57.0	0.4
Total for ten "capital" cities	1,691,926		58.9
Total for three metropoles (La Paz-El Alto, Cochabamba, Santa Cruz)	1,327,824		46.2

Data from the National Electoral Court.

Comparisons between the country's nine departments are driven principally by the country's ten major cities, which account for nearly 60% of the electorate (even just the three metropolitan areas account for nearly half of all votes). If to these ten cities we added five other larger cities (all of them larger than Cobija), we quickly near 80% of the electorate. If

we want to control for potential effects of rural-urban differences between voters, we need to disaggregate data to sub-departmental levels. One clear option is municipal-level data.

Along with the ten capital cities, this study includes a selected sample of twenty-two other municipal units (see Table 8.2).

Table 8.2

Municipalities included in this study

Department	Province	Municipality
Chuquisaca	Oropeza	Sucre
	Luis Calvo	Muyupampa
	Nor Cinti	Camargo
La Paz	Murillo	La Paz
	Murillo	El Alto
	Omasuyos	Achacachi
	Nor Yungas	Coroico
	Pacajes	Calacoto
Cochabamba	Cercado	Cochabamba
	Chapare	Villa Tunari
	Quillacollo	Quillacollo
	Campero	Aiquile
Oruro	Cercado	Oruro
	Sajama	Curahuara
	Carangas	Corque
Potosí	Tomas Frias	Potosí
	Rafael Bustillo	Uncia
	Sud Chichas	Tupiza
	Daniel Campos	Llica
Tarija	Cercado	Tarija
	Gran Chaco	Yacuiba
	Mendez	Villa San Lorenzo
Santa Cruz	Andres Ibañez	Santa Cruz
	Cordillera	Camiri (Chaco)
	Vallegrande	Vallegrande
	Chiquitos	San Jose de Chiquitos
Beni	Cercado	Trinidad
	Itenez	Magdalena
	Vaca Diez	Riberalta
	Jose Ballivian	Reyes
Pando	Nicolas Suarez	Cobija
	Madre de Díos	Puerto Gonzalo Moreno

The thirty-two municipalities were selected to meet the following criteria:

1. Reflect differences (in population size) between the various departments. This means, for example, that more samples were drawn from La Paz than from Pando.

2. Reflect geographic and/or cultural differences within each department. For example, each of the three additional municipalities selected from La Paz represent a different geographical region of the department: Achacachi lies near Lake Titicaca and is a bastion of *katarista* support; Coroico is in the Yungas tropical valley and has a large Afro-Bolivian population; and Calacoto is in the rural Altiplano, near Oruro.

3. Each municipality must have existed, without territorial changes, since 1985. This is important because many municipal boundaries were redrawn sine 1994—including some cases of single municipalities being split into two or more new municipal units.

Circunscripción Level Data

Additionally, this study disaggregates Bolivian electoral data from 1997-2005 by *circunscripción*. Since the 1997 general election, Bolivian voters have cast ballots for parliamentary representatives in single-seat districts. Because these districts are based (primarily) on population, the units are of much more comparable size than municipal-level units. A major limitation, of course, is that since these electoral districts did not exist prior to 1997, we can only compare data from that level in the latter two institutional periods (1997-2002 and 2003-2005).

Such data, however, allow us to make two different kinds of comparisons: comparisons between elections and comparisons within elections. That is, we can compare (as with our other data) voting trends by district from election to election—although with a larger number of units of observation (N=68) than with merely department-level or

municipal-level comparisons. But we can also compare votes cast for uninominal candidates to those for plurinominal (or "presidential") lists within the same electoral district in a single election. In the special case of the 2005 election, we can even employ comparisons with disaggregated prefectural votes.[4] One important caveat, however, is that because the 2005 election involved substantial redistricting of the *circunscripción* districts, the ability to compare across the two latter time periods. This limited ability to compare across institutional periods led this study to adopt cross-municipal comparisons.

Variables

This chapter analyses relationships between three types of variables: party system, electoral system, and regional effects variables. As this overall study is concerned with political stability, and since my theoretical framework operates under the assumption that a stable political party system is necessary for stable democracy, the main concern here is to test the relationship between electoral system variables on party system stability. The main goal is to determine whether statistical evidence supports the assertion that the recent instability of Bolivia's party system is correlated with changes to the electoral system (from list-PR to MMP). Additionally, I also test whether there are regional differences between party systems, and whether these differences increased after the institutional reforms of the mid-1990s. Throughout the subsequent models, therefore, party system variables are treated as dependent variables.

[4] The 2005 general and prefectural elections provide a wealth of data, since each voter provides us with three pieces of information: their presidential vote, their uninominal vote, and their prefectural vote.

Party System Variables

Party system performance is evaluated along four key variables:

1. *Voter turnout*. Though voting is compulsory in Bolivia, voter turnout has shown marked differences across departments. Voter turnout has tended to be higher in *media luna*, than in Andean, departments. While voter turnout figures may not tell us much about citizen's preferences, if cross-regional differences are statistically significant—when controlling for other factors—this may evidence different regional electorate behavioral patterns.

2. *Blank and null votes*. One simple measure of an institutionalized party system is the number of blank and null (or "spoiled") ballots cast in any election. A high share of blank and null votes suggests that voters are dissatisfied with their options between the political parties campaigning for their votes—this is particularly important in countries (such as Bolivia) that have compulsory voting laws. The extent to which the number of blank and null votes varies across national subunits may also reflect relative degrees in party system institutionalization or consolidation.

3. *Degree of multipartism*. The degree of multipartism is measured using the effective number of parties measure developed by Markku Laakso and Rein Taagepera (1979), based on vote shares in each of the general elections.[5] The "effective" number of parties (ENPV) is a more accurate measure of the number of parties in a political system, since it uses weighted measures (correcting for the relative strength of parties), than simply counting the

[5] Measuring the effective number of parties using vote shares (ENPV), rather than by seat shares (ENPS), is more appropriate since legislative seats are allocated by department. Using vote shares also allows us to compare votes for single-seat contests (i.e. uninominal and prefectural ballots) with multi-seat contests (i.e. plurinominal ballots). ENPV is calculated as

$$ENPV = 1 \Big/ \sum v_i^2$$

where v is the vote share or the i-the party.

number of parties (some of which might not win enough votes to be "relevant"). Further, using disaggregated subunit level party system measures allows for observable regional differences. Interestingly, not only is the effective number of parties different across subunits, departmental, municipal, and *circunscripción* ENPV measures tend be smaller than the national figure.

4. *Electoral volatility.* Another common indicator of party system stability is the measure for electoral volatility developed by Mogens Pedersen (1979), which determines the total net change of vote share between parties in sequential elections.[6] High electoral volatility indicates that a party system is not consolidated (or stable), since voters are frequently changing their support from one party to another. Because electoral volatility is measured as changes in votes between elections, the total number of observations is more severely limited than for other measures. While measures for departmental volatility in 1985 can be found by comparing to departmental votes in 1980, municipal-level data for 1980 is not available. Likewise, volatility at the *circunscripción* level is not available for 1997, since such districts did not exist in 1993.

5. *Support for systemic parties.* Finally, a rough estimate for party system stability over time is developed by aggregating votes for the three "systemic" parties (MNR, ADN, MIR). The degree to which these three parties consistently captured a stable percentage of votes, both across time and between provinces, is a strong indicator of differences in voter preference structures. A reduction in votes for systemic parties—nationally or in within

[6] Electoral volatility is measured as

$$V = \frac{1}{2}\sum |pi_t - pi_{t-1}|$$

where p is the vote share for the i-th party in election t.

specific subunits—also suggests erosion in the ability of the traditional, systemic parties to represent civil society's demands.

Electoral System Variables

Electoral system differences over time are reduced to two key variables:

1. *MMP effect*. To test the hypothesis that the change from list-PR to MMP electoral system affected party system stability, this study employs a simple dummy variable that codes as "1" the 1997, 2002, and 2005 elections, and codes as "0" the 1985, 1989, and 1993 elections.

2. *Effective threshold*. To control for other electoral system differences across departments, I introduce the effective threshold measure proposed by Arend Lijphart (1994).[7] Sine the change to MMP also modified each department's electoral threshold (increasing them), controlling for the effective electoral threshold (the minimum share of votes a party must win to secure at least one seat) separate the effects of the changes to MMP from changes to the introduction of higher electoral thresholds on the party system dependent variables. Bolivia has used a 3% legal threshold in elections across institutional periods (1993, 2002, and 2005), though these functioned at the national level. But sine seats are won in department-level multi-seat districts based on various proportional representation formulas (across all elections) the real hurdle parties must overcome to win parliamentary representation is the departmental "effective" threshold. Further, using departmental electoral threshold also allows for some control between departments with different

[7] Electoral threshold is calculated as

$$T = \frac{75\%}{(M+1)}$$

where M is the district magnitude (the number seats).

population sizes (and correspondingly, different number of parliamentary seats). Finally, this study assumes that the behavioral constraints of effective thresholds carry over into plurinominal votes at the municipal and *circunscripción* level.

Regional and Geographic Variables

This study considers three potential regional and geographic effects on electoral behavior:

1. *Regional differences*. To test the hypothesis that electoral behavior is observably different between "Andean" and *"media luna*" departments, I develop a simple dummy variable that codes as "1" the *media luna* departments (Santa Cruz, Tarija, Beni, and Pando), and codes as "0" the Andean departments (La Paz, Cochabamba, Oruro, and Potosî).[8] The same coding structure is applied to municipalities and *circunscripciónes*, which are coded according to their corresponding department.

2. *Rural vs. urban differences*. Because there is reason to suspect that rural and urban electorates vote differently, it is important to test the effect of these differences on party system stability. Similarly, it allows us to control for contamination effects of rural-urban cleavages that may obscure (or, conversely, over-determine) regional differences. These measures are applied specifically to municipal-level data by using a dummy variable that codes as "1" the nine departmental capitals plus El Alto, and codes as "0" the other municipalities. The use of a simple dummy variable is preferred to using population figures,

[8] The department of Chuquisaca is not coded, and drops out of the analysis when using this variable. Political behavior in Chuquisaca does not easily fit either the *media luna* or Andean patterns. In part, the department has its own internal political logic—stemming primarily from its claim as the "constitutional" capital of Bolivia—that sets it against both regional blocs. With a larger number of indigenous residents (though overwhelmingly Quechua, rather than Aymara speakers) than the *media luna* departments, Chuquisaca does, in many ways, resemble an Andean department. Its relative political isolation from the La Paz-based Andean political economy, however, has often pitted the region's political elite against the republic's "administrative" capital. The recent expansion of Chuquisaca's oil and natural gas fields has drawn the region closer to Santa Cruz and Tarija at times, but it has also resisted being drawn too close into that orbit, as well.

since some municipalities have relatively large populations but dispersed over a wide territory.[9] Using more precise population or registered voter figures would only obscure differences between rural and urban municipalities.

3. *The metropole effects*. Where population size does matter is in the potential effect by "metropolitan" voters. These are voters that live in the three major metropolitan areas: the cities of La Paz-El Alto, the city of Cochabamba, and the city of Santa Cruz. Since nearly half of all Bolivian voters live and cast ballots in four municipalities (less than 2% of all municipalities), their behavior in many ways drives the political process. This "metropolitan effect" is tested in *circunscripción*-level analysis. Unlike municipalities, the division of the voting population between *circunscripciónes* is more standardized, with nearly half of all districts drawn from the four metropolitan municipalities, and the rest drawn by combining municipalities into constituent blocs of comparable size.[10]

Analysis

To test for statistical correlations between regional and electoral system variables on the various party system variables, this chapter employs several panel-estimated time-series cross-sectional linear regression models. Three sets of panel data were compiled, based on the three disaggregated levels of data: department, municipality, and *circunscripción*. The datasets were then imported into the statistical software package, Stata, for analysis.[11] Two methods are used:

---

[9] For example, the number of registered voters in Achacachi (25,814) is higher than that in Cobija (14,157). But the majority of the residents of the capital of Pando live in an urban environment, whereas the majority of the residents of Achacachi live in outlying rural, *campesino* communities.

[10] In the 1997 and 2002 elections, 20 of the 68 (29.4%) *circunscripciónes* were drawn from the four metropolitan municipalities of La Paz, El Alto, Cochabamba, and Santa Cruz. While the metropolitan voters are under-represented, the sample sizes are large enough for good comparisons.

[11] Specifically, Intercooled Stata, version 8.1.

1. Between-effects estimated models to test for variations across observational units across time.

2. Fixed-effects (or "within-effects") estimated models to test for variations within observational units across time.

While between-effects models test for regional differences between observational units in Andean and *media luna* departments, fixed-effects models test for the effects of changes to the electoral system from list-PR to MMP within each of the units, independent of regional differences. Simply put, the between-effects models estimate correlations between the independent and dependent variables between panels across time using panel means. In contrast, the fixed-effects models are estimated across time within each of the panels. Correspondingly, the reported *N* in between-effects models refers to the number of panels; in fixed-effects models, the reported *N* refers the total number of unit observations.

Additionally, several simple linear regression models are employed to test for significant correlations within individual elections, using *circunscripción*-level data.

Departmental Models

Looking at departmental between-effects models, we see that the *media luna* dummy is statistically significantly correlated with a decrease in the effective number of parties, an increase in support for systemic parties, and a decrease in electoral volatility (see Table 8.3). The models suggest with some confidence that voters in *media luna* departments were more likely than voters in Andean departments to have a more consolidated or constrained party system (they supported fewer parties and had lower electoral volatility) and—even when

controlling for differences in the effective electoral threshold across departments.[12] The most significant finding was that *media luna* voters supported the three systemic parties by an average of 20% across elections (including 2005) in the most robust model.[13] None of the models that included Chuquisaca (in which *media luna* is dropped) showed any statistically significant correlations.

Table 8.3

Between-effects departmental panel-estimated regression models

	Dependent Variables				
	Turnout	Blank & null vote	Effective number of parties	Support for systemic parties	Electoral volatility
Effective threshold	0.61	0.00	-0.03	1.50	-1.29
Media luna	-0.05	-3.87	* -0.95	** 20.01	** -11.58
Constant	** 73.37	** 90.30	** 4.63	** 45.25	** 45.62
Probability > *F*	0.29	0.13	0.01	0.00	0.00
N (panels)	8	8	8	8	8

* $p > 0.05$ ** $p > 0.01$

Looking at fixed-effects models (see Table 8.4) we see strong correlation between the change to MMP and support for systemic parties and electoral volatility. Across departments, when controlling for other features of the electoral system—the effective threshold and the district magnitude—elections in which voters used MMP saw both a 20-point decrease in support for systemic parties and a 10-point increase in electoral volatility. If

[12] Because *media luna* departments have smaller populations, they tend to have higher effective thresholds than Andean departments.

[13] If we drop data from the 2005 election, the effective threshold does significantly (at $p > 0.05$) increase vote share for systemic parties by 1.76% and the *medila luna* still significantly (at $p > 0.01$) increases vote share for systemic parties by 17.32%.

we drop observations from the 2005 election (an election in which *media luna* departments for the first time had more effective number of parties than Andean departments) on the effective number of parties model, we find a strong correlation suggesting that the change to MMP (when controlling for other variables) reduced the effective number of parties by half a party.[14]

Table 8.4

Fixed-effects departmental panel-estimated regression models

	Dependent Variables				
	Turnout	Blank & null vote	Effective number of parties[a]	Support for systemic parties	Electoral volatility
Effective threshold	-1.50	-0.49	0.05	1.77	-1.79
MMP	-0.40	1.59	** 0.61	** -20.30	** 10.35
Constant	** 85.74	** 94.00	** 3.81	** 63.17	37.28
Probability > *F*	0.54	0.19	0.00	0.00	0.00
N (observations)	54	54	45	54	54

* $p > 0.05$ ** $p > 0.01$

[a] 2005 dropped from the model.

Municipal Models

Looking at panel-estimated models based on municipal-level electoral data, we see that the *media luna* dummy is statistically significant across most models (see Table 8.5). The only exception is the lack of any significant correlation between *media luna* and voter turnout, though in these models we see a significant correlation with a decrease in blank and null

[14] Not surprisingly, if we include 2005 in the effective number of parties model, neither independent variable is significantly correlated and the model is a poor fit (Probability > *F* 0.97).

votes.[15] Additionally, the models again suggest regional differences. In *media luna* municipalities the effective number of parties is lower, support for systemic parties is higher, and electoral volatility is lower—even when controlling for differences in the effective threshold between departments.[16] There were also significant differences between "urban" and "rural" municipalities, but only with regards to voter turnout (higher in urban municipalities) and blank and null votes (lower in urban municipalities). Urban voters appear more likely to vote and to actually vote for a political party. In models that included Chuquisaca (and dropped the *media luna* variable), only three statistically significant correlations appear: an increase in the effective threshold increases voter turnout (by a slight one percent) and the urban dummy has roughly the same effect on voter turnout and blank and null votes as in the other models.

Table 8.5

Between-effects municipal panel-estimated regression models

	Dependent Variables				
	Turnout	Blank & null vote	Effective number of parties	Support for systemic parties	Electoral volatility
Effective threshold	0.27	0.00	0.36	1.11	-0.81
Media luna	1.11	** -3.65	** -0.76	** 26.60	** -12.63
Urban	** 4.46	** -3.37	0.20	2.91	-0.91
Constant	** 74.24	** -89.13	** 3.98	** 41.85	** 49.78
Probability > *F*	0.00	0.00	0.00	0.00	0.00
N (panels)	29	29	29	29	29

* $p > 0.05$ ** $p > 0.01$

[15] In a similar departmental model, *media luna* and blank & null votes were correlated in a similar magnitude (coefficient of -3.84) at the $p > 0.10$ level.

[16] Since the municipal-level data is merely disaggregated department electoral data, I assume that the effects of district magnitude and effective threshold carry over.

In fixed-effects municipal models, we find that the MMP dummy is again the more powerful electoral system variable (see Table 8.6). In many ways, it is actually surprising that even in larger-*N* multivariate models that include an MMP dummy the effective threshold has only limited statistically significant effect. Higher effective thresholds lowered voter turnout and increased votes shares for systemic parties slightly, but in both models the *p* value showed only marginal significant, when compared to values for the MMP dummy, which were consistently stronger. Data from the 2005 election was again dropped from the support systemic parties and electoral volatility model and we again see that the change to MMP drove up electoral volatility and reduced the number of votes for systemic parties.

Table 8.6

Fixed-effects municipal panel-estimated regression models

	Dependent Variables				
	Turnout	Blank & null vote	Effective number of parties	Support for systemic parties[a]	Electoral volatility[a]
Effective threshold	* -2.57	0.36	0.08	* 4.15	-3.16
MMP	** -3.68	** -1.42	** -0.42	** -14.13	** 6.06
Constant	** 93.21	** -92.80	** 3.55	** 48.69	** 51.63
Probability > *F*	0.00	0.04	0.03	0.00	0.03
N (observations)	190	190	190	158	128

* $p > 0.05$ ** $p > 0.01$

[a] 2005 dropped from the model.

Circunscripción Models

The richest models are those drawn from *circunscripción*-level data. Because single-seat districts were drawn up to be roughly equal in size (at least within departments), they are

much more comparable than departments or municipalities. And thanks to the differentiated data provided by the National Electoral Court, the models also allow for tests within each election. Thus, we can test the effects of broader electoral system and geographic constraints on voters in two ways by comparing plurinominal and uninominal votes.

Looking at between-effects models using only plurinominal electoral data, we notice relationships similar to those found in previous models (see Table 8.7). The *media luna* effect is still strong in lowering blank and null votes and increasing votes for systemic parties, though there is significant correlation with the effective number of parties.[17] Also, as with municipal models looking more broadly at urban effects, the more narrow metropolitan dummy similarly increases voter turnout and decreases the number of blank and null votes. Interestingly, there is a small but statistically significant relationship between effective threshold and support for systemic parties in the *circunscripción* model.

Table 8.7

Between-effects *circunscripción* panel-estimated regression models, plurinominal data

	Dependent Variables			
	Turnout	Blank & null vote (plurinominal)	Effective number of parties (plurinominal)	Support for systemic parties (plurinominal)
Effective threshold	0.19	-0.38	-0.03	** 2.84
Media luna	0.60	** -3.13	* -0.45	** 25.06
Metropolitan	** 4.37	** -6.69	0.11	3.51
Constant	** 72.24	** -87.13	** 4.54	** 22.82
Probability > *F*	0.00	0.00	0.04	0.00
N (panels)	65	65	62	65

* $p > 0.05$ ** $p > 0.01$

[17] As in previous models, the 2005 election was dropped. If we include the 2005 election, the model loses predictability (Probability > *F* 0.95).

If we look at uninominal votes, we see remarkably similar results. Table 8.8 also includes a different measure of volatility—the difference between plurinominal and uninominal votes in the same *circunscripción*—to test whether any factors were correlated with split-ticket voting. The *media luna* dummy variable was correlated with lower split-ticket voting across all three elections, suggesting that *media luna* voters vote more consistently.[18] Not surprisingly, there was no correlation between the effective threshold and this measure of inter-ballot volatility. But it is surprising to find a statistically significant correlation between effective threshold and uninominal blank and null votes and support for systemic parties, particularly when the variable performed so poorly in previous models. That an institutional constraint that operates primarily at the departmental level should affect voting behavior in single-seat districts is particularly puzzling. One possible explanation is that voters are less likely to cast blank or null ballots in contests where their vote has the most impact—but this cannot explain why the effective threshold should have such any effect in favor of systemic parties on uninominal votes.

Because all of the *circunscripción*-level data references elections after the adoption of MMP, I introduce a new dummy variable to account for differences between each election. The time variable is coded with the progressive cardinal values 1, 2, and 3 to represent the 1997, 2002, and 2005 elections respectively. Taking time into account, we find that time is significantly correlated with the dependent variable in each of the models (see Table 8.9). When controlling for different department-level effective electoral thresholds, turnout has increased (driven primarily by the sharp increase in voter turnout between 2002 and 2005), blank and null votes have decreased, the effective number of parties has decreased by almost

[18] If the 2005 election is dropped from the model, the *media luna* effect disappears and is replaced by a similarly significant ($p > 0.05$) correlation exists between the metropolitan dummy and split-ticket voting.

one full party within *circunscripciones*, and support for systemic parties has decreased by more than ten points.[19]

Table 8.8

Between-effects *circunscripción* panel-estimated regression models, mixed data

	Dependent Variables			
	Blank & null vote (uninominal)	Effective number of parties (uninominal)	Support for systemic parties (uninominal)	Volatility[a]
Effective threshold	** 0.82	-0.07	** 2.78	0.08
Media luna	** 5.25	-0.29	** 23.52	* -2.40
Metropolitan	** 4.52	-0.30	4.64	1.86
Constant	** 74.21	**4.47	** 25.88	13.26
Probability > *F*	0.00	0.07	0.00	0.08
N (panels)	65	65	65	62

* $p > 0.05$ ** $p > 0.01$

[a] Volatility measures difference between plurinominal and uninominal votes in each election year.

Table 8.9

Fixed-effects *circunscripción* panel-estimated regression models, plurinominal data

	Dependent Variables			
	Turnout	Blank & null vote (plurinominal)	Effective number of parties (plurinominal)	Support for systemic parties (plurinominal)
Effective threshold	* -5.49	1.13	-0.47	-0.63
Time	** 7.00	** -0.92	** -0.95	** -11.08
Constant	** 86.93	** -88.31	** 7.87	** 72.92
Probability > *F*	0.00	0.00	0.00	0.00
N (observations)	206	206	206	206

* $p > 0.05$ ** $p > 0.01$

[19] Time is not statistically significant in models for turnout and effective number of parties when 2005 data are dropped; it is still statistically significant (in the same direction and magnitude) in the others models.

If we look at uninominal voting data, again we find that the time variable performs strongly (see Table 8.10), outperforming electoral threshold (which was highly significant in the between-effects models). These results do not change significantly in models that drop the 2005 election.[20] While there seems to be no temporal effect on split-ticket voting, time is significantly correlated ($p > 0.01$) with a slight increase in split-ticket voting if the 2005 election is dropped out.

Table 8.10

Fixed-effects *circunscripción* panel-estimated regression models, mixed data

	Dependent Variables			
	Blank & null vote (uninominal)	Effective number of parties (uninominal)	Support for systemic parties (uninominal)	Volatility[a]
Effective threshold	-1.40	-0.16	-1.18	** 7.91
Time	** 8.06	** -0.86	** -9.95	0.40
Constant	** 91.26	** 6.47	** 76.01	-25.52
Probability > *F*	0.00	0.00	0.00	0.01
N (panels)	206	206	206	206

* $p > 0.05$ ** $p > 0.01$

[a] Volatility measures difference between plurinominal and uninominal votes in each election year.

To test for potential variations in support for systemic parties and split-ticket voting across each general election, I ran series of independent ordinary least square (OLS) linear regression models for each of the three elections. Interestingly, statistical split-ticket voting models showed virtually no significant differences across elections and each of the models

[20] The biggest difference is in the blank and null vote model, in which effective threshold is significantly correlated ($p > 0.05$) with a slight decrease in blank and null votes.

had a low adjusted R-square value (see Table 8.11). It thus seems safe to conclude that split-ticket voting between presidential lists and uninominal legislative candidates is relatively low.

Table 8.11

Linear regression estimates for split-ticket voting across general elections

	Split-ticket Voting		
	1997	2002	2005
Effective threshold	-0.29	-0.18	0.53
Media luna	-3.04	0.71	-3.02
Metropolitan	1.00	** 6.15	-1.03
Constant	** 13.62	** 14.11	** 12.43
Adjusted R-square	0.06	0.14	0.04
N (observations)	62	62	64

* $p > 0.05$ ** $p > 0.01$

Testing for within-election variations in support for systemic parties, we find again that the *media luna* variable is a strong predictor, even when controlling for effective threshold effects (see Table 8.12). Even when using uninominal votes—where even small or special-interest parties have strong possibilities of winning by simple plurality—*media luna* districts tended to support systemic parties at higher rates than in Andean districts. More importantly, the difference in support for systemic parties between the two regions increased dramatically between each of the elections, almost doubling between the 1997 and 2002 elections. In contrast, the effective threshold differences remained relatively stable across the three elections, while there was no significant correlation between metropolitan *circunscripciones* and rates of support for systemic voters. The models suggest that between 1997 and 2002, Bolivian voters were highly polarized along regional political cleavages and this polarization was increasing over time after 1997. Even as Andean voters shifted away

from systemic party candidates, *media luna* voters continued supporting systemic candidates and the three systemic parties were consolidating their hold in *media luna* electoral districts—even as they lost support across Andean departments.

Table 8.12

Linear regression estimates for support for systemic party uninominal candidates

	Support for Systemic Parties[a]		
	1997	2002	2005
Effective threshold	** 2.82	** 3.08	** 2.07
Media luna	** 16.84	** 29.34	** 32.03
Metropolitan	2.75	0.70	6.77
Constant	** 38.95	** 19.26	** 12.89
Adjusted R-square	0.62	0.81	0.69
N (observations)	62	62	64

* $p > 0.05$ ** $p > 0.01$

[a] Estimates based on uninominal votes; models using plurinominal votes have almost identical results.

Prefectural Election Models

Looking at prefectural election models, we see that *media luna* is again a strong independent variable—though only two of the models are convincingly robust (see Table 8.13). Each of the models includes the effective threshold as an independent variable, though it theoretically should have no effect on voters' decisions in a department-wide single-seat contest. Nevertheless, the measure for effective threshold also serves as a proxy for the department's relative "political size" and may have lingering legacies that shape voting behavior. It is interesting to note that there is a significant, but slight, effect on the number of blank and null votes. In the two most robust models, *media luna* was significantly correlated with support for systemic parties—increasing votes for systemic prefectural

candidates by 33.90%. Combined with the strong performance of the metropolitan dummy variable—which was significantly correlated with an increase in support for systemic prefectural candidates by 13.83%—the data suggests that the strongest bastion of support for systemic prefectural candidates is in the city of Santa Cruz (the *media luna* metropolis), across the *media luna* more broadly, and at a lower level among urban, metropolitan Andean voters.

Table 8.13

Linear regression estimates for prefectural votes across *circunscripciónes*

	Dependent Variables			
	Blank & null vote	Effective number of parties	Support for systemic parties	Split-ticket voting
Effective threshold	** 0.51	-0.07	-0.17	0.02
Media luna	** 4.07	* -0.34	** 33.90	** -11.38
Metropolitan	** 6.48	** -0.54	** 13.83	** 13.97
Constant	** 85.92	** 3.59	** 34.96	** 29.84
Adjusted R-square	0.55	0.16	0.68	0.39
N (observations)	64	64	64	64

* $p > 0.05$ ** $p > 0.01$

[a] Volatility measures difference between plurinominal and prefectural votes.

Because the model testing split-ticket voting had a low R-square value, I have included a second set of models that specifically look for correlations between votes in prefectural ballots to plurinominal ballots (see Table 8.14). The models this time include plurinominal systemic party votes as a control variable. As expected, support for systemic presidential candidates (Podemos' Quiroga and the MNR's Nagatini) was significantly correlated with support for systemic prefectural candidates. When controlling for

plurinominal systemic votes, the *media luna* effect is dramatically diminished (but still significant and in the right direction), as is the metropolitan effect.

Table 8.14

Linear regression estimates for paired party votes across *circunscripciónes*

	Dependent Variables			
	Support for systemic candidates	Support for Podemos candidates[a]	Support for MNR candidates	Support for MAS candidates
Effective threshold	** -1.90	-0.61	-0.15	-0.49
Media luna	* 7.15	-2.06	2.39	* 6.85
Metropolitan	** 8.18	-7.90	** 20.24	* -5.71
Plurinominal support for systemic parties	** 83.51	—	—	—
Plurinominal support for Podemos	—	** 109.66	—	—
Plurinominal support for MNR	—	—	* 61.39	—
Plurinominal support for MAS	—	—	—	** 73.19
Constant	** 24.20	4.98	* 13.25	-4.17
Adjusted R-square	0.91	0.55	0.40	0.80
N (observations)	64	64	51	64

* $p > 0.05$ ** $p > 0.01$

[a] Votes for candidates allied with Podemos but running under their own banner (e.g. AUN in Cochabamba, CR in Tarija) are coded as "Podemos" in the model.

Table 8.14 also includes paired relationships between votes for individual parties or related electoral alliances. Not surprisingly, we again find that voters who support a party's presidential candidate also tend to support that party's prefectural candidate.[21] What is

[21] The MNR prefecture-plurinominal model is in large part driven by the department of Santa Cruz, whose A3-MNR prefectural candidate won almost the same number of votes in one department (175,010) as the MNR presidential candidate did in the entire country (185,859).

noteworthy, however, is the difference in the magnitude of the coefficients: the higher correlation coefficient for the Podemos model suggests that Podemos voters were less likely to split their votes. Similarly, MNR voters were statistically about as likely to not split their votes as MAS voters—even though the MNR did not present prefectural candidates in two departments. The data thus suggests that the hypothesis raised in the previous chapter (that voters supported Evo Morales' presidential campaign but not necessary the entire MAS platform) has support.