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A Test of a modified Committed – Uncommitted Voting Model on 14 Indian States: 1957 – 2018[1]

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A Test of a modified Committed – Uncommitted Voting Model on 14 Indian States: 1957 – 2018[1]

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Abstract

The model of Besley, Persson and Strum (2010) is extended to incorporate voter turnout and then tested for its predictions on data from 14 Indian States between the years 1957 and 2018. The results are broadly consistent with the predictions of the model overall but fit particularly well the lesser developed, so-called BIMAR(O)U states. That is, increased electoral competitiveness, as measured by a smaller first versus second place vote share margin, is associated positively with voter turnout and negatively with asymmetrically adjusted safe seats and vote volatility.

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1. Introduction

In this paper we modify the committed/uncommitted voter model of Besley, Persson and Strum (2010) to allow for the additional choice by uncommitted voters of whether or not to participate in an upcoming election. We then take the model to the data to test its predictions on election data from 14 Indian states over the 1957 to 2018 time period.[2]

2. Adapting the committed -uncommitted voter model for turnout

We begin by reproducing the political model of Besley, Persson and Strum (BPS) model and add to it the feature that not all uncommitted voters chose to participate in an election. The BPS model focusses on two types of voters who can vote for one of two parties, p = 1 or 2. A fraction of the voters, $1-\sigma$, are committed to a preferred party and receive an additional utility gain, Δ, if their preferred party is elected. The remaining fraction of voters, σ, are uncommitted or swing voters. Among the committed voters, some fraction λ favour party 1 so that party 1 can count on votes equal to $(1-\sigma)\,(1+\lambda)/2$, where λ can be positive or negative. We add to the model the feature that not all uncommitted voters will turn out to vote. Hence while core voters can be expected to vote for their chosen party, we let γ be the proportion of swing voters who choose to participate in the election before choosing which party to support. It follows that the fraction of committed voters who favor party 1 is $(1-\sigma)\,(1+\lambda)/2$, the fraction of potential voters who favour party 2 is $(1-\sigma)\,(1-\lambda)/2$, and the percentage of registered voters who are both uncommitted and available to the two competing parties is $\gamma\sigma$.

Swing voters choose which party to support based on the net value to them of the economic and noneconomic positions taken by the two parties. The economic value to a swing voter of having party i in office depends on the policies chosen by the party, τ_i, and is equal to $v_i = q(\tau_i)$. The noneconomic value of having the political position of party i in office (rather than $j \neq i$) is ω which can be positive or negative and is assumed to be uniformly distributed across swing voters over the range $\left[-\frac{1}{2\varphi}, \frac{1}{2\varphi}\right]$ with

[2] The 14 Indian states included in our study are: Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal. Assam was excluded because it was subdivided twice during the 70's and 80's and because it has experienced long periods of communal tension with associated outbreaks of violence. Jammu and Kashmir is excluded for similar reasons. From the 2011 Census, the 14 states cover roughly 85% of India's population of 1.2 billion individuals.

$\frac{1}{2\varphi} < \Delta$. Letting η be the value of an aggregate popularity shock in favor of party i, a swing voter will vote for party i whenever

$$\eta + \omega + v_i - v_j > 0.$$

With this parameterization, the condition for a party i victory becomes:

$$\sigma\gamma\varphi\left(v_i - v_j + \eta\right) + (1 - \sigma)\frac{\lambda}{2} > 0,$$

where the first term is the proportion of the swing voters who both vote and favor party i over party j, while the second term is the proportion of committed voters who favor party i over party j. This can be rewritten as

$$\frac{(1 - \sigma)\lambda}{2(\gamma\sigma)\varphi} + \left(v_i - v_j + \eta\right) > 0,$$

where the first term is called by BPS (p. 1333) "the electoral advantage term". It follows that for any policy preference difference in favor of party i combination with the realization of its favorable party shock $\left(v_i - v_j + \eta\right)$, party i is more likely to win electorally: i) the larger is the proportion of committed voters, $(1 - \sigma)$, the larger is the proportion of committed voters favoring party i, λ; the smaller is voter turnout, $\sigma\gamma$; and the smaller is the density of swing voter preferences for party i, φ. Alternatively, an election will be more competitive in the sense that the vote share of the winner is smaller, the smaller is the difference in voters' policy preference plus any realization of a favorable party shock $\left(v_i - v_j + \eta\right)$; the smaller is the proportion of committed voters committed to party $i, (1 - \sigma)\lambda$; the larger is voter turnout, $\sigma\gamma$; and the lower the salience of noneconomic issues (the larger is φ).[3]

3. A Test the Committed/Uncommitted voter model

In this section we set out our test of a stylized version of the BPS model on Indian State Assembly election data and the variables used to proxy the different elements in the model. The panel data set runs from 1957 through 2018 and includes the outcomes of 195 state elections. With some initial values missing and a number of successive early elections needed to construct our set of explanatory variables, the number of useable electoral observations reduces to 150.

In developing our empirical model, we first recognize that voters' perception of the difference in value of the policies offered by competing parties in combination with the favorable party shock across parties, η, is unobservable. Hence to operationalize the model, we assume that for third party viewers

[3] BPS view "an increase in the density φ of our assumed uniform can be thought of as approximating … a shift towards a more ideologically neutral electorate" (2010, footnote 5).

this outcome as random over time. Conditional on this assumption the first versus second place vote share winning margin, used as our measure of electoral competitiveness, is viewed as functionally related to the other three characteristics hypothesized as determining electoral outcomes: the asymmetry adjusted vote share represented by committed voters, $(1-\sigma)\lambda$; the salience of noneconomic issues to voters, $(1/\varphi)$; and voter turnout, $\sigma\gamma$.

To reflect the degree of asymmetry in committed voters, we use asymmetrically adjusted safe seats (*ASLS*), as constructed by Dash, Ferris and Winer (2019) for 14 Indian States between 1957 and 2012 and extended from 2012 through 2018 by the authors. This measure was formed first by finding for each state the historical volatility adjusted winning margin for incumbent party *p* (which won at time t-1) in constituency *j* in election t as $IPmargin_{pjt} = \frac{(v_{1pjt-1} - v_{2jt-1})}{Volatility_{jt-1}}$. Forming a distribution of constituencies by the size of their *IPmargins* for a rolling average of three past consecutive elections, a one standard deviation cutoff rule was used to define the number and hence the proportion of seats considered safe in each election, ψ_t.[4] To adjust the proportion of safe legislature seats by the degree of asymmetry among parties in their holding of safe seats, the Euclidean deviation from a three-party equal sharing of safe seats, $\phi3_t$, was used to reflect the degree to which the distribution of safe seats departs from an equal distribution of safe seats. Defining as the third party the vote share received by parties other than the top two, the Euclidean measure of deviation becomes $\phi3_t = \sqrt{3/2} * \sqrt{(1/3 - S_{1t})^2 + (1/3 - S_{2t})^2 + (1/3 - S_{3t})^2}$ where S_{it} = the seat share in the state legislature of the party in ith place in terms of seats. The measure of asymmetrically adjusted safe legislative seats then becomes $ASLS_t = \psi_t \phi3_t$ and is expected to be positively related to the first versus second vote share winning margin.

The second element is the salience of noneconomic issues to voters and our proxy for this is one over vote volatility. That is, the lower is the salience of noneconomic issues to voters (the higher φ) the more variation would arise in voter party choices for relatively small variations is voter evaluations of policy differences. This will encourage greater policy convergence across parties and be reflected in smaller variations in vote shares across elections. We adopt the volatility measure of Przeworski and Sprague (1971) and Pedersen (1979) who define electoral volatility as $Volatility_t \equiv \frac{\sum_{p=1}^{n} |v_{pt} - v_{pt-1}|}{2}$, where v_{pt} is

[4] Because volatility margins are available only from 1962 onward, the need to incorporate three successive sets of election results in the distribution from which safe seats are determined means that our measures of ψ_t and AS_t begin in 1971.

the vote share of party *p* in election year t. It measures the extent of vote shifting among political parties between consecutive elections.[5] Increases in vote volatility are then expected to be positively related to the size of the winning margin.

Vote turnout is defined here as the proportion of registered voters who participate in the election by voting. While ASLS and volatility are largely historical by construction, the same cannot be said of voter turnout. Hence to account for likely endogeneity, we instrument voter turnout with the expected value generated by a recent empirical model of voter turnout across Indian states (Ferris, Dash and Voia, 2021).[6]

While all Indian states operate under the same basic political institutions—single member Westminster parliamentary form of representative government requiring the maintenance of confidence over a maximum 5 year term, the specific operation of governance has evolved somewhat differently across states over time. To incorporate party structure differences across states that may affect the size of the first versus second place winning margin, we control cases of coalition government, Coalition, and for instances when the central government takes over the governance of the state through presidential rule, president. In addition to incorporating fixed effects to control for specific forms of difference across states, we also include a time variable, election date, to account for effects on the winning margin that arise across time and are common to all states. In its most general form, the model proposed to test the BPS model is:

$$Winning\ margin_t = \alpha_1 + \alpha_2 ASLS_t + \alpha_3 Turnout_t + \alpha_4 Volatility_t$$

$$+ \alpha_5 Coalition_t + \alpha_6 President_t + \alpha_7 Election\ date_t + \varepsilon_t,$$

where α_2 and α_4 are predicted to be positive, α_3, α_5 and α_6 negative and ε_t is a white noise random variable. The descriptive statistics of our variables and the equation used to instrument voter turnout are included in the Data Appendix to the paper.

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[5] In India every election brings in many new parties and leads to many parties exiting. To operationalize vote volatility, we define a party as one of the top ten vote receiving state parties in three successive elections or one that has received more than 8 percent of the vote in one election. Using this criterion, the number of political parties varies from 14 in Gujarat to 24 in Uttar Pradesh over our period of study and account for more than 90 percent of the vote in each election. Candidates contesting elections without the support of a political party are called independents. Whether independents are grouped together with other small parties not meeting our criteria for party status makes no significant difference to our volatility results.

[6] The equation used corresponds to column (3) in Table 5 of Ferris, Dash and Voia (2021).

4. Results

a. Fixed effects models with voter turnout instrumented

Table 1 presents the coefficient estimates of a set of fixed effects panel models of the vote winning margin arising in our 14 major Indian states. Column (1) presents the results for a truncated version of the model without controls when contemporaneous voter turnout is used. This is presented to contrast with the results in column (2) where actual voter turnout in the truncated model is replaced with its instrumented value. Both models concur in finding all coefficient estimates consistent with their expected sign but with only the coefficients on voter turnout and party vote volatility significantly different from zero at the 1 percent level. While the data suggests that an increase in asymmetrically adjusted safe seats is associated with an increase in the size of the winning margin, that effect is not found to be significantly different from zero. This pattern is replicated in all other versions of our test. The use of instrumented voter turnout in column (2) to control for endogeneity improves somewhat the fit of the model, significantly increasing the size of the estimated effect of voter turnout on winning margins while lowering somewhat the measured effect of vote volatility.

The controls are introduced in two stages. In column (3) the two controls for party structure differences are introduced and while their presence increases the explanatory power of the overall model, their presence does not significantly change the coefficient estimates of the primary determinants found in column (2). Of the two added variables, only control for the presence of a coalition government is found to be significant, decreasing the size of the winning party's margin. The presence of presidential rule is found to have no significant in this form of the test. In column (4) a common time trend across states is introduced and indicates that electoral competitiveness in the sense of falling winning margins has increased over time. Its presence has resulted in an increase in the significance of presidential rule. In this form of the test all variables have their expected sign and all but ASLS are significantly different from zero.

It follows that the predictions of the BPS model receive substantial support for our set of Indian states. Two of the three specific model predictions with respect to political competition receive consistent support while the third prediction is not contradicted by the data. More specifically, for this set of 14 Indian states over the 1957 to 2018 time period, state assembly elections have closer outcomes when voter turnout is expected to rise and vote volatility among parties falls. Increases in asymmetrically adjusted safe seats are associated with less competitive elections as measured by winning margins, but significantly so.

b. Fixed effects models with voter turnout instrumented and vote volatility lagged

In this section we examine the robustness of these results by incorporating two additional issues. First, we recognize that vote volatility is only partially predetermined at the time of an election and to deal with the potential endogeneity arising from its interaction with electoral competitiveness and winning margins we use its lagged value. In effect the test moves from assuming that voters and parties form rational expectations to assuming that expectations are based entirely on past, historical data. Second, many writers on India have noted the dramatic differences that arise across Indian states and found significant differences in the ways that political parties compete and voters participate across states by their stage of development.[7] Using the BIMAR(O)U versus NON_BIMAR(O)U categorization to group states by their stage of development, we ask whether electoral competition in the form of smaller winning margins responds differently by these groupings.[8] The results are presented in Table 2.

In column (1) of Table 2 the model results of using a one election lagged value of volatility instead of its contemporaneous value are presented. Comparison with column (3) of Table 1 indicates that some degree of endogeneity was present in the earlier case--the coefficient estimate on lagged volatility has fallen roughly in half (from .078 to .040) and the explanatory power of the equation as a whole has also fallen somewhat (the R^2 falls from .422 to .398). On the other hand, use of the lagged value leaves the other coefficient estimates and their significance largely unchanged and the measured effect of a change in its value remains significantly different from zero at 10%.

The results of running the model separately for the BIMAROU and NON_BIMAROU states suggests some important differences across the two groupings. First, the BPS model fits the data much better for the BIMAROU states as opposed to the NON_BIMAROU states. The model with controls explains sixty three percent of the within state variation of winning margins in BIMAROU states versus thirty five percent in NON_BIMAROU states. Second it is only in the BIMAROU states where a significant linkage is found between winning margins and asymmetrically adjusted safe seats (ASLS). Perhaps because of the larger

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[7] For recent examples see Pandya and Maind (2017), Santra and Das (2018), Vikas (2018), Dash et al (2019) and Ferris and Dash (2021).

[8] Many writers have used either a four or five state grouping to categorize the poorest set of Indian states. BIMAR(O)U refers to the states: Bihar, Madhya Pradesh, Rajasthan, (Orissa) and Uttar Pradesh. Here we use the five/nine grouping of states to maximize the degrees of freedom available in the smaller grouping of poor states.

incidence of reserved seats for scheduled castes and tribes in BIMAROU state legislatures, the committed-uncommitted feature of the BPS model may apply more naturally. On the other hand, the data indicates that the predicted relationship between winning margins and party vote volatility is significantly stronger in the NON_BIMAROU states.

5. Conclusion

In this paper we have proposed a test of an extension of the Besley, Persson and Strum committed/uncommitted voter model to include voter turnout and found evidence within Indian states that is supportive of at least two of its three key hypotheses. Electoral competitiveness, in the sense of a smaller first versus place winning vote share margin, is found to be larger the larger voter turnout is expected to be and the smaller is party vote volatility. There is also a suggestion in the data that competitiveness is stronger when electoral safe seats are more symmetrically distributed among the major competing parties, but this result is not found to be statistically significant. When the model is run over a bifurcated panel, where states are grouped by their development status, the model is found to fit the data best for the BIMAROU grouping of poorest Indian states where asymmetrically distributed safe seats is found to be a significant determinant of electoral competition.

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Data Appendix:

A. Descriptive Statistics

14 Indian State Elections: 1957 – 2018

Variable name	Observations	Mean	Standard Deviation	minimum	maximum
Winning vote share **margin** v1-v2	195	.145	.046	.06	.29
Party Vote **Volatility**	185	.233	.142	.03	.56
Asymmetrically adjusted safe legislative seats **ASLS**	152	.118	.075	0	.33
Voter **turnout** at the state level	195	.627	.109	.24	.86
Instrumented voter turnout	179	.635	.070	.190	.771
Coalition	195	.369	.484	0	1
President	195	.231	.422	0	1

B. Instrumental Variable equation from Dash, Ferris and Voia (2021).

Voter Turnout = .325Turnout(-1) -.004PC_income growth +.009District Size -.0000002District Size^2

-.088Constituency_Volatility +4.75Gini -6.97Gini^2 -.227Winning margin +.0003Party numbers

-.044Presidential rule +.002Old(60+) -.005Lowered voting age -.438Election1992_Punjab - .371

Table 1

Fixed Effects Panel Regressions of the Winning Vote Share Margin:
14 Indian States, 1971 -- 2018

	Winning margin v1 _v2 (1)	Winning margin v1 _v2 (2)	Winning margin v1 _v2 (3)	Winning margin v1 – v2 (4)
ASLS	0.0057 (0.047)	0.0065 (0.046)	0.0049 (0.046)	0.0055 (0.044)
Voter Turnout	-0.194*** (0.038)			
Instrumented Voter Turnout		-0.292*** (0.075)	-0.331** (0.117)	-0.264** (0.093)
Volatility	0.107*** (0.021)	0.078*** (0.025)	0.074*** (0.022)	0.062** (0.023)
Coalition			-0.014*** (0.004)	-0.014*** (0.004)
President			-0.014 (0.008)	-0.019*** (0.006)
Election year				-0.0007** (0.003)
Constant	0.239*** (0.028)		0.345*** (0.079)	1.741** (0.618)
Statistics				
Observations	150	150	150	150
R^2	0.349	.385	.422	.457
F	96.4	24.5	17.97	21.2
AIC	-591.2	-599.7	-605.0	-612.5

Robust standard errors in brackets, ***(**), signify significance at 1% (5%).

Table 2

Fixed Effects Models of the Winning Vote Share Margin:
14 Indian States and by Stage of Development, 1971-2018

	Winning Margin All 14 States (1)	Winning Margin BIMAROU States (2)	Winning Margin NON-BIMAROU States (3)
ASLS	0.039 (0.047)	0.226** (0.078)	-0.009 (0.040)
Instrumented Voter Turnout	-0.390*** (0.119)	-0.575*** (0.141)	-0.333*** (0.109)
Lagged Volatility	0.040* (0.022)	-0.0007 (0.04)	0.054* (0.028)
Coalition	-0.018*** (0.005)	-0.024*** (0.004)	-0.013* (0.007)
President	-0.011 (0.009)	-0.017 (0.012)	-0.006 (0.011)
Constant	0.363*** (0.051)	0.480*** (0.098)	0.354*** (0.071)
Statistics Observations R^2 AIC	 152 .398 -606.7	 57 .636 -254.2	 95 .349 -352.9

Robust standard errors in brackets, ***(**)[*] signify significance at 1% (5%)[10%].