

“A Panel Data Analysis of General Elections Under Multi Party Electoral College”

Jayesh Kumar*



Indira Gandhi Institute of Development Research,
Mumbai-65.

* jayesh@igidr.ac.in

Abstract

We analyze the probability of an incumbents winning in the consecutive election, under the assumption that all individual candidates are equally likely (i.e. random selection) when that they are from the same party. We are trying to analyze the probability of winning by ruling party (i.e. the party which has won the last election from that constituency), irrespective of whether that party forms a coalition during election, formed the last government in center/state or was the part of the last central/state government in case of coalition government. In particular, we model the voters behavior by Binary Choice Model (Logit Model) using panel data of India's general (parliamentary) elections from 1967 through 1999, without taking into account the effect of the central government's ruling, while we are emphasizing on the effect of constituency wise ruling and the results of that particular constituency. We find evidence that incumbents have better log-odds of getting re-elected if they contest on behalf of the national parties, from reserved seats, from constituencies with large valid votes polled with respect to electorate, if their ruling duration is more. We don't find any significant evidence of getting re-elected if the sex of the competing candidates is same or if the number of candidates contesting election from the constituency is higher.

JEL Classification: C25, N45.

Keywords: electoral system, GEE population-averaged model, panel data and incumbents.

In today's world, democracy can be interpreted as a key variable affecting every major sphere of life, whether economic, social or political. This mass movement of democratization offers a lot of opportunities to analyze the electoral system underlying beneath and its impact on nations economy's future prospects. India with its large electoral mandate and multi party/candidates (i.e. more than three) is a

potential candidate to carry out such an analysis. We restrict our analysis to India only as since independence, India has made enormous strides and faced enormous problems. The mere fact that India has not, like so many emerging economies, succumbed to dictatorships, military rule or wholesale foreign invasion is a testament to the basic strength of the country's democracy and its institutions. Political parties are indispensable for the successful working of the parliamentary system of government, adopted in India. India follows a multiparty system. According to an estimate there have been over 670 political parties in India, since independence.¹

The Indian economy is the ideal model of an 'Emerging Economy'. Here the government recognizes the relative importance of both public and private sectors in the process of economic development.

Since Independence, some dynamic forces of growth have been at work enabling India to enter the process of rapid economic growth. The aim of economic planning has been to diversify the economy through accelerating the pace of all round development. The institutional setup has been encouraging capital formation and the nation has adopted modern technology in agriculture, industry and other areas. The National Income and Per Capita Income have been growing, though much below the desired rates.

In parliamentary systems with proportional representation and multiple parties, the prime minister and his/her cabinet are normally dependent on the support and confidence of more than one parliamentary part. These coalition governments are formed anew after each election in which voters choose parties and not coalitions or governments. Coalitional options are discussed during the election campaigns but not all options turn out to be feasible once the election's returns become known. Contrary to two-party parliamentary systems, the electorate's signals for a new government are ambiguous, giving the party leaders some leeway in coalition bargaining. In order to fulfill most of their promises, parties not only have to enter a winning coalition, but they have to reach a coalition agreement that puts the promised policies on the government agenda.

¹ List of political parties and their symbols, Election Commission of India.

1. Introduction

In this paper, we try to model the chances that a particular party wins the election consecutively from a constituency, under the assumption that all the candidates are equally likely (i.e. there is a random selection procedure of candidates within each party). Also, we assume that the effects on outcome are not individual specific but party specific (which is not a very restrictive assumption). We estimate the probability of winning of the ruling party (i.e. the party which has also won the last election), irrespective of whether it was a coalition party (during elections), the governing party or one of the members of the governing party, in case of a coalition government. Thus, in particular, to interpret the result of a particular constituency we are not taking the effect of central/state government ruling but the effect of constituency wise ruling. We estimate the average probability of winning given that the party has won the last election using constituency wise data of General elections from 1967 to 1999 under given electoral system using a Panel Data Binary Choice Model (Generalized Estimation Equations Population Averaged Model). This exercise gives us the idea of incumbent's performance and its chances to come into the power again, under the assumption of rational voters in the constituency (which is very widely used in existing political economics literature). Which is a key factor of the government stability as well as for the stability of the policies adopted during the ruling of the particular party, which in the sense gives the idea of the future economic scenario of the country. Thus our work is a step in the ongoing research in political economy, which requires a great deal of research work to explore the opportunities lying beneath the issue of governance. There has been no work, in our knowledge, which try to model the voter's choice behavior using such a large panel data of Indian parliamentary elections.

The probability that a party wins the election depends on a lot of factors viz. the state to which the constituency belongs, the inherent characteristics of the population and various other socio economic and cultural factors (caste, religion etc.). One of the potential factors that might affect the winning of a party is that of the same party winning in the prior election. This seems quite a probable case and India with its sociopolitical setup provides an incentive to test the hypothesis that having access to power affects the outcome of elections in future or not.

There has been quite some work done in this field related to different issues. One of the early papers propose a new statistical model for

multiparty election data was by Katz and King (1999). There is another paper by Honaker Katz and Gary King (1999) where they improve upon their original KK model in bias, variance, numerical stability, and computational speed making it quicker to estimate, the difference here being that the problem of effective voting is treated as a missing data problem. They argue that ordinary least squares (OLS) regression is inappropriate when the dependent variable measures the share of the vote going to each party, and they recommend a superior technique. Unfortunately, the Katz-King model requires a high level of statistical expertise and is computationally impractical for more than three political parties. John E. Jackson (2001) has tried to give a simpler estimation procedure using a SUR model (with a multinomial logistic function).

There are some relatively recent studies that go beyond the examination of particular cases, and Assess the impact on national elections. For example:

Richard S. Conley (2000), Using 1990s census and electoral data of Canadian ridings they find significant incumbency effects for MP's and no evidence of a significant increase in incumbency advantage in the last decade.

Pappi et. al (1998) using survey data for the East and West Germany proposes how party preferences of voters in a multiparty system be measured, compared and aggregated.

Martin et al (1998) considered a stochastic model of voter response, based on multinomial probit estimation using Euro-barometer survey data and European elite survey data from 1979. They argue that maximization of expected vote, in general, is not a rational party strategy in multiparty political systems, which are based on proportional representation.

The development of methods to examine multiparty elections has clearly caught discipline's attention judging by the number of recent papers on the topic following the initial Katz and King (1999) paper. Tomz et al (2002), make important steps in this direction as its based on standard linear model and offers a sophisticated yet convenient alternative that involves seemingly unrelated regression (SUR).

Gelman and King (1990,1994) analyze election in all state legislatures elected from a single member district over the period 1968–88 and conclude that redistricting increases electoral responsiveness, and also conclude that it leads to less bias than would be expected if no redistricting had occurred.

Katz and king (1999), King, Honaker, Joseph and Scheve (2001) and Honaker, Katz and King (2001) develop a methodology to estimate the “effective” vote in partially contested, multiparty elections. They treat partially contested elections as missing data problem and use an algorithm procedure to recover parties’ estimated vote shares. We don’t see any reason to expect that had a party contested elections, parties vote shares would have been changed, because if a party is not contesting from a particular constituency then it must be the case that the party is contesting the election indirectly (may be a coalition) or it does not have any scope of winning from that constituency.

Cox and Katz (1999) analyze elections to the U.S. house across several decades, and argue that the changes following *Baker v. Carr* help explain both the persistence of the Democratic majority and the size of incumbency advantage.

Merrill (1994) provides evidence that both the pure proximity and the pure directional models fall short of accounting for the spatial distribution of voters by party.

Gelman and Katz (2001), gives the strength of voting, giving us an insight of the inter-linkages between voting, coalitions and the Electoral College. But no work so far has been done in greater detail to explain the winnings of any party based on their base and performance in the constituency.

Though, survey research has enormous advantages for studying individual-level preferences, but as analyses of random selections of isolated individuals from unknown geographical locations, they necessarily miss much of electoral politics. As such, they are often best complemented with studies of aggregate electoral returns. We hereby propose a simpler econometric model with all the beauties in earlier models. This model is very simple in understanding and easy to apply

in estimation procedure. Our work is much different from earlier works and gives new horizons to be explored. As the vast majority of electoral studies in multiparty democracies dichotomize the electoral system into a pseudo-two-party contest.

The remainder of this paper is organized as follows: we begin section 2 by introducing the Indian Scenario and its electoral system. Section 3 introduces a simple econometric model and explores econometric issues that arise in the specification of the model, followed by empirical results in section 4. Section 5 discusses some interesting implications and section 6 concludes.

2. Indian Scenario

The electoral system of India is largely based on the British pattern. The constitution did not provide any details about the electoral system and left it to the Parliament to determine. Accordingly the Parliament passed a number of laws to regulate the electoral system. Some prominent laws enacted for this purpose include the Representation of people act, 1950 and 1951; Presidential and Vice-Presidential Election Act, 1952 and Delimitation Act, 1952 etc.

India remains by far the largest democracy in the world, with almost 600 million voters. India's parliamentary government and First Past the Post (FPTP) electoral system is a legacy of British colonialism, which ended in 1947.

The Indian Constitution provides that all adult citizens who are 18 years or more of age, and who are not otherwise debarred from voting, can exercise their right to the franchise. Voters elect a 543-member Lok Sabha, or lower house, from single-member constituencies, and each of India's states has adopted a similar system. By contrast, the upper house of parliament members of the state legislative assemblies, indirectly elect the Rajya Sabha or Council of States, as well as the corresponding upper houses of the states. There is also a (non-executive) President and Vice-President elected by the members of parliament and state legislative assemblies.

General elections are held once every five years, but the President may dissolve the Lok Sabha on the advice of the Prime Minister before its term is over, as in 1971 and in 1997, or if he or she is convinced that

no stable government can be formed, as in year 1991 and 1998. The Prime Minister holds office for as long as he or she can command a majority in the Lok Sabha. All the successive governments of the Congress party, which ruled India continuously until 1977, served a full term in office. Since 1977, governments have been less stable, and a number of Prime Ministers have had to resign as a result of party splits or no confidence votes before completing their full term.

The major effect of the electoral system, at least until 1977, was to guarantee majority governments based on a minority of voter support. The FPTP electoral system resulted in the ruling Congress party securing stable majorities in the Lok Sabha, usually against a fragmented opposition. But since 1977, when the opposition parties combined to form coalitions and started putting up common candidates against the Congress candidates (as was the case in the 1977 and 1989 general elections), the Congress majorities have vanished. Moreover, the nature of the system meant that small changes in vote share often had a dramatic impact upon the shape of the resulting parliament.

The overall results of elections to the Lok Sabha have never been proportional. Because the candidate, who obtains the most votes, but not necessarily a majority of votes polled, is declared elected, support can often be divided by setting candidates of the same caste, religion, or region against each other. But despite the divided nature of India's multi-ethnic democracy the electoral system has retained a considerable degree of support, due in part to the practice of reserving seats for socially underprivileged groups. The Indian Constitution, reserves 22 percent of all seats for historically disadvantaged groups, known as Scheduled Castes (79 reserved seats) and Scheduled Tribes (41 reserved seats). In these constituencies, only a member of the Scheduled Castes or Tribes may contest the polls, although all electors have voting rights. This has ensured that their parliamentary representation is in line with their proportion of the population. A constitutional amendment, which seeks to reserve 33 percent of seats for women representatives, is currently being considered.

To date, pure First Past the Post (FPTP) systems are found in the United Kingdom and those countries historically influenced by Britain. Along with the United Kingdom, the most analyzed cases are Canada, India, New Zealand, and the United States of America. However, New Zealand switched to a MMP system of Proportional Representation in 1993. In FPTP systems, the winning candidate is simply the person who

wins most votes. In theory, a candidate could be elected with two votes, if every other candidate, secured only a single vote. There are the advantages as well as disadvantages of the FPTP system.

2.1 The main features of the Indian electoral system

- It is based on universal adult franchise, which means that all citizens above the age of 18 years (earlier 21 years) are entitled to take part in elections provided they have registered themselves as voters and fulfill certain conditions laid down in this regard.
- There is a single electoral body and the system of communal representation, which existed in the pre-independence period, has been done away with.
- Representation is based on the territorial principle. There is common electoral roll for each constituency.
- Elections are held on the basis of single member constituencies and only one representative is elected from each constituency.
- Political parties are an indispensable part of the electoral process and serve as an important link between the people and the government.
- Prior to 1962, there were both single - member and multi member constituencies. These multi - member constituencies used to elect more than one member. The multimember constituencies were abolished in 1962.
- The first general election was held in India during 1951 - 1952. The total strength of Lok Sabha at that time was 489.
- Under Sec 14 of Representation of People Act 1951, the President of India by a notification will call upon the constituencies to elect their members to the House of People. Thereafter the electors of the Parliamentary Constituencies will directly elect the Lok Sabha members. As per article 326 of the Constitution of India, elections to the House of the People shall be on the basis of adult suffrage.
- The maximum number of elected members of Lok Sabha is 550. Article 81 of the Constitution provides that not more than 530 members will be elected from the States and not more than 20 members from Union Territories. Article 331 of the Constitution provides that the President of India, if in his opinion that community is not adequately represented in that House may nominate not more than 2 members from the Anglo Indian Community.
- Lok Sabha is composed of representative of the people chosen by direct election on the basis of adult suffrage. The maximum

strength of the House envisaged by the Constitution is 552 up to 530 members to represent the States, up to 20 members to represent the Union Territories and not more than two members of the Anglo-Indian Community to be nominated by the President, if, in his opinion, that community is not adequately represented in the House.

The total elective membership is distributed among the States in such a way that the ratio between the number of seats allotted to each State and the population of the State is, so far as practicable, the same for all States.

2.2 Some prominent features of the party system in India

- India has a very large number of political parties.
- Power has generally been concentrated in the hands of the Congress. (Except from 1977-1980 and 1994 onwards)
- The membership of political parties in India is very small and party discipline is not very rigid.
- A large number of regional parties exist in India.
- Political parties are yet to mature in terms of policies, ideologies and programs.
- Political parties in India tend to give precedence to party interest over national interest.
- Leadership occupies an important place in the party system and a number of parties are formed around distinguished personalities.

3.1 Model Specification

The probability of a party winning the consecutive election in a constituency depends on the parties ruling in that constituency. We have tried to take into account a set of factors that might be potentially responsible for a party's winning in a particular constituency. It is very difficult to take into consideration all the factors (esp. the socio-cultural factors that one might think of to be related to a party's winning) due to lack of data availability, we have taken only those variables which seems to be the most important in terms of their effect on the log-odds of an incumbents winning and reliable data is available. There lies the opportunity to increase the richness of the data set and get much more precise estimates, but considering the length of the paper we restrict our self to these variables only. As we are much

more interested to enrich our understanding than predicting the probability.

Incumbency effects may be sensitive to voter turnout. There are competing hypothesis about the direction of the turn out variable on party vote shares. A popular incumbent might increase loyal voter's desire to go to the polls. Yet some voters may stay home if the "safe seat" incumbent seems sure to win. The potential for turnout to damage candidates' fortunes is most likely when voters are unhappy with the incumbent and go to the polls to register their dissatisfaction (Karnshisky and Milne (1991), Conley (2002)).

Electoral size is included in the model indirectly because electoral constituencies in India, unlike those in United States, are not of equal size. Electoral size may be important to candidates in several ways: First, the potential obstacles to reaching voters during the campaign period may increase in proportion to total population. Incumbents name recognition may not be as great in bigger constituencies. Second, as electoral size increases, MP's ability to provide constituency services to voters may diminish to reduce the value of incumbency status.

Dummy variables for the states are brought to bear in the model to control for regional effects not captured otherwise. A detailed treatment of differences in state/ regional political culture is well beyond the scope of the paper. Yet historical, economical and cultural foundations that distinguish the Indian states and regions from one another may exert a significant influence on electoral outcomes (see Bell (1992); Lipset (1990)).

The model to be estimated is:

$$\begin{aligned} (wins)_{it} = & \beta_0 + \beta_1(np)_{it} + \beta_2(reserved)_i + \beta_3(sex)_{it} + \beta_4(electors)_{it} \\ & + \beta_5(valid\ votes)_{it} + \beta_6(voters)_{it} + \beta_7(candidates)_{it} + \beta_8\Sigma(rdum)_i \\ & + \beta_9\Sigma(ydum)_t + u_{it} \end{aligned}$$

We have taken the dependent variable as a dichotomous variable (wins), which takes two values i.e. 1 if the incumbent party holds the seat and 0 if it does not. The explanatory variables used in the model are:

1. Voters' turnout in the constituency (poll_percentage): it is the percentage turnout of voters in that election, showing the effect of the public desire for a change or the extent of anti-incumbent voting.

2. Dummy variable for the category of the constituency (reserved):

$$\begin{aligned} &= 1 && \text{if the constituency is } \textit{reserved}. \\ &= 0 && \text{otherwise} \end{aligned}$$

As there is general perception that reservation of a particular seat can give undesired favor to some political parties compared to others.

3. Dummy variable for the sex of the candidates (sex):

$$\begin{aligned} &= 1 && \text{if } \textit{winner and runner up are of the same sex} \\ &= 0 && \text{otherwise} \end{aligned}$$

In Indian case it is assumed that males have more access to power than the women, which gives them undue favor. This variable controls for the effect of the sex discrimination.

4. Dummy variable for the party being a national party or not (np):

$$\begin{aligned} &= 1 && \text{if the party is a } \textit{national party}^2 \\ &= 0 && \text{otherwise} \end{aligned}$$

This is to control the national party's ability to get more resources and its access to power, which can influence on the result. One may argue that if a candidate is from National Party then his/her promises are more likely to be fulfilled compared to others or candidate may get the favor due to the favorable scenario for the party.

5. Duration: This is the gap between two consecutive elections measured in years, to control for the effect of time gap to fulfill one's promises before going for the next election.

6. Validvotes: This variable is the ratio of total valid votes polled to the size of electorate, i.e. the variable to control for the education (knowledge) level in the constituency.

² As per Election Commission Of India's declarations at the time of election.

7. Candidates: Number of candidates contesting. This variable controls for the effect of competition in the constituency. One may treat this variable as a control for the dummy candidates.

8. Time Dummy: To capture the effect of current socio-economic-political scenario at the time of election.

9. State dummy: This is to control demographic influence on the result.

As the dependent variable is dichotomous, hence we are using the Binary Choice (Logit) model. Which is represented by

$$\text{Probability (wins =1)} = \exp(z) / [1 + \exp(z)]$$

Here, due to presence of extreme point observations in the distribution of the observations (i.e. fat tail) in the data set, we have used the Logit Model.

3.2 Estimation

The OLS and GLS estimator of β are inconsistent, so we choose maximum likelihood method such that:

The response probability,

$$P(X_{it}) \equiv P(y_{it} = 1 | X_{it}) = P(y_{it} = 1 | x_{1t}, x_{2t}, \dots, x_{kt})$$

$$L(Y_i = 1) = P_i = \Lambda(\beta'X)$$

$$L(Y_i = 0) = 1 - P_i = 1 - \Lambda(\beta'X)$$

The Likelihood function is:

$$L = P_i^{Y_i} (1 - P_i)^{1 - Y_i}$$

$$\text{Maximisation of } \log L = \sum_i [Y_i \log \Lambda(\beta'X) + (1 - Y_i) \log \{1 - \Lambda(\beta'X)\}]$$

The underlying latent variable model is:

$Y^* = \beta'X + e$ $y = 1[y^* > 0]$, where e is a continuously distributed variable independent of X and the distribution of e is symmetric about zero, and $1[\cdot]$ is the indicator function.

If G is the cdf of e , then, because the pdf of e is symmetric about zero, $1 - G(-z) = G(z)$ for all real numbers z .

Therefore,

$$P(y=1 | x) = P(y^* > 0 | x) = P(e > -X\beta | x) = 1 - G(-X\beta) = G(X\beta)$$

Where, $G(z_{it}) = \Lambda(z_{it}) = \exp(z_{it}) / [1 + \exp(z_{it})]$, here e has standard logistic distribution.

Since $G(\cdot)$ is strictly increasing cdf, $g(z) > 0$ for all z . Therefore, the sign of the effect is given by the sign of the estimated coefficient.

We calculate the robust standard error by GEE population-averaged approach (see Zeger, Liang and Albert 1988). In the GEE approach the unobserved effects binary response model, the response probabilities are specified conditional only on X_i , with the result that we have,

$$E(y_{it} | x_{it}) = E(y_{it} | x_i) \text{ for all } t.$$

Concerning the *pseudo R-squared* (McFadden, 1974), for ML models with discrete outcomes, we use the formula:

$$\text{Pseudo } -R^2 = 1 - L1/L0$$

Where $L0$ and $L1$ are the constant-only and full model log likelihood respectively. For discrete outcomes, the log likelihood is the log of a probability, so pseudo $-R^2$ is always negative. For continuous outcomes, the log likelihood is the log of a density. Since the log-likelihood for a binary response model is always negative, and so the pseudo r -squared is always between zero and one.

$$\text{Odds Ratio} = \text{Pi}/(1-\text{Pi})$$

F-test statistic:

$$F_{(n-1, nT-n-K)} = [(R_u^2 - R_p^2) / (n-1)] / [(1 - R_u^2) / (nT - n - k)]$$

The spatial model has been in use in political science for close to 30 years, and in that period it has achieved a place of prime importance as our paradigm of the process of candidate-choice used by voters.

For much of this time political scientists have estimated models of candidate-choice using binary logit or probit, even in cases where there were more than two choices facing voters. Recently discrete choices models beyond binary logit and probit have been making their way into use in political science with increasing frequency.

The properties of these models, and their relationship to the spatial model, are frequently misunderstood. This paper demonstrates four essential points. First, the popular multinomial logit model is in fact equivalent to running a series of binary logit models. It involves nothing more than pair-wise comparisons of the choices. Second, despite containing no information about the choices, the multinomial logit model provides reduced form estimates of the effect of characteristics of choices that are equivalent to the estimates of such effects provided by the logit model which does utilize information about the characteristics of the choices. Third, the multinomial logit model cannot offer any inferences as to effects of changing the characteristics of the choices, or introducing additional choices; whereas the logit model can offer such inferences. Fourth, the classic spatial model has a flaw in multi-candidate settings that has been overlooked, with more than two candidates the spatial model explicitly contradicts an aspect of voter behavior widely believed to be prevalent: the tendency of voters to view certain candidates as 'similar' alternatives, and thus for the presence of additional candidates to effect asymmetrically the probability of existing candidates being chosen.

The software used for the estimation procedure was ***Intercooled Stata 7.0***

3.3 Data and Data Mining

The data was obtained from the *Election Commission of India*. The dataset consist of general elections data from 1967–1999. The first the general election (1967) data is used to form the required variable *wins*, as the prior elections data is not readily available. Which leaves us with the election data from 1971–1999 (i.e. 1771, 1977, 1980, 1984, 1989, 1991, 1996, 1998 and 1999). Which, accounts for 10 elections out of total 13 held so far. We haven't taken data before 1967's elections, as there has been major restructuring of the boundaries of constituencies in 1971 election.

Thus, we end up with 4743 constituency years, which consist of minimum 5 elections and maximum 9 elections per constituency, as in some constituencies' election didn't happen meanwhile (See Table2). In some states elections didn't happened at the time of general elections, we have treated those elections as they have happened at the same time. For example: In Punjab et.al. the election for 1984 happened in 1985, in such cases we have treated them as they happened in 1984 only.

4. Empirical results

We find that the sign of the coefficients of sex, duration and poll_percentage is negative and the sign of np, reserved and candidates are positive. While most of the state dummies have negative coefficients, J&K and west Bengal have positive coefficients.³ The results of the regression are reported in the table 3.

One may suggest to include lagged values of the variables, to capture the effect of change from the last election⁴.

5. Discussion

Before the regression, we had some a-priori expectations about the coefficients, which we would like to test. Like a national party, in general, has more resources and better organization and thereby can take substantial measures to increase the popularity of its candidate in the constituency, thereby increasing the probability (P_i) of the winning. We find that the log odds of winning are higher if the incumbent belongs to the national party. But we also see that polls comes with a negative coefficient, which suggests that as the voters turnout increases in a constituency, the probability of winning of the incumbent decreases i.e. more while in an anti-incumbency polling. This might be due to the fact that those voters, who would have been otherwise indifferent, have disliked the incumbent's performance and get the motivation to vote against him or her for effecting the change, thereby increasing the poll percentage.

We see that the estimated coefficients of np, reserved, poll_percentage and validvotes are all statistically significant at 5% level of significance. While the rest of the coefficients turn out to be insignificant. Thus, sex and candidates do not have significant effect on the probability of the incumbent winning the election again. The estimated coefficients give us the effect on the log of the odds in favor of winning and holding due to a unit change in the explanatory variable. Thus, given a value of the explanatory variable we can estimate the log of the odds ratio and thereby estimate the probability of holding the seat. A positive coefficient implies high (log) odds, while a negative coefficient implies low (log) odds.

³ We have done the regression with regional dummies instead of state dummies also, but results don't change significantly.

⁴ Introduction of the lag values also do not change the results significantly. All, the lagged values' coefficients turns out to be insignificant at 5% level of significance. The only noticeable change is the significance of duration, which turns out to be insignificant after introduction of lagged values in the model.

The odds ratio can also be used, directly to get an estimate of the probability. By looking at the odds ratio we can interpret the results easily.

6. Conclusion

One's choice of an estimator should be based on appropriateness of the assumptions contained in each model for the situation at hand, the statistical properties of each estimator, and the robustness of each method in the face of the practical problems that infect all applications. In our model, we have found that our assumptions are quit justified with the dataset.

The results show that the candidates of the national parties have a better chance of winning again in the same constituency. The other factors that have positive effect are number of previous wins and vote shares. Whereas, an increase in the poll percentage in a constituency, has an adverse effect on the probability of incumbent winning the election, reflecting the view that the voters are indifferent between polling, when they are not very keen on changing the power. While they are willing to cast their votes when they want the requisite change in the benevolent government, reflecting the poor performance of the ruling party, in the particular constituency.

Thus, in a nutshell we can say that the party ruling in the constituency does reflect the people's choice of government, which in fact is responsible for the welfare of the society rather than the welfare of the particular dominant section in any particular constituency except some outliers. As well as the candidate as such is less responsible than the party, which is natural in fact as in the economics a lot have been talked about the incentive constrain for the incumbent to his best for the society.

References

- Alvarez, R. Michael and Jonathan Nagler. "The Spatial Model and Specification of Choice Models"
http://wizard.ucr.edu/polmeth/working_papers95/alvar95d.html
- Conley, S. Richard, "Constituency Contexts, Incumbency, and Party Competition in Canadian Ridings in 1990s", working paper 2002.

- Gel man, Andrew and Katz N. Jonathan. “ How Much Does A Vote Count? Voting Power, Coalitions And The Electoral College”, Social Science Working Paper 1121, California Institute Of Technology, May 2001.
- Gel man, Andrew and King, Gary. “A Unified Method Of Evaluating Electoral Systems and Redistricting Plans”, American Journal Of Political Science, Vol.38, No.2 (May): 514-554,1994.
- Gel man, Andrew and King, Gary. “Estimating the Electoral Consequences of Legislative Redistricting”, Journal of American Statistical Association, 1990.
- Glasgow, Garrett. “ Heterogeneity in Discrete Choice Models”, Social Science Working Paper 1131, California Institute Of Technology, December 2001.
- Hinich Melvin J, Valeri, Ordeshook Peter C. “ Ukraine’s 1998 Parliamentary Elections: A Spatial Analysis”, Post-Soviet Affairs: 15(2), April-June 1999.
- Honaker, James. , Katz N. Jonathan, King Gary. “ An Improved Statistical Model for Multiparty Electoral Data”, Social Science Working Paper 1111, California Institute Of Technology, February 2001.
- Jackson E. John, “ A Seemingly Unrelated Regression Model For Analyzing Multiparty Elections”, Annual Summer Political Methodology Conference, Emory University, July19, 2001.
- James Honaker, Jonathan Katz, and Gary King. “ [A Fast, Easy, and Efficient Estimator for Multiparty Electoral Data](#),” *Political Analysis*, Vol. 10, No. 1 (Winter, 2002): pp. 84-100.
- Jeffery M. Wooldridge, “Econometric Analysis of Cross Section and Panel Data”, The MIT Press 2000.
- Jonathan Katz and Gary King. “ [A Statistical Model for Multiparty Electoral Data](#),” *American Political Science Review*, Vol. 93, No. 1 (March, 1999): pp. 15-32.
- Katz N. Jonathan and King, Gary. “A Statistical Model For Multiparty Electoral Data”. American Journal Of Political Science, Vol.93, No.1 (March): 15-32,1999.
- King Gary, Honaker James , Anne Joseph and Kenneth Scheve, “ Analyzing Incomplete Political Science Data: An Alternative Algorithm for Multiple Imputation”, *American Political Science Review*, Vol. 95, No. 1 (March, 2001): pp. 49-69.
- McFadden, D.L., “Conditional Logit Analysis of Qualitative Choice Analysis”, in *Frontiers in Econometrics*, P.Zarembka (ed.). New York: Academic Press, 1974.

- Pappi U. Franz and Eckstein Gabriele, “ Voter’s party preferences in multiparty systems and their coalitional and spatial implications: Germany after unification”, Public Choice, Vol 97: pp 229–255, 1998.
- Samuel Merrill,III, “A Probabilistic Model for the Spatial Distribution of Party Support in Multiparty Electorates”, Journal of American Statistical Association,1994.
- Schofield Normal, Martin D. Andrew, Quinn M. Kevin and Whitford Andrew, “Multiparty electoral competition in the Netherlands and Germany: A model based on multinomial probit”, Public Choice, Vol 97: pp 257–293, 1998.
- Tomz Michael, Tucher A. Joshua and Wittenberg Jason, “ An Easy and Accurate Regression Model for Multiparty Electoral Data”, Political Analysis, Vol. 10, No. 1 (Winter, 2002): pp 66–83.
- William H. Greene, “Econometric Analysis”, Fourth Edition, Pearson Education Inc. 2002.

Table 1

VOTING PERCENTAGE IN GENERAL ELECTIONS TO LOK SABHA(1952-1999)

General Election	Year	Male	Female	Total
First	1952	-	-	61.2*
Second	1957	-	-	62.2*
Third	1962	63.31	46.63	55.42
Fourth	1967	66.73	55.48	61.33
Fifth	1971	60.90	49.11	55.29
Sixth	1977	65.63	54.91	60.49
Seventh	1980	62.16	51.22	56.92
Eighth	1984	68.18	58.60	63.56
Ninth	1989	66.13	57.32	61.95
Tenth	1991	61.58	51.35	56.93
Eleventh	1996	62.06	53.41	57.94
Twelfth	1998	65.72	57.88	61.97
Thirteenth	1999			60.60*

*Calculated on the basis of valid votes polled.

Note : Sex wise break-up of electors is not available for First, Second and Thirteenth General Elections.

Table 2

Variables	Description
Const.	'Constituency number (code 1-543)'
Year	'Year of election (time dummy)'
Np	'Candidates belong to National party (dummy)'
Reserved	'Reserved seat for SC/ST (dummy)'
Sex	'Sex of winner and runner up are same (dummy)'
Duration	'Number of years of ruling (gap between elections)'
Wins	'Wins consecutive elections (Binary Dependent Variable)'
Poll_percentage	'Percentage of votes polled in the Constituency'
Valid votes	'Share of valid votes polled in the Constituency'
Candidates	'Number of candidates in the Constituency'
Regions	'Region (dummy) NR(Haryana,Rajasthan,Punjab,J&K,Uttar Pradesh,Himachal Pradesh), ER(Orrisa, Bihar, West Bengal), NE(Assam,Meghalya,Mizoram,Manipur,Nagaland,Sikkim,Tripura), WR(Gujrat, Maharashtra, Madhya Pradesh), SR(Andhra Pradesh,Karnatka,Kerela,Tamil Nadu), UT(Capital tertiary, Goa, Delhi)
State	'State (dummy), combining all UT's as one state"

Table 3

Data Description (Year wise)

Year	1971	1977	1980	1984	1989	1991	1996	1998	1999	Total
Np=1	408	481	485	452	471	478	403	182	369	3729
Sex=1	533	502	478	460	461	462	473	465	470	470
Wins=1	230	128	34	54	209	305	260	267	274	1761
Reserved	130	130	130	130	130	130	130	130	130	130
Constituency	484	525	529	515	529	542	543	543	543	4743

Table 4
Distribution of Reserved seats (State wise)

State	Gen. Freq.	Reserved seats	Total Freq.	Total Reserved
Andhra Pradesh	42	18	378	162
Arunachal Pradesh	2	0	18	0
Assam	14	3	126	27
BIHAR	54	13	486	117
CAP.TERI	6	2	54	18
DELHI	7	1	63	9
Goa	2	0	18	0
Gujrat	26	6	234	54
Haryana	10	2	90	18
Himachal Pradesh	4	1	36	9
Jammu and Kashmir	6	0	54	0
KARNATAKA	28	4	252	36
KERELA	20	2	180	18
M.P	40	15	360	135
MAHARASHTRA	48	7	432	63
MANIPUR	2	1	18	9
MEGHALAYA	2	0	18	0
MIZORAM	1	1	9	9
NAGALAND	1	0	9	0
ORISSA	21	8	189	72
PUNJAB	13	3	117	27
RAJASTHAN	25	7	225	63
SIKKIM	1	0	9	0
TAMIL NADU	39	7	351	63
TRIPURA	2	1	18	9
UTTAR PRADESH	85	18	765	162
WESTBENGAL	42	10	378	90
Total	543	130	4887	1170

Generalized Estimating Equations - Population Average Model (GEE-PA Model)
 using Logit Link, under Binomial Family with Exchangeable Correlation.

Table 5

Variables	Oddsratio	p> z	Coefficients	p> z
np	2.121444	0.000	0.7520968	0
reserved	1.28389	0.004	0.2498942	0.004
sex	0.9578321	0.719	-0.0430828	0.719
duration	0.7033292	0.000	-0.3519302	0
poll_perce~e	0.8296361	0.001	-0.1867681	0.001
validvotes1	1.36E+08	0.002	18.72681	0.002
candidates	1.000599	0.847	0.0005984	0.847
s1	0.6805947	0.004	-0.3847882	0.004
s2	0.3884401	0.000	-0.9456164	0
s3	0.908574	0.779	-0.0958789	0.779
s4	0.3165001	0.000	-1.150432	0
s5	0.6164599	0.389	-0.4837619	0.389
s6	0.3376417	0.000	-1.08577	0
s7	0.153114	0.000	-1.876572	0
s8	0.4793286	0.001	-0.7353689	0.001
s9	0.2159504	0.000	-1.532706	0
s10	0.2825454	0.000	-1.263916	0
s11	1.460552	0.199	0.3788147	0.199
s12	0.7541362	0.113	-0.2821823	0.113
s13	0.9820251	0.936	-0.0181384	0.936
s14	0.4910497	0.001	-0.7112099	0.001
s15	0.4564442	0.000	-0.7842888	0
s16	0.5690525	0.000	-0.5637825	0
s17	0.9728536	0.904	-0.0275217	0.904
s18	1.961654	0.000	0.6737882	0
s19	0.5746601	0.000	-0.5539766	0
s20	0.35074	0.000	-1.04771	0
s21	0.2614977	0.000	-1.34133	0
s22	0.2317411	0.000	-1.462134	0
s24	0.9285822	0.572	-0.0740964	0.572
s25	0.7015764	0.007	-0.3544255	0.007
s26	0.2483297	0.000	-1.392998	0
s27	2.323487	0.000	0.8430691	0
ydum1	1.746942	0.000	0.557867	0
ydum3	0.0930481	0.000	-2.374639	0
ydum4	0.1869712	0.000	-1.6768	0
ydum5	2.079232	0.000	0.7319984	0
ydum6	1.720078	0.000	0.5423696	0
ydum7	3.616483	0.000	1.285502	0
ydum8	1.724317	0.000	0.5448311	0
cons_			0.7265703	0.041