Estimating the Likelihood of Winning Parliamentary Constituencies

Borooah, Vani

University of Ulster

December 2014

Chapter 3
Estimating the Likelihood of Winning Parliamentary Constituencies

3.1 Introduction

In this chapter we begin a comparison between the two major protagonists in Indian elections – the Bharatiya Janata Party (BJP) and the Indian National Congress (INC). The comparison relates to the relative efficiency of the two parties in winning constituency battles and in converting votes into seats. This chapter places emphasis on the *probability of winning elections*. It provides estimates of such probabilities and shows how these differ between the BJP and the INC. In so doing, the first port of call is the 'marginal constituency': a constituency where the margin of victory between the winner and the runner-up is so small that the result could have been reversed with a small shift in votes from the winner to the loser. In the context of such constituencies we first estimate the separate likelihoods of INC and BJP candidates winning marginal seats, in post-1984 *Lok Sabha* elections, after controlling for factors, like *inter alia* incumbency and turnout.

We next consider, in this chapter, consider *all* constituencies in which the INC and the BJP went 'head-to-head' in the sense that both fielded candidates in those constituencies. In estimating the likelihoods of the INC and the BJP winning 'head-to-head' we used the econometric estimation method of bivariate probit which allowed the testing of inter-party differences.

Lastly, the chapter considers the electoral performances of the INC and the BJP separately for the Hindi-speaking and the non-Hindi speaking major Indian states. The seven Hindi-speaking states - Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Rajasthan, Uttarakhand, and Uttar Pradesh - provide 204 seats of the total of 543 *Lok Sabha* seats and these are of particular importance to the BJP because a large part of its contested constituencies are from these states: in the *Lok Sabha* elections of 2014, 192 of its contested 428 constituencies were from these states.

3.1 Marginal Constituencies

A *marginal constituency* is one where the difference in votes received between the winning party and the runner-up is so narrow that the result could have been reversed with a small shift of votes away from the winner. In this book we adopt - admittedly on arbitrary but, it is to be hoped, not

unreasonable criteria - two definitions of a marginal constituency: (i) the difference in vote shares between the winner and the runner-up was 10 percentage points or less so that, under this definition, a shift of five percent of the constituency vote away from the winner to the runner-up would have reversed the result; (ii) the difference in vote shares between the winner and the runner-up was 5 percentage points or less so that, under this definition, a shift of 2.5 percent of the constituency vote away from the winner to the runner-up would have reversed the result.

Notwithstanding the fact that elections to the *Lok Sabha* often have clear winners and losers many elections in several constituencies are closely contested. In 2014, when the BJP won a handsome parliamentary majority with 282 seats, there were 190 constituencies (35 percent of the total of 540 constituencies) in which difference in vote shares between the winning and the losing party was 10 percentage points or less and 96 constituencies (18 percent of the total of 540 constituencies) in which difference in vote shares between the winning and the losing party was 5 percentage points or less. The corresponding figures for the INC "landslide" election of 1984 were 154 constituencies at the 10 point level and 80 constituencies at the 5 point level: respectively, 29 percent and 15 percent of the total of 537 constituencies. Table 3.1 shows the number of marginal constituencies for each of the elections between 1962 and 2014.

<Table 3.1>

The important point that emerges from about Table 3.1 is the growing presence of marginal constituencies in the total of constituencies. In 1971, when the INC won 352 seats, one in four constituencies was a "ten point" marginal and "five point" marginals comprised 12 percent of total constituencies. By 1984, when the INC won 414 seats, "ten point" marginals and "five point" marginals comprised, respectively, 28 and 15 percent of total constituencies and, in the elections since 1998, marginal seats have come to dominate reaching an apotheosis in 2009 of 63 percent of all constituencies decided on a margin of 10 percent or less and 36 percent of all constituencies decided on a margin of 5 percent or less. This would suggest that targeting key groups of voters is (or should be) an increasingly important part of electoral strategy in India since small swings in support can, more than ever before, make the difference between forming a government or sitting in opposition.

<Table 3.2>

Table 3.2 shows the distribution of marginal constituencies, across the major Indian states, for the 2014 *Lok Sabha* elections. Of the 178 marginal constituencies (at a 10 points difference) in the major Indian states, 113 (63 percent) were located in the six states of Andhra Pradesh, Bihar, Karnataka, Kerala, Uttar Pradesh, and West Bengal. In Kerala, 80 percent of constituencies were "marginal"; in Andhra Pradesh and Karnataka nearly two in three constituencies were "marginal"; and in Bihar and West Bengal nearly one in two constituencies was "marginal".

3.3 The Likelihood of Winning Marginal Seats

Against this background, an important question in Indian politics – and, indeed in electoral politics in general – are the relative strength of the factors which determine whether or not parties win marginal seats. Using econometric techniques, we attempt to tease out, for India' two leading political parties, the INC and the BJP, answers to this pressing, and complex, question.

In order to do so, we estimated for the INC - across the 14 elections between 1962 and 2014 - a logit equation on data for "ten point" *marginal constituencies*, in the 20 major Indian states (listed in Table 3.2), in which the INC was either the winner or the runner-up. These, collectively, yielded a total of 1,989 constituency observations. A similar equation was estimated for the BJP on data for "ten point" marginal constituencies, in the 20 major Indian states in which the BJP was either the winner or runner-up. Since the BJP only made its electoral debut in the 1984 *Lok Sabha* elections, the data related to the nine elections between 1984 and 2014. These, collectively, yielded a total of 1,009 constituency observations.[1][2]

In a logit model the dependent variable, *y* takes the value 1 if the condition is present (a party wins the election from constituency *i*: $y_i=1$) and the value 0 if the condition is absent (a party loses the election from constituency *i:* $y_i=0$). Suppose there are *N* constituencies which the party contests so that $y_i=1$ for some constituencies and $y_i=0$ for the others. If $Pr[y_i=1]$ and $Pr[y_i=0]$ represent,

[1] Note that 'observations' are distinguished by constituency name and by year of election: for example, Adilabad in the 1989 and 1991 *Lok Sabha* election is treated in the analysis as two distinct constituencies and, therefore, as two separate observations.

[2] The focus was on constituencies in which the winning margin was 10 points or less in order to harvest the largest number of constituencies from the data while remaining within the ambit of marginal constituencies.

respectively, the probabilities of the party winning from constituency *i*, *i=1…N*, the logit formulation expresses the log of the odds ratio as a linear function of *K* variables (indexed *k=1…K*) which take values, $X_{i1,}X_{i2}...X_{iK}$ in constituency *i*, *i=1…N*:

$$\log\left(\frac{\Pr[y_i=1]}{1-\Pr[y_i=1]}\right)=\sum_{k=1}^{K}\beta_k X_{ik}+u_i=Z_i \qquad (3.1)$$

where: β_k is the coefficient associated with variable *k, k=1…K*.

From equation (2.1) it follows that:

$$\Pr[y_i=1]=\frac{e^{z_i}}{1+e^{z_i}} \qquad (3.2)$$

where, the term 'e', in the above equation represents the exponential term.

The explanatory power of the logit equations are shown in terms of the 'Pseudo-R^2'. The 'Pseudo-R^2' is a popular measure of the model's performance in binary models and compares the maximised log-likelihood value of the full model (log L) to that obtained when all the coefficients, expect the intercept term, are set to zero (log L_0) and is defined as: 1-(log L/log L_0). The measure has an intuitive appeal in that it is bounded by 0 (all the slope coefficients are zero) and 1 (perfect fit).[3]

The dependent variable in the logit equations estimated in this section took the value 1 for a (marginal) constituency if the party (INC or BJP) was the *winner* in that constituency and the value 0 if the party (INC or BJP) was the *runner-up* in that constituency.[4] In some of these contests in marginal constituencies the INC and the BJP went head-to-head (meaning, one was the winner and the other the runner-up) but, in other contests, the INC and the BJP went head-to-head with other opponents.[5]

There were seven variables which were hypothesised to play a significant role in determining the outcome (winner or runner-up) in a marginal constituency:

1. The share of the total votes received by the party in that constituency.

[3] See Long and Freese (2014), p. 126-28 for a discussion of measures of fit in binary models.
[4] By implication we do not consider marginal constituencies in which the INC or the BJP was neither the winner nor the runner-up.
[5] Over the elections from 1962 to 2014, there were 113 constituencies in total in which there was only *one* party candidate, the rest being Independents. The most recent of such these was Kokrajhar (Assam) in 2004 when the INC unsuccessfully fought the seat alongside three Independents.

2. Whether the party held the constituency in the previous election (that is, it was the 'incumbent' party).[6]
3. The percentage of the electorate voting in that election ("turnout").
4. The number of independent candidates in the election.
5. The number of 'other' (that is, third, fourth etc.) party candidates in the election.
6. The year of the election.
7. The state in which the constituency was located.

In order to allow for non-linear effects, the squared value of 'vote share', 'turnout', 'the number of independent candidates', and the number of other' parties, was also included in the equations. The logit estimates for the INC and the BJP equations are shown in Tables 3.3 and 3.4, respectively. The coefficient estimates shown in the second column of Tables 3.3 and 3.4 are the estimates of the coefficients β_k in equation (3.1). The third column shows the standard errors associated with these estimates. Dividing the estimates by their corresponding standard errors yields the z-value shown in column 4. The value in column 5 shows the probability of observing the z-value under the null hypothesis that the coefficient was zero. At 5 and 10 percent levels of significance, this null hypothesis was 'rejected' for, respectively, $p<0.05$ and $p<0.1$.

<Tables 3.3 and 3.4>

Following the advice contained in Long and Freese (2014), the results from the estimated equations in Tables 3.3 and 3.4 are presented, for subsequent analysis, in the form of the *predicted probabilities* or, equivalently, *predicted likelihoods* (the terms 'probability' and 'likelihood' are, hereafter, used interchangeably) computed from the estimated logit coefficients, from which these probabilities are derived, and not in terms of the estimates themselves. In other words, the subsequent analysis uses the expression in equation (3.2) to compute the outcome probabilities where these are derived from the coefficient estimates of equation (3.1). This is because the logit estimates themselves do not have a natural interpretation – they exist mainly as a basis for computing more meaningful

[6] The effects of incumbency are analysed in detail in the next chapter. Here incumbency is simply used as a variable determining electoral outcome.

statistics and, in this case, these are the predicted probabilities of winning under a variety of configurations.

It should be emphasised that these predicted probabilities will, in general, differ from the sample proportions. This is because the predicted probabilities are computed after controlling (or adjusting) for the effects of the conditioning variables (noted above) while the sample proportions represent raw, unadjusted data. Since a property of the logit model is that it passes through the sample mean, the *overall* predicted probability, from the logit model, of winning a marginal constituency will be the same as the overall sample proportion of marginal constituencies in which the party was victorious. However, while the estimated model passes through the overall sample mean, it does not pass through the means of the different sample subgroups. This is illustrated in Table 3.5 which compares, for each year and in aggregate, the predicted probabilities and the sample averages. The two quantities differ for each election (though they follow each other closely over the elections) but are the same when aggregated over all the elections.

<Table 3.5>

The general methodology for computing the predicted probabilities was to calculate, for each of the observations (1,989 for the INC; 1,009 for the BJP), the probability of winning the election under a *hypothetical* situation (Scenario 1) in which *some* of the independent variables took specified values (for example, the variable 'year' was set to 1967), the values of the other independent variables (turnout etc.) being *as observed*. This then yielded 69.2 percent as the predicted probability of winning a marginal constituency in 1967.

In order to obtain the predicted probability of winning in 1971, the variable 'year' was set to 1971, the values of the other independent variables being as observed. This then yielded Scenario 2. The difference in the average probability of winning between the scenarios could then be ascribed to the change in the value of the independent variable(s), in this case between the years 1967 and 1971.

Election-on-election changes in the probability of winning marginal constituencies

Table 3.5 showed that the predicted probability of the BJP winning a marginal constituency was, except for the 2009 election, always greater than that for the INC. So there is *prima facie* evidence, that with respect to marginal constituencies at least, the BJP is a more electorally efficient

party than the INC; however, we postpone, till the next section, a detailed examination of this hypothesis. The other question raised by the results of Table 3.5 are whether the year-on-year likelihoods of winning marginal constituencies significant different from each other?

<Table 3.6>

Table 3.6 shows the results from testing the significance of election-on-election changes in the likelihood of the INC and the BJP winning marginal constituencies. This table shows that, for the INC, the change in the likelihood of winning marginal constituencies was significantly different from zero (hereafter, simply "significant") between: the 1967 and 1971 elections (went down); the 1971 and 1977 elections (went down); the 1977 and 1980 elections (went up); the 1980 and 1984 elections (went down); the 1984 and 1989 elections (went down); the 1998 and 1999 elections (went down); the 1999 and 2004 elections (went up); the 2004 and 2009 elections (went up); and between the 2009 and 2014 elections (went down).

For the BJP, the year on year changes were significantly different from zero between: the 1991 and 1996 elections (went up); the 1996 and 1998 elections (went down); and the 2009 and 2014 elections (went up). Overall, in terms of contesting marginal constituencies, the two good elections for the INC since 1989 have been 2004 and 2009 after both of which the INC's predicted probability of winning marginal constituencies rose. For the BJP, on the other hand, 1996 was a good election in terms of contesting marginal constituencies and, of course, so was the most recent election of 2014.

Incumbency Effects

Table 3.7 shows that the average likelihood of the INC winning marginal constituencies was 53.5 percent if it was the incumbent party and 46.7 percent if it was the non-incumbent and this difference was significantly different from zero. For the BJP, on the other hand, the likelihood of winning marginal constituencies was 54.5 percent if it was the incumbent party and 58.2 percent if it was the non-incumbent but this difference was *not* significantly different from zero. Consequently, the overall evidence, over the elections between 1962 and 2014, was that for the INC there was a significant *pro-incumbency* effect operating in marginal constituencies. On the face of it, there was an *anti-incumbency* effect operating in marginal constituencies for the BJP. However, considering the

elections between 1989 and 2014 in their entirety, the observed *anti-incumbency* effect was not statistically significant.

<Table 3.7>

Number of Candidates, Turnout, and Vote Share

Figure 3.1 shows the predicted probability, computed over all the *Lok Sabha* elections between 1967 and 2014, of the INC winning a "10-point" marginal constituency as 49.9 percent.[7] In computing this probability the values of all the other variables – in particular, the number of independent and 'other' party candidates – were 'as observed'. If the model was tweaked so that there were *no* independent candidates – the number of 'other' party candidates as observed – the predicted probability of the INC winning a marginal constituency would have fallen to 45.7 percent. Under a different, but related, scenario in which there no 'other' party candidates - the number of independent candidates as observed - the predicted probability of the INC winning a marginal constituency would have fallen to 35.8 percent. The results when the predicted sample was restricted to the elections between 1989 and 2014 were similar. The general conclusion is that electoral competition in marginal constituencies – through the presence of independents and 'other' parties – enhances the INC's chances of winning marginal constituencies. These candidates split the anti-INC vote so that, in their absence, the INC's chances of winning would have been lower.

<Figure 3.1>

For the BJP, on the other hand, the predicted probability, computed over all the *Lok Sabha* elections between 1989 and 2014, of its winning a marginal constituency would have risen from 56.6 percent, when the number of independent and 'other' party candidates were 'as observed', to 60.4 percent under a scenario under which there were no independent candidates. In electoral terms, the presence of independent candidates erodes the BJP vote and reduces its chances of winning. In this respect, the effect of independent candidates on the chances of the INC and the BJP winning marginal constituencies are diametrically different: Independents help the INC but hurt the BJP.

<Figure 3.2>

[7] This is also the figure reported in the last row, second column, of Table 3.5.

Figure 3.2 shows that a high turnout of voters in marginal constituencies hurts the winning chances of both the INC and BJP. *Ceteris paribus* the INC was predicted to have a 48.7 percent chance, computed over all the *Lok Sabha* elections between 1989 and 2014, of winning a marginal constituency when the turnout of voters was 50 percent. The corresponding prediction for the BJP was 59.8 percent. As the turnout rate rose, the likelihood of both parties winning fell: at a 65 percent turnout, the predicted probabilities of the INC and the BJP winning marginal constituencies were, respectively, 43.5 and 53.1 percent.

It is a truism of electoral politics that the recipe for winning in getting your supporters into the polling booth while, simultaneously, ensuring that your opponents stay at home. The above findings illustrate this truism. Both the INC and the BJP have core supporters who would readily vote for their party. A low turnout, on the other hand, ensures that many putative voters - who may not be as enthusiastic about the INC or the BJP as their more committed supporters- do not spoil the party by coming out to vote.

<Figure 3.3>

Figure 3.3 shows the predicted probabilities of the INC and the BJP winning marginal constituencies for different vote shares obtained. Computed over all the eight elections between 1989 and 2014, the predicted probability of winning marginal constituencies, at each of the three vote shares, 35, 40, and 45 percent, was always higher for the BJP than for the INC: with a 35 percent vote share, the INC had a 34.4 percent chance of winning a marginal constituency compared to the BJP's 56.3 percent. The next section examines the relative performance of the INC and the BJP in greater depth.

3.4 The Electoral Performance of the INC and the BJP Compared

The previous section examined the electoral performance, in marginal constituencies, of the INC and the BJP. This was, however, conducted separately for the two parties without attempting to assess their comparative performance. So, for example, we examined, for marginal constituencies in which the INC was the winner or the runner up, the likelihood of it winning the election regardless of who its closest opponent was: this could have the BJP, or another party, or even an Independent

candidate. In similar vein, we examined the likelihood of the BJP winning in marginal constituencies, in which it was the winner or the runner up, regardless of who its closest opponent was: this could have the INC, or another party, or even an Independent candidate. By contrast, in this section we make a head-to-head comparison of the INC and BJP by analysing all the constituencies that were contested by *both* parties.

<Table 3.8>

Table 3.8, which sets out the number of constituencies contested by both parties, shows that the proportion of all *Lok Sabha* constituencies contested by both parties has increased from 41.5 percent in 1984, to around 85 percent in 1991 and 1996, before falling to around 66 percent in the last three *Lok Sabha* elections of 2004, 2009, and 2014. This fall had been engendered by the INC and the BJP having to bow to the exigencies of coalition politics and contesting fewer seats than they were used to in the 1990s.

<Figure 3.4>

As Figure 3.4 shows, the constituencies contested by the INC in 2014 were, at 464, 62 seats fewer than the 526 contested by it in 1996. For the BJP, the largest numbers of constituencies contested were in 1991 and 1996 when it contested well over 450 constituencies. It then drew in its horns for the 1998, 1999, and 2004 elections, when its tally of contested constituencies was well short of 400; since then the BJP has extended its electoral reach, contesting 433 and 428 constituencies, respectively, in the 2009 and 2014 election.

Econometric Methodology

In order to assess the relative electoral performance of the INC and the BJP we estimated a two-equation *probit* (bivariate probit) model over the sample of constituencies - in the 20 major states of India (listed in Tables 3.3 and 3.4) and over the nine *Lok Sabha* elections from 1984 to 2014 – which were contested by *both* the INC and the BJP.[8] The first equation related to the INC: the dependent variable in this equation took the value 1 ($y_i=1$) if the INC won the election for

[8] The difference between a logit and a probit model, both of which deal with binary outcomes, is in the assumption made about the distribution of the error term. In a logit model, the error term is assumed to be logistically distribution while in a probit model it is assumed to follow a normal distribution.

constituency *i, i=1,…N*, and zero if it did not *(y_i=0)*. The second equation related to the BJP: the dependent variable in this equation took the value 1 *(z_i=1)* if the BJP won the election for constituency *i, i=1,…N*, and zero if it did not *(z_i=0)*.

This system of two probit equations (*bivariate probit*) is the discrete choice analogue of the *Seemingly Unrelated Regression Equations* (SURE) method of estimation with continuous dependent variables (Greene, 2003, 710-19). Like SURE estimates, the estimates from the bivariate probit system are more efficient than those obtained from estimating each equation as a single equation because the correlation between the error terms of the two equations is explicitly taken into account. In addition, and more importantly for the purpose of this analysis, the fact that the equations are estimated as a system allows hypotheses to be tested *between* equations rather than just *within* individual equations. As we will see, this allows one to arrive at an assessment of the comparative electoral efficiency of the INC and the BJP.

The estimates from the bivariate probit equation, estimated on data for the 2,684 constituencies contested by both the INC and the BJP over 1989-2014, are shown in Table 3.9. The same conditioning variables were used in both the probit equations – one for the INC, the other for the BJP - and, indeed, are those used in the logit analysis of the previous section.[9] To recapitulate, these were:

i. The share of the total votes received by the party in that constituency.
ii. Whether the party held the constituency in the previous election (that is, it was the 'incumbent' party).
iii. The percentage of the electorate voting in that election ("turnout").
iv. The number of independent candidates in the election.
v. The number of 'other' (that is, other than the INC and the BJP) party candidates in the election.
vi. The year of the election.
vii. The state in which the constituency was located

[9] Listed in Table 3.9 which mirrors the listing in Tables 3.3 and 3.4.

The comparison between the electoral performance of the INC and the BJP, in constituencies where both parties were contestants, was made with respect to two parameters:

1. The overall probability of winning the constituency computed with the values of the conditioning variables taking their observed constituency values..
2. The overall probability of winning the constituency for each party obtaining a particular vote share: 35, 40, and 45 percent. In other words, what would be the likelihood of the INC and the BJP winning a constituency if their vote shares had been (say) 35 percent and was this likelihood significantly different between the two parties?

<Table 3.10>

Table 3.10 compares the predicted probabilities of the INC and the BJP winning *Lok Sabha* elections between 1989 and 2014 in constituencies, in the 20 major Indian states, which they both contested. Aggregated over all these elections, the first row of Table 3.10 shows that the INC had a 30.6 percent chance of winning an election compared to the BJP's 40.5 percent and, furthermore, reading across the row, this difference of nearly 10 points was significantly different from zero. For every election in this period, except for the 2009 election, the predicted likelihood of the BJP winning was greater than that of the INC and, for several elections (1989, 1996, 1999, 2004, and 2014), this difference in the likelihoods was significantly different from zero.

<Table 3.11>

Table 3.11 compares the probabilities of winning for the INC and the BJP under different scenarios for the vote share obtained. If the INC received 35 percent of the vote then *ceteris paribus* its predicted probability of winning would be 22.6 percent; if, on the other hand, the BJP received 35 percent of the vote then *ceteris paribus* its predicted probability of winning would be 31.5 percent. Under a 40 percent vote share scenario, the predicted probabilities of winning would rise for both parties, but the BJP's probability would still be higher than that of the INC: 50.8 percent against 39.6 percent. The pattern was repeated when each party received a hypothetical 45 percent share of the

total vote: both likelihoods of winning would rise further but the BJP advantage in terms of a higher winning probability would continue (69 percent versus 60.2 percent).

3.5 Hindi versus non-Hindi Speaking States

Of the total of 543 *Lok Sabha* constituencies, 204 (or 37.6 percent) are – and have been since the 1996 *Lok Sabha* election - in the seven Hindi speaking (HS) states of Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Rajasthan, Uttarakhand, and Uttar Pradesh; of these 204 constituencies, respectively, 40 and 80 are in Bihar and Uttar Pradesh.[10] The HS states are of particular importance for the BJP since a large number of its contested constituencies are from these states: in 2014, as Figure 3.5 shows, nearly 45 percent (192 out of 428) of the constituencies contested by the BJP were from the HS states. These states are also important for the INC but to a lesser degree: as Figure 2.6 shows, 34 percent (158 out of 464) of the constituencies contested by the INC in 2014 were from the HS states.

<Figure 3.5>

Figure 3.6 shows that, of the 373 constituencies which were contested by *both* the INC and BJP in 2014, 153 constituencies (41 percent) were from the HS states while, in 2009, of the 361 constituencies which were contested by *both* the INC and BJP, 149 constituencies (40 percent) were from the HS states. Although this proportion of approximately 40 percent of 'head-to-head' contests, between the INC and the BJP, in constituencies in the HS states has dipped from the corresponding figure of 48 percent in the 1999 and 2004 elections – 145 out of 307 constituencies in 1999 and 151 out of 310 constituencies in 2004 – these constituencies are, and likely to remain, an important battlefield for both parties.

<Figure 3.6>

This raises the question of whether the electoral performances of the INC and the BJP, when they contested the same constituency, differed according to whether the constituency was in a HS or a non-HS state? With a view to answering this question, this section compares the electoral

[10] After the creation in November 2000 of the states of Uttarakhand and Jharkhand from, respectively, the erstwhile states of Uttar Pradesh and Bihar, the former lost five constituencies while the latter lost 14 constituencies.

performances of the INC and the BJP when they (both) contested constituencies in the HS and in the non-HS states.

In order to compare the performances of the INC and the BJP we estimated two *separate* bivariate probit models (of the type described in the earlier section): the first bivariate probit model was estimated on data for constituencies, which were contested by both the INC and BJP, in the 13 major non-HS states and the second bivariate probit model was estimated on data for similar constituencies in the seven major HS states,. In total, over the eight elections between 1989 and 2014, there were 1,456 such constituencies in the non-HS states and 1,228 constituencies in the HS states.

As in the previous section, the first equation in each of the two bivariate probit models related to the INC: the dependent variable in this equation took the value 1 ($y_i=1$) if the INC won the election for constituency *i, i=1,…N*, and zero if it did not ($y_i=0$). The second equation related to the BJP: the dependent variable in this equation took the value 1 ($z_i=1$) if the BJP won the election for constituency *i, i=1,…N*, and zero if it did not ($z_i=0$). The control variables in the non-HS and the HS models were the same as those used in the previous section: the share of the total votes received by the party in that constituency; whether the party held the constituency in the previous election (that is, it was the 'incumbent' party); the turnout in that election; the number of independent candidates in the election; the number of 'other' (that is, other than the INC and the BJP) party candidates in the election; the year of the election; and the state in which the constituency was located.

The comparison between the electoral performance of the INC and the BJP, in constituencies where both parties were contestants, was made - separately for non-HS and HS major states - with respect to two parameters: (i) the overall probability of winning the constituency, the values of the conditioning variables taking their observed constituency values; (ii) the overall probability of winning the constituency when each party obtained a particular vote share; 35, 40, and 45 percent.

<Table 3.12>

Table 3.12 shows that, in terms of the *overall* predicted probability of winning a constituency – computed over all the eight elections between 1989 and 2014, with the conditioning variables taking their observed constituency values - the electoral performances of the INC and the BJP, in

constituencies they both contested, differed according to whether these constituencies were in non-HS or in HS states. The INC was much stronger in the non-HS states – at 40.7 percent, its average probability of winning in these states was significantly higher than the BJP's 28.2 percent; the BJP, however, was much stronger in the HS states – at 55.5 percent, its average probability of winning in these states was significantly higher than the INC's 18.7 percent.

These probabilities of winning varied when they were computed on an election-by-election basis. For example, the superior performance of the INC in non-HS states withered in the 2014 election when there was no significant difference between the INC and the BJP in their respective probabilities of winning in the non-HS major states (26.2 percent versus 29.1 percent) but the superior performance of the BJP over the INC in HS states was magnified (8.2 percent versus 74.3 percent). In the 1996 (when the INC won 139 seats to the BJP's 161) and 1999 (when the INC won 114 seats to the BJP's 182) elections, too, there was no significant difference between the two parties in their respective likelihoods of winning in non-HS states.[11] In general, however, the pattern of the various elections was that, in constituencies contested by both parties, the average likelihood of the INC winning, compared to that for the BJP, was significantly higher in non-HS states and significantly lower in HS states.

<Table 3.13>

As the results in Table 3.13 show, the thrust of these results were not altered when the likelihood of winning was computed at different vote shares. for a 40 percent vote share in a HS state constituency [row HS:40 in Table 3.13], the predicted probability of a BJP victory would be 68.2 percent compared to the INC's 45.8 percent; with the same vote share in a non-HS state [row NHS:40 in Table 3.13], however, the INC would win with probability 34.9 percent compared to the BJP's 34.6 percent, a difference which was not statistically significant. The pattern was repeated under a hypothetical 45 percent share of the total vote: both likelihoods of winning would rise further but the BJP advantage in terms of a significantly higher winning probability in HS states would remain (83.3 percent versus 62.8 percent in row HS:45 of Table 3.13); in non-HS states the difference between the

[11] Notwithstanding the fact that, compared to the BJP, the likelihood of winning was greater for the INC.

parties in their respective likelihoods of winning remained statistically insignificant (57.8 percent for the INC versus 57.9 percent for the BJP in row NHS:45 of Table 3.13).

3.7 Concluding Remarks

This chapter represented the first step towards the overall purpose of this book which is to evaluate the relative electoral efficiency of India's two major parties – the INC and the BJP. Whether one considered the marginal constituencies in which the INC was the winner or the runner up (and a parallel set of constituencies in which the BJP was the winner or the runner up), or whether one considered the set of *all* constituencies which the INC and the BJP *both* contested, the answer always seemed to be the same: the average predicted probability of the BJP winning a *Lok Sabha* constituency election was, except for the 2009 *Lok Sab*ha election, always greater than that for the INC.

When attention was narrowed to constituencies in Hindi-speaking states and those in non-Hindi-speaking states, the advantage of the BJP over the INC in Hindi-speaking states (in terms of the average probability of winning constituencies in these states) was statistically significant; on the other hand, for constituencies in non-Hindi speaking states, the difference between the INC and the BJP in their respective probabilities of winning was not statistically significant.

It is important to emphasise that the results presented in this chapter are based on *average* probabilities: that is, the average of the predicted probabilities of winning individual constituencies. So, the results should *not* be interpreted to mean that in *every* constituency the probability of a BJP win is greater than that of the INC. There will be constituencies where the INC was predicted to have a better chance of winning than the BJP but *averaging* over these probabilities, the BJP was better placed to win than the INC.