13

How Electoral Systems Shape Candidate Vote Shares

Up to now, this book has been principally about the interparty dimension of representation. That is, the focus has been on how different features of electoral systems – principally assembly size and district magnitude, but also electoral formula – shape the effective number of parties (votes and seats), as well as deviation from proportionality and other measures. In this sense, it is firmly in line with most of the literature on electoral systems. However, there is another dimension, mostly neglected until recently,[1] but of increasing importance to scholars and designers of electoral systems alike. That is the intraparty dimension, which is the focus of this chapter and the next. We show how, as with the interparty dimension, the votes of candidates on the intraparty dimension can be deduced from the constraints of seats available. In this sense, this chapter is also of methodological interest: it further demonstrates the power of assuming the mean of the conceptual extremes.

It is axiomatic that parties are collective actors, consisting of many politicians and other actors who associate with the party for purposes of enhancing their ability to win seats. Whenever $M>1$, a party typically may have more than one candidate running under its banner in a given district. The range of questions about how parties choose who their candidates will be, and how those candidates relate to voters and to one another form the essence of the intraparty dimension. We introduced various rules that shape the intraparty dimension in Chapters 1–6, and so they are not new to this chapter. In those chapters, we noted the distinction between open and closed lists, and showed how the single nontransferable vote and other nonlist systems for $M>1$ districts work. We offered examples in Chapter 6 of how alliances work when two or more parties combine on one list under either closed or open list systems. Now that we have established the main parameters of how electoral systems shape the interparty dimension, it is time to turn our focus to intraparty relations.

[1] Among scholars who have noted the relative neglect of the intraparty dimension are Lijphart (1985), Shugart (2005a), and Colomer (2011). Important pioneering comparative work was done by Marsh (1985), Katz (1986), Mainwaring (1991), and Ames (1995a, b).

We made the point in Chapter 2 that the simplest of all systems were the category of "list PR," in which each competing party presents a single list of candidates, and the electoral formula allocates M seats among them, in accordance with their relative vote shares. We noted that FPTP is the limiting case of a list having one candidate, and the allocation formula awarding the sole seat in the district to the highest vote-earner. As we elaborated further in Chapter 5, it need not matter whether voters choose a given list because they like the party as a whole or because they like one or more of the candidates – the sole candidate in the case of $M=1$. This is a pure categorical choice, with no opportunity to indicate a preference for one candidate of the party over some others. This is how closed-list systems operate, and for them, the intraparty dimension is primarily about candidate selection and campaign styles. It is not about competition for votes within a party.

As soon as we move to open lists, however, now the contest is one of competition on both dimensions. Voters may (or must, depending on specifics of a country's rules) select a candidate and not simply a party.[2] Lists are competing against one another for votes, but inside each list, candidates are likewise competing against one another. The key characteristic linking competition of candidates and lists together is that a vote for any candidate on an open list is also a *pooling* vote, in Cox's (1997: 42) typology: it counts for the list (of allied candidates) on which the candidate was nominated as well as for the specific candidate.

An open-list PR system remains "simple" by our definition because each list wins seats in proportion to its collective votes, within the constraints of district magnitude and allocation formula. Once the number of seats won by any given list has been put through the operation of the PR formula, then the winners within the list are simply its s highest vote-earners, where s is the number of seats won.[3]

Given that an open-list system means each candidate competing against list-mates for one of s seats the party wins, a question we devote this chapter to is: *Does the competition among candidates inside a list tend to follow a predictable pattern* as does the competition among lists within a district of a simple PR system? We will show that indeed there are such patterns. We can develop logical reasoning on the intraparty dimension in a way similar to what we have done for the interparty dimension – at least for some key aspects of intraparty relations.

There are also, of course, systems with $M>1$ but no lists. We outlined several of them in Chapter 3, but we have had little to say about them till now because of our focus on simple systems. Nonlist, $M>1$, formulas have the potential to

[2] As noted in Chapter 2, some open-list systems permit a voter to cast more than one preference vote. However, in the present chapter and Chapter 14, we will address only the single-vote systems.

[3] In this chapter, we do not explore flexible-list systems, a hybrid described briefly in Chapter 6.

break one of our defining characteristics of simplicity: the rank-size principle. This is so because it is possible for a party to have the most votes in a district yet not have the most seats, or more generally for parties not to win seats in order of their *collective* vote shares. The simplest of these nonsimple formulas, as we noted in Chapter 3, is the single nontransferable vote (SNTV). Under SNTV, the winners are the candidates who have the *M* highest vote totals, *regardless of their party affiliation* (if any). Because it is just a top-*M* candidate-based allocation formula, SNTV means that it matters how many candidates a party has, and how its votes are distributed among the candidates, as explained in Chapter 3. It does not matter how many votes a party has collectively; unlike any list system, votes do not "pool" on the list for the purposes of determining the interparty allocation of seats. The pure candidate-based aspect of SNTV introduces the incentive of parties to "manage" their internal competition.

Vote management means restricting the number of candidates, attempting to equalize candidates' votes, or other methods of shaping the competition (such as in the characteristics of candidates and how widely they appeal within the district). One key implication is that parties under SNTV will attempt to avoid having one candidate dominate the others nominated by the party in the same district. If one candidate is very popular, those are votes that the party would have benefitted from shifting to another candidate to help bring him or her into the district's top *M* vote totals.[4]

This imperative for parties to engage in vote management under SNTV is in stark contrast to the internal competition under open-list PR. Because of the pooling of votes on the list, parties in open-list systems can afford "laissez faire" competition. With seats first being allocated among lists before they are allocated to candidates, a party should want to have as many candidates as the law allows. Any votes obtained by a candidate benefit the party collectively, because they add to the pool of votes on which the list obtains seats. Moreover, a very popular candidate is an asset, as the votes he or she brings may increase the list's total seats and help elect less popular list-mates. Thus parties generally should not have reason to worry themselves at how unequal the vote shares of their candidates are, in contrast to parties under SNTV.

This distinction between *laissez-faire* competition under open-list proportional representation (OLPR) and incentives for parties to manage competition under SNTV has several implications that will form the basis of a logical model in this chapter, and of several other testable implications explored. Then in Chapter 14, we turn these logical implications onto a related aspect of electoral competition – that between sublist collective actors. We assume that sublist collective actors almost always exist in

[4] Coordination of candidates' personal vote totals has been central to the literature on SNTV, e.g., Batto (2008), Cox (1997: 100–114), Cox and Niou (1994), Cox and Shugart (1995), Grofman et al. (1999), Johnson and Hoyo (2012), Reed (1991), Swindle (2002), Thayer (1969).

a list-PR system. If those lists are open, these actors are competing against each other for the seats their combined list wins. We know from the extensive literature on SNTV that subparty actors, typically called "factions," are common in such systems. We will not explore the question of factions in SNTV further, as it is well-trod ground (e.g., Hrebenar 1986; Grofman, et al., 1999; Reed 2009). However, much less is known about OLPR with alliances, in which we often do not have party lists, per se, but alliance lists in which the list's candidates may be variously branded by different party labels. That is, the sublist collective actors are themselves parties. Before we can make sense of sublist collective actors, we need to understand the individual actors, that is the candidates, and their vote shares within a party or list. That is the focus of the rest of this chapter.

THE SCOPE OF OLPR AND SNTV AND WHAT WE CAN LEARN FROM THEM

Before we go farther on the topic, we might pause to ask, why study such systems at all? Are they not so rare that we should not bother? Is it not the case that most PR systems used closed lists? Is not SNTV a relic of history? Not quite, although open lists are less common than the categories of closed or flexible list, it is true. (Recall our discussion of flexible-list systems in Chapter 6; see Crisp et al. 2013, André et al. 2017, Cahill et al. n.d). Nonetheless, OLPR is found in the two largest countries that use PR: Brazil and Indonesia (Allen 2018), the fourth and fifth largest countries in the world. It is also used in several longstanding democracies in Europe, including Finland (von Schoultz 2017) and Switzerland.[5] Poland, the sixth largest country in the European Union, has used OLPR since it democratized in the 1990s (as discussed in Chapter 1), and other relatively large countries including Colombia and Peru use it.[6] Chile has used it whenever it has had democratic elections since the 1950s.[7] OLPR is also apparently spreading in Latin America, as since around 2000 at least three smaller countries in the region have replaced closed lists with open: Dominican Republic, El Salvador, and Honduras.[8] Thus it is far from being a marginal system.

[5] The system used in Switzerland, while meeting the criteria of open lists, is more complex. Voters may cast up to M preference votes, across lists (*panachage*, as mentioned in Chapter 2), and parties may run multiple lists in a district, and pool votes across them.

[6] Colombia has used OLPR (with a party option for closed lists instead) since 2006. Prior to that time it used SNTV. Data in this chapter included one election under each system. For details, see Shugart et al. (2007), Pachón and Shugart (2010), and Taylor and Shugart (2018). In the Peruvian case, a voter may cast two preference votes within a list.

[7] That is, in its two democratic periods, interrupted by the dictatorship of 1973–1989.

[8] The latter two cases permit the voter to cast up to M preference votes, with *panachage*.

It is true that SNTV is not currently used by any large democracy. However, it was used for decades in Japan. It was also used in Taiwan, and thus accounts of a sizeable block of East Asian democratic experience to date. The system was adopted for Afghanistan in 2005 (Reynolds 2006), and has been used in subsequent elections there. A system that is SNTV in its essential details is used in Hong Kong (Carey 2018), where it serves as a potential example for democracy activists in China (of which Hong Kong is a part, with a special status) as well as a thorn in the side of the Communist Party ruling that country.

A basic reason for studying these systems is not merely the scope of their use around the world, but because the logic of competition that they provide may be the key for understanding further aspects of the still-understudied intraparty dimension of representation. In the remainder of this chapter, we develop models of intraparty competition among candidates, showing that we can employ similar techniques of combining logic and empirical analysis as we have done previously on the interparty dimension.

HOW OLPR AND SNTV SHAPE THE NUMBER OF CANDIDATES AND COMPETITION BETWEEN THEM

In analyzing the intraparty dimension, we are interested in how electoral system features, specifically the district magnitude and the allocation formula, affect the behavior of parties as collective actors consisting of individual candidates. The two formulas we investigate are OLPR and SNTV, and each is used in a wide range of district magnitudes (with that range being greater empirically for OLPR).

The first question we will address is the question of how many candidates a party nominates. It is usually not in a party's interests to nominate M or more candidates if the system is SNTV. Given the absence of vote pooling, parties that spread their votes out across many candidates may fail to convert their collective votes into a proportionate number of seats. Thus parties under SNTV should tend to nominate fewer than M candidates, although it remains to be seen how many fewer. When the system is OLPR, the vote-pooling mechanism of any list system guarantees the party will convert its collective votes into a proportionate share of seats, within the limits of the district magnitude and whichever specific PR formula is used. Thus it has no reason to restrict the number of candidates.

Thus, we start with two basic premises about the expected number of candidates, c:

$$c \geq M \text{ if OLPR;}$$
$$c' \leq M, \text{ if SNTV.}$$

We introduce here the prime mark ($'$) to differentiate quantities under SNTV from those under OLPR (which will be unmarked). To take these inequalities farther towards a logical model, we can stipulate that for OLPR, the number of candidates should rise 1:1 with magnitude. Sometimes the law restricts the number of candidates, and thus we would expect c=M. However, many countries, including Brazil and Finland, permit c>M, and as we have stated already, parties have clear incentive to nominate as many as they are allowed. Thus our expectation for OLPR is:

$$c = \beta M \quad [\text{OLPR}] \tag{13.1}$$

where β must be determined empirically and is equal to or greater than 1.0.

In the case of SNTV, many parties may follow the ultimate safe strategy and nominate only one candidate. In fact, parties that nominate just one candidate comprise a majority of our SNTV parties: 728 of 1271 (57.3 percent). These parties then have no need for further vote management among their candidates, because they have mitigated the problem of unequal votes distribution by having only one standard-bearer. For all other parties, then, we need a model that anchors at c'=2, M=2, given that we do not expect parties to nominate c'>M and we have excluded c'>1 and hence M=1 from the model. We should expect c' to rise with M, but at a declining rate. Following our usual process of taking the geometric average when we lack other information, we start from the lower limit of 1 and the expected upper limit of M, and expect a slope of $M^{1/2}$. Thus we propose:

$$c' = (2M)^{0.05} = 1.4\sqrt{M}\ [\text{SNTV, if } c' > 1]. \tag{13.2}$$

The expression obviously produces c'=2 at M=2, and then predicts a rise with M, but not the 1:1 relationship to M that we expect with OLPR.

When we run regressions to test Equations 13.1 and 13.2, we get c=1.22$M^{1.004}$ for OLPR and c'=1.37$M^{0.474}$ for SNTV (provided c'>1). While we had no specific expectation for the value of β in Equation 13.1, we confirm the expected slope of 1.0; that is, c really does rise 1:1 with M, on average. The regression for SNTV confirms the logical model of Equation 13.2 almost precisely. The output of these regressions is shown in the appendix to this chapter.

In Figure 13.1 we plot the result for the two formulas, OLPR in the left panel and SNTV in the right. Both panels are scaled to identical logarithmic axes in order to see at a glance the different patterns under the different formulas, even though the range of district magnitude is considerably lower under SNTV.

In the case of OLPR, the dashed line shows the average fit, c=1.22$M^{1.004}$. There is a bulge of data points at M≥6 where many parties are seen with c>M; these represent the main range of M in Brazil and Finland, two countries that allow c>M.[9] In the SNTV panel, we see that c'=1 occurs at all observed values

[9] The data points in Figure 13.1, left panel, seem to form several parallel lines; we will not discuss them, other than to note that such a pattern is consistent with the predicted slope of M^1.

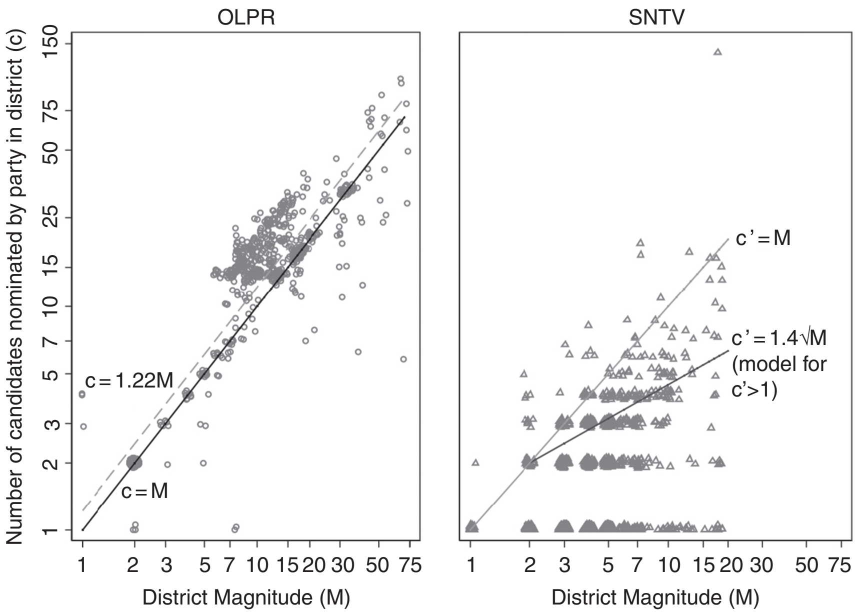

FIGURE 13.1 Candidates nominated by district magnitude under open list proportional representation (OLPR, left panel) and single nontransferable vote (SNTV, right panel)

of *M*, and we also see that the model fits the average pattern well for those that have *c*′>1, huge scatter notwithstanding. Surprisingly, *c*'>M is sometimes observed. We will discuss later the reasons why parties might nominate more than *M* candidates even under SNTV, although it is worth noting that fewer than 5 percent of parties do so.[10]

Vote Management: Vote Distribution Across Candidates

Now we turn our attention to what, if anything, parties do to manage the distribution of votes across whatever number, *c*, of candidates they have nominated. To carry out this analysis, we will model the *preference-vote shares* of candidates at various ranks within their party (or list) at the district level. By preference votes, we mean the votes of candidates when there are two or more competing within a party, under any system in which voters cast votes below the level of the party, including OLPR and SNTV.[11] Just as vote and seat

[10] There is one data point in the right panel that looks like a sure mistake. It is not: The Liberal Party in the district of Bogotá, Colombia, really did nominate 141 candidates in a district with *M*=18 in 2002.

[11] The term, preference vote, is well established. See, for example, Marsh (1985), Katz (1986), Karvonen (2004), Renwick and Pilet (2016).

shares of parties are the standard means of measuring the relative success of parties – as in several of our preceding chapters – so the vote shares of candidates within a party are an obvious measure of candidates' performance relative to one another.[12]

We designate any given candidate's share of the preference votes as $P_r = V_r/V_p$, where V_r is the vote total of the candidate ranked r in votes in the party and V_p is the sum of the votes of all the party's candidates[13] running in the same district. For winning candidates, r ranges from 1, the first winner, to s, the party's "s^{th}" candidate (where s is the party's seat total in the district).

We will consider P_1 and P_s, the preference-vote shares of the first and last winners, respectively. The *first winner* is important partly because many parties have only one winner. In the case of OLPR, even if a party has several winners, it may have one "list-puller" who dominates the intraparty competition while others win seats largely due to the pooling of the list-puller's votes. In the case of SNTV, on other hand, the first candidate has further importance because if that candidate is overly popular, the party may fail to convert its (collective) votes into seats.

If we are interested in developing a more complete picture of the shape of intraparty competition, the *last winner* is also of interest. In a very fragmented party, it may be possible to win a seat with a very small share of the party's votes, while in other parties winning two or more seats, the last winner may have a share not far behind the first winner. Comparing first and last winners' votes offers us an indicator of incentives for intraparty equalization. We now build logical models of these quantities.

First Winner's Vote Shares

The more candidates a party runs in a district, the smaller the vote share of its first winner is likely to be. As is the case throughout this book, we want to do more than stipulate the direction of the effect. We seek to generate reasonably precise estimates of the relationship so that our models can be of use to electoral-system "engineers." Let c be the number of candidates the party has nominated in the district. When c=1, P_1 cannot be anything else but 1, and with c>1 it must decrease. The simplest format to satisfy these conditions is:

$$P_1 = c^b,$$

where P_1 is the preference-vote share of the first winner, and the exponent b must be negative. To derive an expected value for b, we consider what the

[12] This section of the chapter draws heavily on Bergman, Shugart, and Watt (2013); readers wishing detail on the dataset may consult the earlier article.

[13] Where, as in Brazil, a list-only vote is also permitted, such votes are not included in the denominator because such votes do not affect the order in which candidates are elected.

constraints are on the variables, in order to rule out values that are impossible on logical grounds. The value of the top candidate's share of preference votes, P_1, obviously can never exceed 1. It also can never be less than $1/c$ (the value when c candidates have equal votes). Thus we have a clearly limited range beyond which the quantity of interest would not be found. If a party has no collective incentive to intervene in its internal competition, as is the case with OLPR, there is no reason to expect actual values of P_1 to be closer to either limiting value. Some parties might have a dominant list-puller, whose pooled votes benefit the party: P_1 approaching 1. Other parties might nominate numerous candidates of equal popularity, secure in the knowledge that vote pooling means there is no risk from having over-dispersed votes: P_1 approaching $1/c$, which alternatively can be written as c^{-1}. Given no reason to expect the trend to be closer to one limiting condition than to the other – as is the case with OLPR's *laissez-faire* competition – we expect the average value. With logged variables the average is found by the geometric mean of the extremes:

$$P_1 = (1 * c^{-1})^{0.5} = c^{-0.5} \tag{13.3}$$

That is, under OLPR, we expect the first winner's share to be, on average, equal to the *inverse square root* of the number of candidates running under the party's banner.

What about SNTV? The model just derived applies to the situation in which the party has no collective incentive to intervene in its internal competition, that is OLPR. However, as we have argued theoretically, parties under SNTV have incentive to intervene. Such intervention is expected to include efforts to avoid a leading candidate who is overly popular, leading to a "vote equalization error." Thus the first winner's preference share under SNTV, which we shall denote as P'_1 (with the prime mark indicating SNTV), should tend to be systematically closer to $1/c$ than is the case for OLPR. But can we get at a more precise numerical prediction?

In the absence of any knowledge on just how effective SNTV parties would tend to be at vote equalization, our best "minimax bet" again would be the geometric average of extremes. Our average SNTV party has a c=2 (actually 2.08). Perfect equalization results in P'_1=0.5, whereas *laissez-faire* coordination would produce P'_1=.$2^{-0.5}$=0.707. The geometric average of 0.5 and 0.707 is 0.595, which can be obtained for c=2 when b=–0.75. Thus we expect:

$$P'_1 = c^{-0.75}. \tag{13.4}$$

Because our estimates for SNTV did not rely on absolutes – we estimated a prediction from a prediction – Equation 13.2 rests on a weaker logical foundation than does Equation 13.1.

We can turn to our empirical test, and run the following equation, using an interactive term to check that there is a significant difference in the slopes:

$$\log P_1 = \log a_1 + k_1 \log c + k_2(\log c * sntv) + sntv. \tag{13.5}$$

The variable, *sntv*, is a dummy for that electoral system, and the interactive term tests for the expected difference of slopes; a is the regression's estimated constant term. The regression (see appendix) actually yields an absurd result for OLPR, in that it fails to respect the mandatory anchor point of P_1 =1 when c=1. Instead it gives us:

$$P_1 = 0.88c^{-0.408}.$$

The distribution of data gives us hardly any cases with just a single candidate, and therefore the regression will not anchor itself at the logically mandatory point, P_1 =1, c=1. Thus we need to run it again with the intercept 0 imposed. For SNTV, where we do have many case of c'=1, the result is both relatively close to our expectation and respective of the anchor point:

$$P'_1 = 1.00c^{-0.707}.$$

Our expected –0.75 is within the confidence interval.[14]

Because of the need to have an expression that respects the anchor point, we can run separate no-constant regressions, which results in:

$$\text{OLPR} : P_1 = c^{-0.45} \tag{13.6}$$

$$\text{SNTV} : P'_1 = c^{-0.72}. \tag{13.7}$$

Note that the result for SNTV is closer the logical model (Equation 13.4) than is the OLPR result. This is striking, given that we had somewhat weaker logical foundations for it than for Equation 13.3, the OLPR expectation. As for the OLPR model, it is, of course, "politics blind." This may especially be a problem for predicting vote shares on the intraparty dimension under OLPR. In this system, there is a strong premium on the personal vote, combined with no incentive of parties to manage their internal votes distribution. This means that a party under OLPR is likely to have at least one "star" candidate who has been nominated precisely because she can draw lots of votes. The implication is that once we introduce political factors – here the vote-seeking value of the main candidates, including the first winner – we have to expect that P_1 will be higher than what we derive from a model that does not address such considerations. Instead, our model addressed only the number of candidates. Given such a sparse model, it is remarkable that it comes so close!

As for SNTV, the "politics blind" feature of the model proves to be an advantage. This is actually not surprising, because parties intervene to attempt to prevent their leading candidate from being too popular. This is, of

[14] Specifically, –.7735 – –.6595.

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course, politics – in the sense of party organization and campaign strategy. It is not, however, political talent or other personal vote-earning characteristics of the candidates themselves, whose votes we are modeling. Rather, it is political imperatives derived precisely from the one factor in our model: the presence of multiple candidates in a party that cannot pool its own votes across those candidates. Thus a model that takes no account of individual candidate characteristics is more accurate for SNTV, where parties seek to minimize differences among their candidates. It is, by contrast, less accurate under OLPR, where parties can adopt a *laissez-faire* approach to the characteristics and vote-pulling talents of their candidates.[15]

In Figure 13.2, we probe the models and the data distribution further. The graph shows all of the OLPR data points with light gray circles, and those for SNTV with gray triangles. The SNTV data points, in particular, are more clustered, resulting in their often looking like a blob rather than individual data points. In fact, this is as expected: SNTV behavior is much less variable because of the imperative of vote-management in order to avoid wasting many votes and electing fewer candidates than the party's collective votes could have allowed. On the other hand, the distribution of OLPR data points is much more scattered than for SNTV, at least when $c>2$. This is consistent with the *laissez-faire* approach that parties can afford when their candidates' votes in the district all pool. Thus we see some lists in which the leading candidate dominates, with 80 percent or more of the list's votes, even on lists with ten or more candidates. We see other lists where the leading candidate does not have even 10 percent of the list's votes.

Despite the wide variation in OLPR first-winners' shares, there is a distinct relationship, compared to that for SNTV. The SNTV parties' first winners tend to be distributed at lower values for all $c>2$, relative to those from OLPR. The SNTV data points have a notably stronger tendency to be closer to the minimum possible value of $1/c$ (the upper border of the forbidden area[16]), consistent with efforts by these parties to equalize votes. The dashed line is Equation 13.3, our model for OLPR: $P_1=c^{-0.50}$.[17] The solid dark-gray line is Equation 13.4, $P_1=c^{-0.75}$, our logical model for SNTV.

15 Even so, it is noteworthy that the coefficient for SNTV is almost precisely the mean of −1.0 (where all candidates are equal) and the coefficient for OLPR (−.45). We expected just such a relationship between the two coefficients, except that we thought the one for OLPR, would be −0.5, giving us −1.5/2 =−0.75 for SNTV.

16 It appears that some data points are in the forbidden area, but this is only due to the "jittering" of data points, which is necessary to prevent multiple points at the same values from looking like a single point.

17 Even though −.5 is not, in fact, within the empirically estimated confidence interval for OLPR, we use it. Given the scatter in the actual data, the empirical result (−.45) is not superior to the one that has logic to back it up.

 https://doi.org/10.1017/9781108261128.014

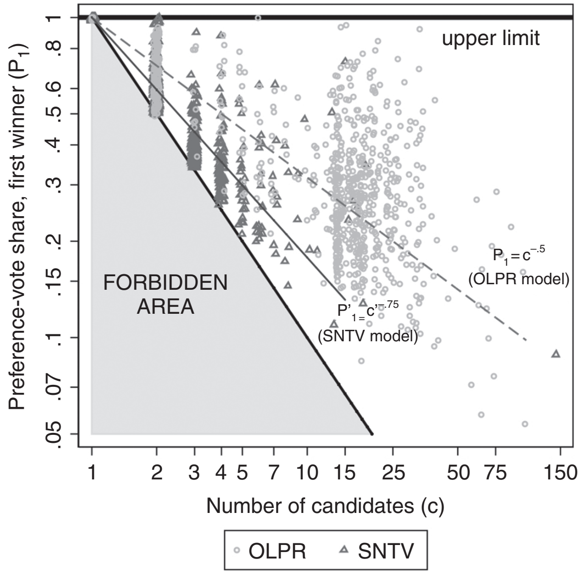

FIGURE 13.2 First winner's share under OLPR and SNTV: Logical models and data

Last Winner's Vote Share

To model the last winner's share, we start with SNTV, because its strategic imperatives make for a clear logical baseline. Just as parties under SNTV have the incentive to attempt to reduce the vote share of their leading candidate, they have a similar imperative to intervene in intraparty competition to equalize their candidates' votes. A hypothetical party that fully equalized across its candidates, all of whom won, would have a vote share of 1/*c* for each candidate. If our 1,271 parties competing under SNTV are, *on average*, successful at distributing votes equally across *s* candidates, then we should find:

$$P'_s = c^{-1}.$$

If this were the case, the average party would waste no votes. This is, of course, an unrealistic assumption, given that parties do not have perfect information about how their votes will be distributed across candidates, no matter how impressive their vote-management organization may be. Moreover, the last winner obviously has the same votes as the first winner for parties that win just one seat. Therefore, we might model the last winner's share as a fraction of the votes the party has left over *after accounting for its first candidate*. It is quite likely that parties need to factor into their management strategies the popularity of their leading candidate in the district. As we have argued, vote-management strategies under SNTV are partly aimed at reducing the leading candidate's intake of votes. A very popular candidate is a potential liability under SNTV, for any party seeking to win more than one seat. Nonetheless, there is only so much a party can do to undermine its own leading candidate. For these reasons, our logical model for the last winner's share is as follows:

$$P'_s/(1–P'_1) = 1/(c–1) \tag{13.8}$$

In words: the last winner's votes, as a share of the party's votes after subtracting those of its first winner, should be equal to the reciprocal of the number of its candidates after the first winner. This expectation assumes perfect equalization of votes of remaining candidates, which makes the model naïve, but forms a reasonable basis on which to build our logical model.

Now let us return to OLPR. Vote-pooling means that parties under this system do not have to worry that the distribution of their candidates' votes might undermine the collective performance of the party. Thus we should expect a higher share of P'_s for any given c. Equation 13.8, derived for SNTV would be a highly unlikely result for OLPR, because *laissez-faire* competition under the latter system means parties do not attempt to equalize votes among their candidates.

In the appendix, we propose two logical models for OLPR that take account of the *interparty dimension*. One is based on the expected relationship of the number of parties to district magnitude, $N'_{S0}=\sqrt{M}$ (as confirmed in Chapter 7), and the assumption that, under OLPR, parties nominate M candidates to their lists. The result of the logic is an expectation of:

$$P_s/(1–P_1) = [(c^{0.5}–1)(c–1)]^{-0.5}. \tag{13.9}$$

As detailed in the appendix, Equation 13.9 contains two terms on the right-hand side. The first, $c^{0.5}–1$, is based on estimating how many seats the average list holds, after accounting for the first winner, while the second, $c–1$, is based on the total number of remaining candidates (as in Equation 13.8).

The second approach to estimating P_s under OLPR takes account of the *actual* number of seats won by each list, as a function of district magnitude. While Equation 13.9 proves surprisingly accurate (as explained in the appendix), we will plot instead the results of an equation that is obtained from the known number of seats won, given that our focus on the intraparty dimension. That is, rather than incorporate any error of estimation from the interparty allocation of seats to lists, we can start with the known allocation. The adjusted model that we will plot here, and which is confirmed via regression (see appendix), is:

$$P_s/(1–P_1) = [(M^f–1)(c–1)]^{-0.5}. \tag{13.10}$$

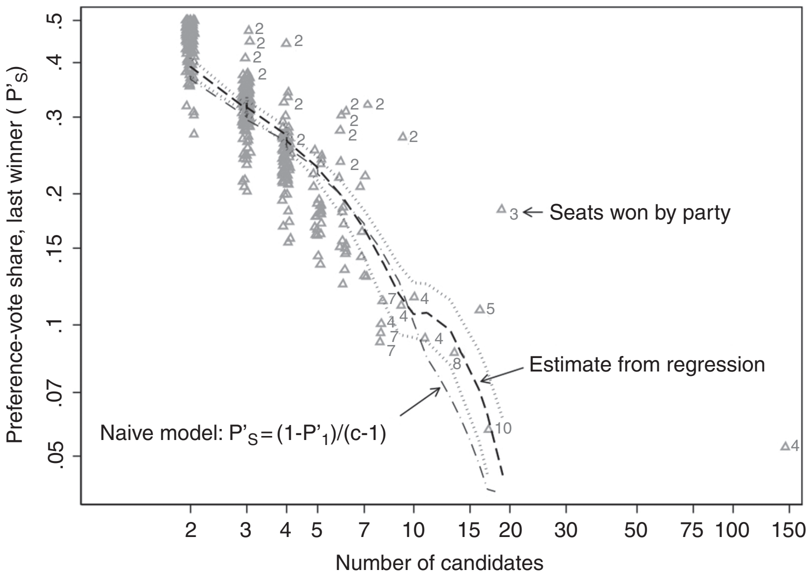

FIGURE 13.3 Last winning candidate under SNTV

where the exponent, f, on M in the first term on the right-hand side of the equation is the exponent that yields each individual list's *actual* number of seats won.[18]

We now proceed to graphs of last winner's shares under SNTV and OLPR. In Figure 13.3, we see a data plot for last winners in SNTV. The graph plots our naïve expectation for SNTV, Equation 13.8, as well as an estimate from a regression, which has a coefficient of –0.83 instead of –1.[19] The plotted equations are not straight lines, because we are plotting the equation with each party's actual value of P_1 plugged in, given that we are modeling what share P_s represents of the votes remaining after the first winner. The light dotted lines show the 95 percent confidence interval on the regression.[20] The naïve model is shown with the light dash-dot line.

As compared to the naïve model, then, parties under SNTV actually are not as good at equalizing. Or perhaps they are, if we relax the most "heroic" assumption of the naïve model, which is that parties nominate the correct

[18] That is, if M=9 and a given party won 2 seats, f=0.315, because $9^{0.315} = 2$.

[19] The regression is $\log[P_s/(1-P_1)]=-0.02 - 0.830\log(c-1)$; R^2=0.858. The 95% confidence interval on the coefficient is –0.919 – –0.741. A no-constant version of the regression has a coefficient of –0.870.

[20] Both expressions that are plotted are algebraically modified so that they predict P'_s after accounting for actual P'_1. That is, the naïve model is plotted as $P'_s=(1-P'_1)/(c-1)$. The lines plotted are actually local regression (loess) curves, given that varying P'_1 would otherwise imply multiple curves. The same is true of the lines plotted in Figure 13.4.

number of candidates, for how many they can elect with optimal intraparty vote distribution. In fact, parties may overnominate and then attempt to equalize among those they expect they can actually elect. To probe this idea impressionistically, we have indicated the number of seats won by all those parties that have an actual last winner's share that is above the regression's upper confidence estimate, or where the number of candidates is large, i.e., more than seven. We note that the parties with a higher than anticipated last winner's share also elected considerably fewer candidates than they had running. In fact, most of these win two seats, even if they have four or more candidates. Those with seven or more candidates and a very low last winner's share tend to have elected from $c/2$ to $c–1$ candidates through good vote-management strategy over a subset of their candidates. For instance, note the frequent occurrence of the number seven (and one case of eight and another of ten) in this area of the graph. These parties, then, had managed to suppress the votes going to their excess number of losers. We return to these questions of nominating and vote-management in more detail in Chapter 14.

Figure 13.3 thus shows that, despite the difference in coefficients, the naïve model is not far from the regression estimate, once we take the party's P_1 into account. In fact the naïve model, shown with the light dash-dot line, is barely below the regression's lower confidence bound when $c<4$, and again when $c>10$. Through the rest of the data plot, it is fully within the regression confidence bounds. Thus we see considerable evidence that parties under SNTV do indeed approximate the optimal vote management strategy, which is to ensure their winners' votes are not too disparate.

In Figure 13.4 we show a similar plot for OLPR last winners. Our logical model, Equation 13.10, which takes into account actual seats won by the list, is indicated by the black dash-dot curve. The lighter dashed curve is the empirical regression. The model and its regression test are both detailed in the appendix. What we see is that the actual pattern, as estimated via the regression, for last winner shares is somewhat higher than we expected. The difference is hardly so great as to prompt an adjustment to the model, which captures the trend well through most of the data, as well as the distinction with SNTV (when compared to Figure 13.3).

The reasons for the tendency for last winner shares under OLPR to be somewhat greater than we expect is likely due to the popularity of the candidates that parties nominate with expectation of their winning. That is, our model is blind to the personal vote-earning attributes of the candidates. It is based only on the expected number of seats a party would win, on average, and how many candidates it is expected to run. Parties may win more or fewer seats, nominate more (or less often, fewer) candidates, and some of those candidates are sufficiently popular as to stand out above the other nominees. In fact, parties may seek to prioritize the winning of candidates representing the party's constituent groups via their nomination strategy; they can increase the odds of certain candidates winning by ensuring that some of them represent specific

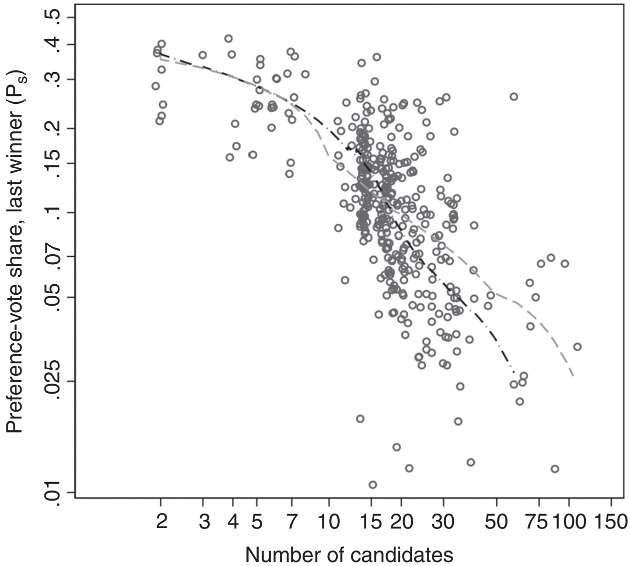

FIGURE 13.4 Last winning candidate under OLPR

constituencies.[21] To the extent that this is so, of course they are being less *laissez-faire* than we have assumed. Analysis of how the personal characteristics of winners and losers may produce the patterns observed in these graphs (or deviations from them) is a topic for further research.

CONCLUSION

In this chapter we have seen how the presence or absence of vote-pooling affects how votes are distributed across candidates in two basic types of system that entail intraparty competition for votes and seats. In both open-list proportional representation (OLPR) and single nontransferable vote (SNTV) systems, candidates stand in competition with others of the same party. The party is a collective actor that seeks to maximize the seats it wins, whereas candidates must amass a sufficient number of preference votes for themselves in order to surpass other candidates and win a seat.

The critical difference between OLPR and SNTV is in the relationship between these two goals: the party's and the candidates'. OLPR "pools" votes, and thus the party wins seats in proportion to the collective votes of its candidates (plus any votes solely for the list, if the ballot format of a given country permits such votes). Only after this seat total is known are seats

[21] Additionally, parties in their campaigning may boost the fortunes of a few of their key candidates (for instance, through the allocation of media time or party-provided finance).

allocated to the individual candidates, in order of their individual preference votes. This is the sense in which the system is "top s" on the intraparty dimension: the party gets s seats in the district, and the top-s candidates win them. As a result of the pooling of votes, we saw that parties tend to nominate at least M candidates. They can tolerate widely disparate vote totals for these candidates, because there is no risk of candidates spreading their votes too thinly for the party to achieve its proportionate seat total.

By contrast, SNTV is a top-M system on both dimensions. In fact, in a real sense there is no *inter*party dimension under SNTV, because the electoral system itself does not allocate seats to parties, only to candidates.[22] Thus a party wins as many seats in the district as it has candidates with top-M individual vote totals. We saw in this chapter the consequences of this distinction. In the case of SNTV, the party has an incentive to attempt to avoid too many votes going to its leading candidate. One step in this process is for a party to nominate a number of candidates close to the number it might elect. Many parties simply nominate one candidate, even when $M>1$, which obviates further vote management. Those that nominate more than one tend to keep the number below M, and we developed and confirmed a logical model that the number of candidates would tend to be, on average, $c'=(2M)^{1/2}=1.4\sqrt{M}$. Then, having two or more candidates, the party has incentive to equalize votes across whatever number of candidates it can realistically elect. Thus under SNTV we see parties engaging in managing of their internal competition, in contrast to parties under OLPR which benefit from *laissez-faire* competition.

In Chapter 14, we further investigate the behavior of parties in both SNTV and OLPR, with a focus on further consequences of vote management: how concentrated votes are on the party's winning candidates. We then take the analysis back to the interparty dimension, by examining cases under OLPR where lists consist of alliances of two or more parties.

Appendix to Chapter 13

This appendix displays the output of regressions discussed in Chapter 13, and explains detailed steps behind the model derived in the chapter for last winner's share.

REGRESSION RESULTS FROM CHAPTER 13

In Table 13.A1, we see regressions to test our expectations for the number of candidates (c) as a function of district magnitude (M). Both variables are entered as their decimal logarithms. Regression One is a test of Equation 13.1 for OLPR; we expect $\log(c) = a + 1.00\log(M)$. We have no specific expectation for

[22] See Shugart (2005a) for a more complete discussion of this point.

TABLE 13.A1 *Regression results for number of candidates and district magnitude*

	(1) OLPR No. of candidates (logged)	**(2) SNTV No. of candidates (logged)**
District magnitude, *M* (logged)	1.004***	0.475***
	(0.0313)	(0.0394)
	[0.942 – 1.065]	[0.397 – 0.552]
Constant	0.0878***	0.137***
	(0.0258)	(0.0259)
	[0.0369 – 0.139]	[0.0858 – 0.188]
Observations	762	543
R-squared	0.843	0.255

Robust standard errors in parentheses.
95 percent confidence intervals in brackets.
*** p<0.01

the value of *a*, other than that it must be not less than zero, as explained in the chapter text. The expected coefficient of 1.00 on log(M) is confirmed.

Regression Two is a test of Equation 13.2 for SNTV; we expect $\log(c) = 0.1505 + 0.50\log(M)$, as explained in the chapter text.[23] Both expectations are within the 95 percent confidence intervals of the regression result, as indicated in the table.

In Table 13.A2 we test Equation 13.5, using an interactive term to check that there is a significant difference in the slopes for SNTV and OLPR. For the expectations and interpretations of the results, see the chapter text.

MODEL FOR LAST WINNER'S SHARE

For last winners, the model for SNTV is introduced in the chapter as Equation 13.8:

$$P'_s/(1{-}P'_1) = 1/(c{-}1).$$

This model is tested in Table 13.A3 as Regression One. Discussion and interpretation of the result was done in the chapter text.

For OLPR, the model is more complex, and we explain its logic here. We expect parties to nominate a full slate of candidates (M or more, if allowed); the expectation was confirmed (Table 13.A1, Regression One). As a result, they will have many losers, when M is large. Unlike in SNTV, then, there is no expectation of roughly equal vote shares among candidates after the first winner. In fact, because the last winner has many losing candidates trailing him or her, the vote share of the last winner should be well

[23] Note that 0.1505 is the decimal logarithm of the square root of 2.

TABLE 13.A2 *Regression results for first winner*

VARIABLES	**Preference-vote share for first winner (P_1), logged**
Number of candidates, logged (log(c))	−0.408***
	(0.0152)
Interaction of log(c) X dummy for SNTV	−0.299***
	(0.0360)
SNTV dummy	0.0455***
	(0.0125)
Constant	−0.0543***
	(0.0119)
Observations	2,033
R-squared	0.812

Robust standard errors in parentheses.
*** p<0.01

TABLE 13.A3 *Regression results for last winner*

	(1) SNTV $\log[P_s/(1-P_1)]$	**(2) OLPR $\log[P_s/(1-P_1)]$**	**(3) OLPR $\log[P_s/(1-P_1)]$**
$\log(c-1)$	−0.830***		
	(0.0453)		
$\log[(c^{0.5}-1)(c-1)]$		−0.447***	
		(0.0166)	
$\log[(M^f-1)(c-1)]$			−0.545***
			(0.0147)
Constant	−0.0220*	−0.0714**	0.00628
	(0.0112)	(0.0320)	(0.0247)
Observations	386	384	384
R-squared	0.858	0.501	0.818

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

above $1/(c-1)$, which is our naïve assumption for SNTV (where parties are assumed to have perfect equalization strategies among the "correct" number of candidates, after the first).

With OLPR, we expect, on average, $N'_{S0}=M^{0.5}$; it must also be the case, then, that on average, a party wins $s=M^{0.5}$ seats. We can attempt a model under this assumption. However, if the actual number of parties winning seats – and hence the mean number of seats won – deviates from these expectations, it will throw off our estimate of P_s. As it happens, this data sample has a number of parties per district that is, on average, closer to $N'_{S0}=M^{0.6}$. Because the number of seats per average party, times the number of parties winning seats must equal the magnitude, this means we have $s=M^{0.4}$. We thus can build the model either around the pure logical inputs, where we assume $N'_{S0}=M^{0.5}$, or around the empirically observed relationship between a given party's number of seats, s, and the magnitude of the district, M. Of course, the latter will be more accurate. But let us first do the purely theoretical logic.

Let us further assume that a party has $c=M$ candidates (although it tends to be slightly higher, in our OLPR data sample). This would make for a mean number of seats per party of $s=c^{0.5}$. Thus, after the first winner, a party has $c^{0.5}–1$ additional winning candidates.

Suppose its winners are well known and of approximately equal quality. This need not be the case, but is a simplifying assumption needed to keep the logical model tractable. If this were the case, the winners (after the first) might have vote shares around:

$$1/(c–1).$$

This is our "soft" upper boundary for the last winner's share. On the other hand, the minimum that the last winner would have is the same as the naïve model for SNTV, $1/(c–1)$. We can take the geometric average:

$$P_s/(1–P_1) = [(c^{0.5}–1)(c–1)]^{-0.5}.$$

This is Equation 13.9, introduced in the chapter. It is a complex expression, but it has a logical basis in both expected number of seats won by a party (on average) and expected intraparty vote distribution. When we test it via OLS, it is approximately confirmed. As shown in Table 13.A3, Regression Two, we get:

$$\log[P_s/(1–P_1)] = 0.071–0.447\log[(c^{0.5}–1)(c–1)] \quad (R^2 = 0.501).$$

The intercept, 0.07, suggests $P_s/(1–P_1) = 0.851$ (when unlogged) for $c=2$. This is illogical, as in such a situation the last winner must have 100 percent of the votes not won by the first winner. If we rerun the regression with the constant suppressed, we get a coefficient of –0.486, which is very close to the expected –0.5. This is remarkable, given how many assumptions have gone into it.

If we want to improve the calculations, we can use the actual exponent on M for a given number of seats won by the individual parties in the sample. This will allow the parameters in the model to vary with the actual success of parties on the interparty dimension, removing the prior "leap of faith" that our parties all average $M^{0.5}$ seats. The actual exponent on M, which we will call f, can be derived easily:

$$f = \log(s)/\log(M).$$

Then the previous steps are adjusted as follows. After the first winner, a party has (M^f –1) additional winning candidates. If they had equal votes then we would have P_s=1/(M^f –1). This would be the "soft" upper boundary. We would thus have Equation 13.10:

$$P_s/(1–P_1) = [(M^f–1)(c–1)]^{-0.5}.$$

It is an even more complex expression, but it has a logical basis in both expected number of seats won by a party (on average) and expected intraparty vote distribution. When we test it via OLS, it is almost precisely confirmed (see Table 13.A3, Regression three):

$$\log[P_s/(1–P_1)] = –0.006–0.545\log[(M^f–1)(c–1)] \quad (R^2 = 0.814).$$

This constant, –0.006, is highly insignificant (we expect zero), and the coefficient, –0.544, is not far from the expected –0.5. Moreover, this adjustment has substantially improved model fit.