

CEP 18-07

**Economic Performance and Electoral Volatility: Testing the  
Economic Voting Hypothesis on Indian States, 1957–2013**

Bharatee BhusanaDash  
National Institute of Public  
Finance and Policy (NIPFP)

and

J. Stephen Ferris  
Carleton University

June 28, 2018

**CARLETON ECONOMIC PAPERS**



**Carleton**  
UNIVERSITY

**Department of Economics**  
1125 Colonel By Drive  
Ottawa, Ontario, Canada  
K1S 5B6

# **Economic Performance and Electoral Volatility: Testing the Economic Voting Hypothesis on Indian States, 1957–2013**

by

Bharatee Bhusana Dash  
(bharatee.dash@nipfp.org.in)  
National Institute of Public Finance and Policy, New Delhi, India

and

J. Stephen Ferris\*  
(steve.ferris@carleton.ca)  
Department of Economics, Carleton University, Ottawa, Canada

June 2018

## **Abstract**

The electoral consequences of variations in economic growth on vote volatility are analyzed on a panel of fourteen Indian states between 1957 and 2013. Two measures of volatility are used: first changes in party vote shares at the assembly level and the state average of volatilities constructed at the constituency level. While the results suggest that both volatilities are reduced by higher income growth rates, volatility at the constituency level is found to be somewhat more sensitive to growth rates. Examination of the periodicity of income growth's impact finds that the growth rate in the final year of governance has a stronger effect on volatility than does the average income growth rate arising over the entire election cycle. We also find that vote switching responds more to negative rather than positive growth changes and, by decomposing volatility, find that growth changes affect internal vote shifting more than between established parties and new comers. More generally the responsiveness of volatility to set of economic and political characteristics of the state suggests that theories of economic voting have an important role to play in understanding electoral outcomes and hence the process of development.

**JEL Code:** D72, O11, O43, R11

**Key Words:** Vote volatility, Economic voting, Indian States, Political business cycle, growth asymmetries

\* Corresponding author

## 1. Introduction:

In most democracies political parties compete in elections by promising to provide voters policies that will deliver greater economic prosperity. Hence it is natural to expect that voters will react to economic conditions and hold the incumbent party/coalition responsible for the performance of the economy. If the incumbent fails to deliver on its electoral promise, voters could be expected to drop their support for the governing party/coalition and switch their vote to one of the opposition parties or one of the promising new arrivals. Voters switching parties to punish the governing party/coalition for poor economic outcomes arising during its tenure would then increase vote volatility in the upcoming election.

The impact of changing economic circumstances on electoral outcomes has been widely studied but primarily within developed economies and primarily with respect to whether the incumbent party or party coalition loses either the upcoming election or a portion of its vote share (Pacek and Radcliff, 1995; Brender and Drazen, 2008; and Gupta and Panagariya, 2014).<sup>1</sup> While the majority of studies find evidence consistent with the hypothesis that economic conditions matter (for India see Khemani (2004)), there are a sufficient number of ambiguous findings to suggest that winning versus losing and/or the size of the change in an incumbent's vote share may be too narrow a measure to capture the full impact of economic conditions on election outcomes (Arcelus and Meltzer, 1975; Bengtsson, 2004; Evans and Anderson, 2006; and Vaishnav and Swanson, 2015).<sup>2</sup> Moreover, economic conditions can generate more effects on voting behavior and electoral stability than just those experienced by the incumbent party. Not only can an incumbent be punished for producing poor economic conditions without necessarily losing the next election, but disappointing performance may prompt the redirection of votes among established parties and/or between the established and newly arising opposition parties. This suggests that measuring changes in support through changes in the vote shares received by all competing parties may allow for a more continuous and precise measure of the influence of economic conditions on the stability of parties and the electoral process. It is perhaps for this reason that the literature has focused more recently on vote volatility.

Our work contributes to the growing literature on electoral volatility in four interrelated ways. First, while the relationship between economic conditions and political instability has been a topic of growing interest, empirical work using economic variables to explain political instability is still largely confined to cross-country analysis (Alesina and Perotti, 1996; Aisen and Veiga, 2013; and Dassonneville and Hooghe, 2017) and country-specific analysis largely confined to those in developed countries (Van Der Meer et al., 2012; Dassonneville, 2016; and Dassonneville and Stiers, 2018). Studies focusing specifically on developing countries are slowly beginning to appear

---

<sup>1</sup> As Nadeau et al. (2012: 565) conclude "the economy is not a mirage. Voters see it, and see it rather clearly, when they exercise their choice."

<sup>2</sup> Perhaps most strongly, Bengtsson (2004: 765) concludes that "[t]he result of the study shows without doubt that a universal economic effect cannot be demonstrated at the aggregate level." More conditionally, Bloom and Price (1975) and others suggest that weak findings overall are the result of an asymmetric response to recessions as opposed to prosperity while Vaishnav and Swanson (2015) find support for economic variables in India only in the post 2000 time period.

(see, for example, Roberts and Wibbels (1999) and Kuenzi et al. (Forthcoming) on Latin America and Africa, respectively) but, as yet, only Noorudin and Chhibber (2008) have utilized the diversity of India's states to analyze electoral volatility. In their study covering 15 Indian states over the 1967 to 2004 time period, Noorudin and Chhibber argue that fiscal space (i.e. the space within the government budget that allows for higher spending without jeopardizing financial stability) is the key determinant of state wide electoral volatility, with economic conditions such as the level of per capita income and its growth having no significant influence on volatility. In this paper we re-examine electoral volatility within Indian states by extending their study backwards to 1957 and forward to 2013.<sup>3</sup> The sharing of a common British parliamentary political heritage in combination with its wide range of ethnic, cultural and economic diversity makes the Indian states an ideal setting in which to test a wider range of hypotheses on volatility. In doing so we find results that modify somewhat the conclusions made by Noorudin and Chhibber.

A second and more technical innovation is related to how electoral volatility is measured. All current studies of vote or seat volatility measure electoral volatility by using party outcomes at the aggregate legislature/parliament level. However, Katz et al. (1997) has argued that measuring volatility by aggregating from the constituency level upward is more meaningful than simply using state level election results. In our work we calculate volatility both at the state assembly level and by aggregating upwards from the constituency. To the best of our knowledge, no study has used constituency-based volatility to study the economic reasons for vote shifting nor considered empirically what difference the use of constituency-based volatility makes.

Arguing that voters have deteriorating memories and respond more favorably in elections when government delivers visible public goods and services towards the end of the electoral tenure, Ferris and Dash (2016) show that Indian state governments do spend increasing amounts on highly visible physical infrastructure as the election approaches. Hence applying the 'deteriorating memory of voters' to vote shifting's in the context of the political business cycle model is the third contribution of this paper.

Finally, there are two specific dimensions of vote volatility that have received much current attention. First a number of recent studies have questioned whether voter response to good and bad economic conditions is symmetric. The competing hypothesis is that the level of punishment voters inflict on incumbents for poor economic performance will be much stronger than the voting reward they confer under economic prosperity (Nannestad and Paldam, 1997; Singer, 2011; Dassonneville and Lewis-Beck, 2014). Other recent studies have argued that vote volatility consists of two distinct types: volatility arising from the entry and exit of parties (Type A volatility) versus vote volatility arising from voters switching among existing parties (Type B volatility). The hypothesis here is that Type A volatility is more sensitive to economic outcomes than Type B volatility (Birch, 2003; Golosov, 2004; Sikk, 2005; Tavits, 2008; Powell and Tucker, 2014; and

---

<sup>3</sup> The 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 was excluded for similar reasons.

Mainwaring et al., 2017). In addition to testing both of these hypotheses on India's states, we examine the extent to which the economic outcomes in adjacent states impact own state voters' evaluation of their incumbent government's performance. Does better own state economic performance relative to its neighbors reduce vote volatility in state elections?

The remainder of the paper is organized as follows. In the next section, we discuss data and variables used in this study. Section 3 starts with presenting and discussing the baseline results on the effects of growth on volatility. A number of robustness tests are carried out to check the sensitivity of baseline results. Section 3 ends with discussing these results. In section 4, we analyze the results of the extensions of the economic voting hypothesis. Section 5 presents the concluding remarks.

## 2. Data and Variable Descriptions:

The data used in this study come from a wide variety of sources (source details and descriptive statistics are given in Table A1 of the Appendix). The electoral variables on assembly election outcomes are constructed from information collected from the Election Commission of India.<sup>4</sup> Data on state populations and gross domestic products (SGDP) come from the Indian Central Statistical Organization (CSO) while fiscal data is taken from the Reserve Bank of India Bulletin. The combination of these sources allows us to test our volatility hypotheses on Indian states over the period 1957–2013. More specifically, our dataset covers the 179 assembly elections that took place in 14 major Indian states over 56 years. The states and their election periods are listed in Table A2 of the Appendix.

Following Przeworski and Sprague (1971) and Pedersen (1979), electoral volatility can be defined as:

$$Volatility_t \equiv \frac{\sum_{p=1}^n |v_{pt} - v_{pt-1}|}{2}, \quad (1)$$

where  $v_{pt}$  is the vote/seat share of party  $p$  in election  $t$ . It measures the net extent of vote/seat shifting among political parties between consecutive elections.<sup>5</sup> The volatility index varies between 0 (a stable political system) and 1 (an unstable political system). Using this definition we calculated vote volatilities both at the assembly level and as aggregated upwards from the constituency level (weighted by each constituency's share of the aggregate vote). Calculating vote or seat volatility at the assembly level is straight-forward. However, adjustments must be made for the constituency-based measure because redistricting creates new constituencies that

---

<sup>4</sup> State legislatures in India are known as assemblies. Elections at the state level are commonly known as assembly elections.

<sup>5</sup> Every election in India brings in many new parties and many parties cease to exist. To talk meaningfully about vote volatility across parties 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. Under this criterion, the number of political parties varies from 14 in Gujarat to 24 in Uttar Pradesh during our period of study while accounting for more than 90 percent of the vote in each assembly election.

cannot be matched across time.<sup>6</sup> Because the calculation of a constituency's volatility requires a voting outcome from the past election, we first linked electoral constituencies with their administrative district and then used the party average across that district to construct a proxy past history for each new constituency.<sup>7</sup>

Figure 1 provides a descriptive overview of the evolution of both constituency and assembly-based volatilities over time for each of our 14 Indian states. Perhaps the most visible features of Figure 1 are that with few exceptions the constituency and assembly volatilities move together in all states and that average volatility at constituency level is usually higher (roughly a quarter higher) than that calculated at the assembly level. While neither shows a strong time trend over the entire period, both volatilities exhibit a steady rise through the 1975-77 National Emergency followed by a slight downward trend, most apparent in the assembly-based measure.

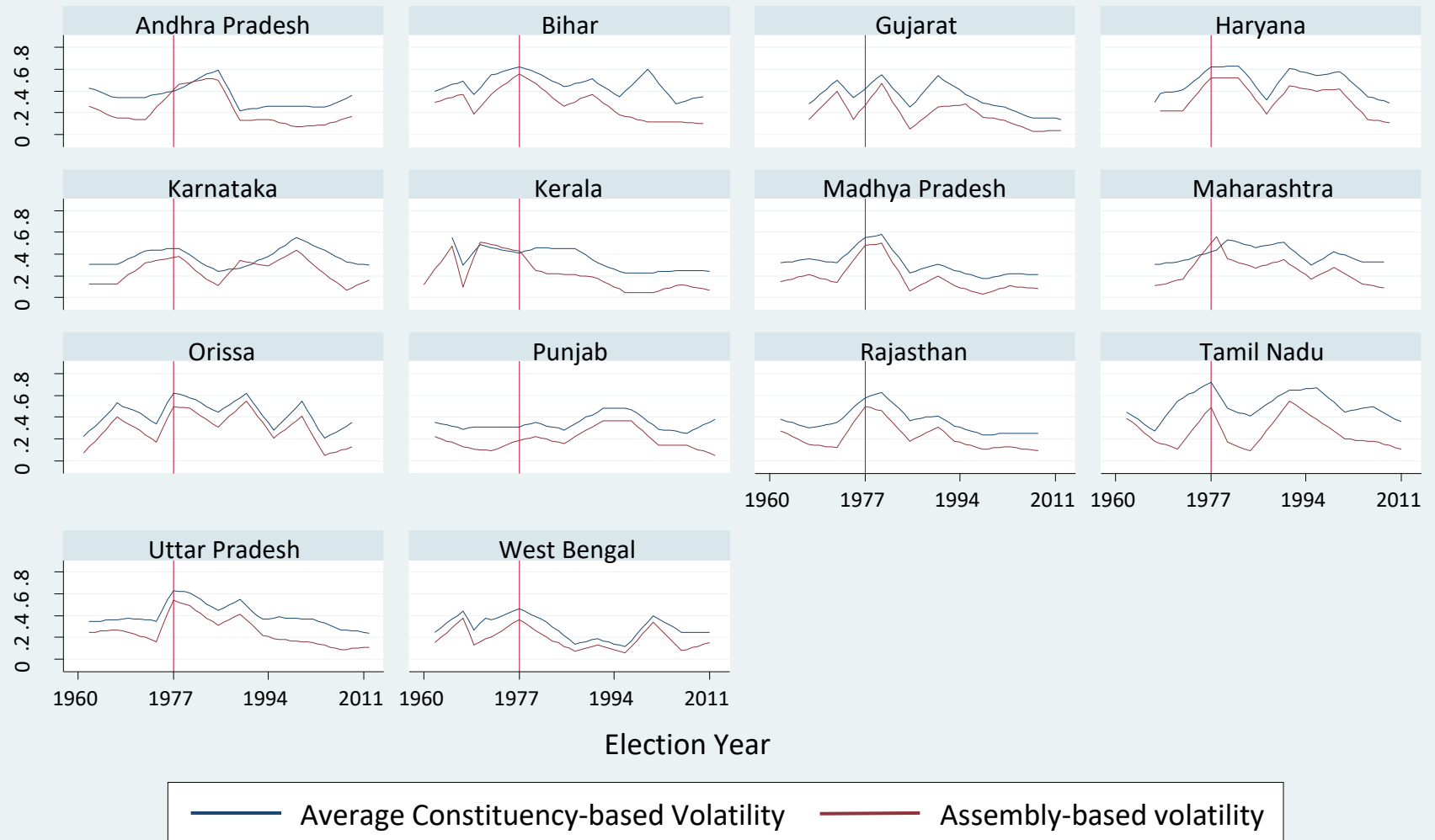
A more detailed look at state outcomes indicates that volatility has evolved somewhat differently across the states. To some extent this reflects the different rates at which the states reacted to the early period of dominance by the Congress Party. At the national level the Congress Party was undefeated from Independence through the imposition of the National Emergency (from 25 June 1975 to 21 March 1977), but its hold over the electorate was already breaking down. However, it was the imposition of the National Emergency that produced a major turning point in Congress's success. At the national level the unpopularity of the National Emergency led to the first-time defeat of the Congress Party in 1977 by a grand coalition formed under the Janata Party. Similar coalitions formed at the state level, leading to the Congress Party's loss of most state elections taking place in 1977 and 1978. The large scale shift in voting at the state level is reflected in the historically high levels of volatility arising in most states between 1978 and 1980. The elections held after the National Emergency also brought with them the entry of many new regional and national parties to the political system and changed the competitive nature of state politics. Politics in many states are now dominated by competition among state-specific regional parties with vote fragmentation increasing the frequency of coalition governments. The varying degree of success in forming stable governing coalitions tends to account for the different volatilities trends across states, particularly in the post-1977 period.

---

<sup>6</sup> The constitutionally appointed body of Delimitation Commission is given responsibility for redistricting constituencies in India. So far four such Commissions have been formed in the years: 1952, 1963, 1973 and 2002 with recommendations implemented in the years: 1957, 1967, 1974 and 2008. See the Appendix A2 for further details on Delimitation Commission and constituency redistricting.

<sup>7</sup> See the Appendix A2 for more details on this.

**Figure 1**  
**Alternative measures of vote volatility across Indian states, 1957–2013**



To measure the impact of economic circumstance on the economic voting hypothesis, most analysts have used macroeconomic indicators such as economic growth, unemployment and inflation. Because our analysis is at the state level, however, inflation is not available as a variable under the control of the state government, and state unemployment rates are generally unavailable in India. For this reason we have chosen the growth rate of state per capita income as our indicator of the measure of economic performance most meaningful to state voters.<sup>8</sup> To assess the time interval over which growth rates matter most for voting behavior, we use two time intervals: the average growth rate over the entire prior governing interval and the growth rate arising in the last year of the incumbent's governing tenure. If the income growth rate in the last year of the prior governing period plays a more important role in determining vote volatility, the data would be consistent with the Ferris and Dash (2016) conjecture that voters attach more weight to the visibility of recent events relative to the same event arising in the early years of tenure. In such cases incumbent political parties can benefit by reallocating state expenditures through time to produce pre-election circumstances that take advantage of voters' tendency to forget benefits conferred in the past.

Among the political determinates of electoral volatility, the most commonly used determinant is the Effective Number of Parties (ENP)<sup>9</sup>, a measure of party system fractionalization. A larger number of effective parties increases the party options available to voters and it is expected to lead to greater vote switching. In India, one of the most ethnically diverse countries in the world, the party system evolves around ethnic factors such as caste (social class), language, and religion (Harris, 1999; Yadav and Palshikar, 2003; Heath, 2005; Jaffrelot (2012); and Dash et al., 2018). In the absence of a time-series measure for ethnic divisions in India, ENP will also proxy for the degree of ethnic division across states. We use the change in ENP between elections as our measure of the fragmentation of the party system and/or the heterogeneity of its electorate at the state level. Increases are expected to affect volatility positively. In more recent decades, electoral mandates have become increasingly fractured, resulting in the frequent formation of coalition governments. However in practice, most coalition governments have settled partners and contest elections based on a pre-election set seat sharing arrangements. As a result, while the number of parties at the assembly level may appear high, not all parties are competing. Hence as the number of parties associated within a government increases, a decline in volatility is expected.

In India the Congress Party stands out as the most successful political party in electoral history. For instance, the Congress Party is the governing party in 46 percent of elections in our sample period. While the Congress Party is not the same political force that it once was, it still enjoys considerable support, particularly from voters in the rural areas of India. Moreover support for Congress arises in many cases by default, with voters needing a reason not to vote for Congress. A dummy variable, Congress, is used to differentiate elections won by the Congress Party from those won by others, defined as 1 if the Congress party has won, 0 otherwise. This success of the

---

<sup>8</sup> The availability of both GDP and income at the state level allows us to use state GDP later as a robustness check.

<sup>9</sup> Following Laakso and Taagepera (1979), we measure ENP as:  $1 / \sum_{i=1}^n v_i^2$ , where  $v_i$  is the vote share of party  $i$ .



Congress Party is then a signal of the strength of partisan loyalty and likely to have had a negative impact on vote switching.

Because of its traumatic effect on Indian politics, a dummy variable, Emergency, is used to account for the first assembly elections arising after the national emergency. In addition, presidential rule is sometimes imposed on a state when the law and order situation deteriorates or when no party/coalition is in a position to form the government in the middle of an electoral tenure or after an election. When it is imposed, the state legislature is suspended or dissolved and placed under direct central rule.<sup>10</sup> Imposing President's rule is then a clear signal of a party/coalition's inability to govern the state. A Presidential rule dummy variable (1 if the rule was imposed during an electoral tenure, 0 otherwise) is expected to be linked with increased vote shifting.

Volatility will also be affected by a number of other demographic factors. In India, the number of electoral constituencies in each state is determined as a fixed proportion of population size. It follows that more populous states will have more assembly constituencies and are likely to have a more diversified/heterogeneous electorate. Assembly size, the number of seats in the assembly, is then expected to have a positive impact on volatility. As a young and rapidly developing country, India has a sizeable number of first-time voters in each election. In addition, each election attracts numerous peripheral voters.<sup>11</sup> To the extent that new and non-partisan voters are less politically predictable than established voters with stronger ideological and/or partisan preferences (Hansford and Gomez, 2010), each increase in voter turnout would be expected to increase volatility. Because the inability to serve out a full-term signals a less successful governing period in a Westminster parliamentary system, shorter-lived governments would be expected to be followed by a larger vote shifting in comparison with governments that complete their mandated tenure. The number of years passed since last election would then be expected to be negatively related to volatility.

Electoral results and vote shifting may also respond to public policy and provide evidence consistent with a political budget cycle in addition to, or instead of, a political business cycle. Studying the impact of public policy on electoral volatility in Indian states, Nooruddin and Chhibber (2008) have shown that constrained fiscal space hampers a government's ability to deliver public goods and services, resulting in reduced electoral success and a rise in volatility. Here we define fiscal space as the share of revenue receipts left after meeting non-development expenditures. Non-development expenditures include budget items such as interest payments on outstanding debt, administrative services and pension payments that governments find difficult to cut in the short-run (Chakraborty and Dash, 2017). These are considered to be committed spending items. While we find that an increase in fiscal space, averaged over prior electoral tenure, tends to reduce electoral volatility, we do not find it to be a consistently significant influence.

---

<sup>10</sup> Article - 356 of the Indian Constitution deals with the issue of imposing president's rule in detail.

<sup>11</sup> Campbell (1966) defines peripheral voters as those who are less involved in political campaigns and hence tend to be less certain about their voting choices.

Finally, because successive elections are not held in the same year across states, we use the date of each election rather than the election number to pick up any systematic time trend in our measures of volatility over time. The sources of our data and the descriptive statistics of each variable are presented in the Appendix as Table A1. Fisher’s test for panel unit root, proposed by Maddala and Wu (1999), is the appropriate test for the time series properties of variables in an unbalanced panel like ours. The results are presented in the Appendix as Table A3 and can be seen to confirm that all our variables are stationary.

### 3. The Effects of Growth on Vote Volatility:

In this section, we present and discuss the results on the effects of per capita income growth on volatility. A fixed-effects estimator is used to study the effects of growth on volatility:

$$Y_{i,t} = \alpha_0 + \alpha_1(X_1)_{i,t} + \alpha_2(X_2)_{i,t} + \gamma_i + e + \epsilon_{i,t}, \quad (2)$$

where  $Y$  represents for types of volatilities,  $X_1$  for growth rates, and  $X_2$  for other explanatory variables.  $\gamma_i$  are state fixed effects,  $e$  is the trend of election years,  $\epsilon$  is a time-varying disturbance, and the subscripts  $i$  and  $t$  represent state and time, respectively. All regressions are estimated with standard errors corrected for heteroscedasticity and clustered at state level to account for autocorrelation.

#### 3.1 Baseline Results

The coefficient estimates of three different versions of equation (2) are presented as Table 1 and discussed as our baseline results. In columns 1 to 3 the estimated impacts of real per capita income growth on average constituency-based volatility are reported and the corresponding estimates for assembly-based measures of volatility are reported in columns 4 through 6. Columns 1 and 4 show the estimated effects of per capita income growth averaged over the entire tenure of the incumbent governing party, while columns 2 and 5 do the same for the per capita income growth arising only in the last year of the incumbent government. All four of these coefficient estimates are significantly negative indicating that higher income growth overall and in the immediate pre-election period is associated with less vote shifting both at the constituency and assembly levels.<sup>12</sup> These results are then consistent with the hypothesis that Indian voters, despite hold very strong partisan positions and social preferences,<sup>13</sup> hold the incumbent political party accountable for the state of the economy at the sub-national level. In relative terms, the constituency-based volatility results are somewhat stronger than the assembly-based results in the sense that the levels of statistical significance of the growth rates are higher. It suggests that

---

<sup>12</sup> In results that are available upon request, the covariates in Table 1 were run as a panel probit model explaining the re-election probability of the incumbent party and as a panel regression with fixed effects explaining the percentage of the vote won by the incumbent party. While the coefficient estimates enter with their expected sign, in neither case does the data support the hypothesis that economic conditions, as represented by per capita income growth rates, are significant determinants of election outcomes.

<sup>13</sup> For instance, Chandra (2004), Dunning and Nilekani (2013), Banerjee et al. (2014), Acharya et al. (2015), and Blakeslee (forthcoming) emphasize different aspects of partisan and social preferences of Indian voters.

vote shifting at the local (constituency) level is even more responsive to changing economic conditions than it appears to be at the aggregate (assembly) level.

One further hypothesis test is presented as columns 3 and 6. That is, Ferris and Dash (2016) advance the hypothesis that voters have deteriorating memories to explain systematic compositional changes in the more highly visible elements of state budgets over the life of a government in a way that complements the presence of a political budget cycle (PBC) across Indian states. Here we extend that hypothesis by asking whether the volatility response to income growth over the entire prior tenure is less strong than the response to income growth in the incumbent government's final year. The results are presented in columns 3 and 6 where both growth rate periods are included in the same regression model. The results in columns 3 and 6 show that while all growth rates have their expected negative signs, volatility response to growth is significantly negative only for the last year's growth rate and only with constituency-based volatility. Hence for the constituency-base measure in column (3), the data is directly consistent with greater voter response to economic outcomes experienced later in the governing tenure rather than earlier. The assembly-based outcome is less clear. In column (6) neither effect is found to be significant when both are included even though their combined effect in the final period approaches significance (as in column (5)). Evidence in favor of the deteriorating memory hypothesis is then stronger at the constituency level than at the assembly level.

Among the other determinants of vote volatility, ENP stands out as a significant determinant. The data are consistent with the hypothesis that the greater is the fragmentation of political parties, the more party options and policy platforms are there for voters to choose among and this will be reflected in an increase in vote volatility. The estimated effects are highly significant in all models. Assembly size, used to capture the scale and heterogeneity of the state is seen to affect volatility positively as expected, but significantly only at the assembly level. Because the size of the electorate in individual constituencies is more or less the same within and across states, it not surprising to see that assembly size is much less significant for individual constituencies. The findings for the change in voter turnout are in line with those found by Nooruddin and Chhibber's (2008) and do suggest that voter turnout does not play as important a role in Indian states as it has elsewhere (see, for example, Hansford and Gomez, 2010). As expected, the smaller are the 'Years since the last election', the larger does vote shifting tend to be, but the results are weak and become significant (at 10 percent) only in column 1. On the other hand, as the size of a governing coalition increases, volatility declines. The estimated effect, however, is bigger and more consistent at the assembly level than at the constituency level. This may be due to pre-election coalition governments reducing the actual number of parties competing against each other at the assembly level. This may be less relevant to the constituencies where regional differences and concerns may make the total number of competing parties at the state level less important. The results of including a dummy variable for Congress suggest that votes tend to get consolidated under the Congress Party rule, but the partisan effect of Congress never becomes statistically significant.

**Table 1**

**The impact of income growth rates on vote volatility in Indian states, 1957–2013**

	Volatility (Constituency)			Volatility (Assembly)		
	(1)	(2)	(3)	(4)	(5)	(6)
Per capita growth rate (prior tenure)	-0.016** (2.19)		-0.002 (0.22)	-0.028* (2.00)		-0.014 (0.89)
Per capita growth rate (Last year)		-0.013** (2.90)	-0.012** (2.36)		-0.016* (2.09)	-0.012 (1.44)
Δ in Effective Number of Parties (ENP)	0.317** (2.81)	0.311** (2.66)	0.31** (2.66)	0.585** (2.9)	0.59** (2.86)	0.579** (2.83)
Assembly size	0.165 (0.66)	0.077 (0.29)	0.076 (0.29)	1.39** (2.93)	1.3** (2.74)	1.3** (2.74)
Δ in Voter turnout	-0.252 (1.56)	-0.175 (1.27)	-0.185 (1.37)	-0.219 (1.14)	-0.077 (0.38)	-0.151 (0.77)
Years since election	-0.121* (1.94)	-0.108 (1.59)	-0.11 (1.69)	-0.073 (0.7)	-0.044 (0.39)	-0.061 (0.56)
Number of parties in government	-0.06 (1.6)	-0.069* (1.86)	-0.068* (1.85)	-0.178** (2.63)	-0.189** (2.73)	-0.186** (2.65)
Congress government	-0.026 (0.63)	-0.047 (1.01)	-0.045 (0.94)	-0.112 (1.44)	-0.141? (1.73)	-0.132 (1.63)
Election after emergency	0.237*** (4.2)	0.266*** (4.22)	0.266*** (4.16)	0.508*** (6.69)	0.541*** (7.11)	0.537*** (6.95)
Presidential rule	0.006 (0.14)	0.015 (0.32)	0.013 (0.3)	0.06 (0.61)	0.08 (0.8)	0.067 (0.68)
Fiscal space	-0.199 (1.39)	-0.135 (0.93)	-0.136 (0.94)	-0.444* (1.92)	-0.367 (1.61)	-0.38? (1.70)
Election years	-0.004* (1.93)	-0.004* (1.83)	-0.004* (1.8)	-0.012*** (3.43)	-0.013*** (3.41)	-0.012*** (3.39)
Constant	6.37 (1.43)	6.73 (1.43)	6.5 (1.38)	17.55** (2.29)	19.45** (2.38)	17.68** (2.26)
R <sup>2</sup>	0.28	0.32	0.32	0.37	0.38	0.38
F-Stat	25.26***	37.7***	36.04***	90.02***	48.67***	50.4***
Elections (States)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)

Notes: All models include state fixed-effects. \*\*\*(\*\*)[\*] = significant at 1% (5%) 10%. ? = just misses significance at 10%. Robust t-statistics are given in parentheses. Standard errors are corrected for heteroscedasticity and clustered at the state level. All variables in logs except *Congress government*, *Emergency*, *President's rule*, and *Election years*.

The data reinforce the hypothesis that imposition of the National Emergency made the Congress party hugely unpopular among voters throughout the country such that the first assembly elections after the emergency saw large scale vote switching away from the Congress party. In all models the coefficient estimates are positive and highly significant. Voters also seem to be attributing incumbent governance failure to the introduction of Presidential rule, however the coefficient estimates never become a significant factor in large scale vote shifting (perhaps because of the varied circumstances in which it is introduced). Like Nooruddin and Chhibber (2008), we also find support for the hypothesis that greater fiscal space reduces vote volatility, but its impact over our sample period is much weaker and confined to vote shifting at the assembly level.<sup>14</sup> One reason why fiscal space may not have a statistically significant impact on volatility at the constituency level is that the fiscal actions of the incumbent government may be better evaluated and held accountable for its actions at the state assembly level. Finally, the coefficient estimates on Election years indicate that volatility has slowly decreased over the years as the party system has matured and stabilized. Its impact is more visible at the assembly level.

### 3.2 *Robustness Checks*

To assess the robustness of the baseline results presented in Table 1 we have used a variety of different approaches. The strategies adopted and their results are discussed below, the empirical support in the form of estimation tables is reported in the Appendix.

First, India's reputation as a fast-growing developing economy did not develop until the years following the first generation of economic reforms in 1991. For the three decades following Independence, India could be characterized as a closed economy with an average growth rate of about 3.5 percent. The relatively low growth rate during this period is often attributed to the adoption of more inward-looking socialist policies. In response to a series of balance of payment deficits that were becoming increasingly untenable, a series of economic reforms were initiated in 1991 to liberalize the economy. The major economic reforms introduced during this period include a reduction in import tariffs, the deregulation of some markets, the privatization of public sector utilities (PSUs), a reduction of taxes, and the encouragement of foreign investment.

Because the policies of economic liberalization following 1991 have been widely credited with enabling the very high economic growth rates that India has experienced (Mukherji, 2010), one might expect that voters in India would have become more aware of the government's ability to stimulate economic performance in the post-1991 years. To check the possibility that our baseline results are driven by the experience learned by the post-1991 experience, we introduced an interactive variable on both per capita income growth rates (prior tenure and last year). A dummy variable taking on 1 for the post-1991 elections, 0 otherwise was applied to both income growth rates. Doing so led to a weakening of the effect attributable to the prior period's average income growth rate while leaving the effect of last year's growth largely unchanged. The results with respect to the 'deteriorating memory of voters' hypothesis become somewhat more

---

<sup>14</sup> Note that while our definition of fiscal space is similar to that proposed by Nooruddin and Chhibber (2008), it is not identical with it.

significant than those found in Table 1. The sensitivity of vote volatility to the income growth rate in the post-1991 elections is negative in all models but are significantly so (at the 10 percent level) only when both growth rate variables are regressed on assembly-based volatility. While the results are weak, the data is consistent with the hypothesis that voters are somewhat more responsive to the variations in the higher levels of economic growth sustained in the post-1991 period. Table A4 in the Appendix presents the full set of results.

Thus far our analysis has assumed that the time of the election is determined exogenously, independent of economic circumstance. With election dates are fixed in advance, the governing party can choose policy over the governing period and thus be held responsible for the result arising at election time. In a parliamentary system, however, a governing party/coalition encountering favorable economic conditions can choose to call an election before the end of its mandate to benefit.<sup>15</sup> In different circumstances, a governing party can unexpectedly lose the confidence of the state assembly and thus have an election triggered at times that are independent of economic circumstance (for reasons of scandal or coalition breakdown). It follows that if mid-term elections are triggered primarily by the governing party's choosing to call an election when prevailing economic conditions are particularly favorable, then in those periods the negative correlation between income growth rates and vote volatility would be stronger. On the other hand, if mid-term elections are triggered primarily by events independent of economic circumstance, the negative correlation would be weaker. To assess which of these possibilities is more prevalent, we follow Khemani (2004) and divide all assembly elections into mid-term or scheduled elections. Out of the 163 assembly elections considered in our study, 34 of them were mid-term elections while the remaining 129 are scheduled elections.<sup>16</sup> The results of re-estimating the models of Table 1 over the restricted sample of 129 scheduled elections are presented in the Appendix as Table A5. The overall findings with respect to per capita income growth are weaker than in the baseline finding. This is in part attributable to the loss of sample size. To the extent that the falloff in significance is meaningful, however, the results suggest that in the terminology of the political business cycle literature, Indian states 'surf' by choosing the appropriate time to hold their election (Chowdhury, 1993).<sup>17</sup> Like the baseline results, the growth rate in the last governing year plays a more important role than the average growth rate over the prior governing period, with last year's growth rate coefficient having a negative sign in all models. However, the negative effect is significant only at the constituency level.

---

<sup>15</sup> It is thought that because the overall state of economy was favorable, the National Democratic Alliance (NDA) coalition movement led by Bharatiya Janata Party (BJP) called for an early election at the center in 2004. Some of the state governments aligned with the NDA coalition did the same thing at the state level. This is known as the 'India Shining' campaign of 2004.

<sup>16</sup> Of the 179 state elections held over our time period, the need for a prior election to calculate volatility led to the loss of 14 volatility measures. In addition, there were two elections when no government could be formed and states were governed for a time from the center.

<sup>17</sup> Despite the relatively small sample of 34 mid-term elections, running the three models run over only the mid-term elections did produce income growth coefficients that are both larger and often more significant than those found in Table 1. These results are available upon request.

As an additional robustness check, we re-estimated the models using alternative measures for both economic growth and volatility. First, we replaced real per capita state income growth rates with the growth rate of real per capita State GDP. The results are displayed in the Appendix as Table A6. As an alternative volatility measure, we used seat shares in the assembly rather than assembly vote shares in the calculation of volatility. See Table A7 in the Appendix for these results. These results indicate that the use of these alternative measures of growth and volatility does not disturb our baseline findings.

While we have analyzed vote volatility at the state level in isolation from events arising at the political center, in a federation outcomes at the national level (center) and the center-state political nexus can impact on election outcomes at the state level. To incorporate these potential effects, we use two indicators. First, if the election at the national level is held around the same time as the election at the state level, the national election outcome may impact directly the state outcome. For this, we used a dummy variable whose value is 1 if both national and state elections were held in the same year, 0 otherwise (Same election year). Second, studies by Khemani (2007) and Arulampalam et al. (2009) have shown that if the same political party/coalition governs in both the center and the state, those states tend to receive discretionary benefits from the center, particularly in form of intergovernmental transfers. For this, we used a dummy variable whose value is 1 if the same party/coalition rules both at the center and in the state, 0 otherwise (Nexus). Finally, we also interacted these variables. The results incorporating these additional variables are presented in the Appendix as Table A8. With the exception of Nexus in model 1 (at 10 per cent), none of these variables had any significant impact on net volatility nor does their introduction into the models affect any of our basic findings with respect to economic circumstance.

#### **4. Further Results:**

The previous section studies the effects of per capita income growth on vote shifting from the point of view of the traditional measure of volatility and its expected link to economic voting. There we found robust support for income growth rates playing a major role in determining electoral volatility across Indian states. In this section we extend that analysis by studying the relationship between volatility and economic voting in light of more recent concerns and developments. We do so in three different ways. Two of these extensions have already been studied in the context of other countries, while the third investigates whether in India there is evidence of a spillover onto a state's vote volatility from concurrent economic conditions arising in neighboring states.

##### *4.1 Grievance Asymmetry*

It is sometimes argued that because individuals are typically risk averse, they will attach a higher weight to negative outcomes than to similar sized positive ones (Lau, 1985). Applying this reasoning to voters and economic conditions, the *grievance asymmetry* literature predicts that voters will not respond symmetrically to good and bad economic conditions, rather they will react more strongly to conditions that are bad than to those that are good (Nannestad and Paldam,

1997; Singer, 2011; Dassonneville and Lewis-Beck, 2014). To analyze the *grievance asymmetry* hypothesis in the context of Indian states, we test for a different sized vote volatility response to positive versus negative changes in per capita state income growth rates. Dividing our two period measures of per capita income growth into two separate variables, one with positive and the other with negative growth rates, the models of Table 1 were re-estimated and the results presented in Table 2. As in Table 1, columns (1) and (4) refer to income growth rates arising over the entire governing tenure of the previous government while columns (2) and (5) focus on income growth rates rising in the final governing year. Columns (3) and (6) use both. Note that to make interpretation easier, positive and negative changes are defined so that a negative coefficient sign will signal the inverse response of volatility to each respective change.

The negative signs found for all combinations of income growth rate periods (entire tenure and last period) and positive versus negative growth rates suggests that in all cases increases in income growth are rewarded and decreases in growth penalized. However, of all the possible combinations only those negative changes arising in the final year of governing tenure are found to produce a significant effect on vote shifting as measured by volatility. Moreover, the significant effect is found at both the constituency and assembly levels. The result is then consistent with the presence of a *grievance asymmetry* in Indian states where voters' response to worsening economic conditions is stronger than to similar improving circumstances. This confirmation of the *grievance asymmetry* hypothesis within Indian states is reinforced by seeing that the *p-values* for the negative average tenure growth rates are always higher than that for the positive growth ones. Once again it should be noted that the effects are somewhat stronger at the constituency level than at the assembly level. Like the baseline results of Table 1, Table 2's results support the 'deteriorating memory of voters' hypothesis as last year's growth rate is found to have had a stronger impact on volatility than the average growth rate over the entire governing tenure, irrespective of whether positive or negative growth rates are considered. In terms of the other determinants of volatility, their results are very similar to those found for the baseline.



**Table 2**  
**The impact of positive versus negative income growth rates on vote volatility**  
**Indian States: 1957 – 2013**

	Volatility (Constituency)			Volatility (Assembly)		
	(1)	(2)	(3)	(4)	(5)	(6)
Positive per capita growth rate (prior Tenure)	-0.01 (0.98)		-0.001 (0.03)	-0.017 (1.01)		-0.009 (0.43)
Negative per capita growth rate (prior Tenure)	-0.037 (1.22)		-0.009 (0.23)	-0.071 (1.25)		-0.035 (0.53)
Positive per capita growth rate (Last year)		-0.011 (1.63)	-0.011 (1.44)		-0.01 (0.98)	-0.008 (0.6)
Negative per capita growth rate (Last year)		-0.015** (2.69)	-0.013** (2.15)		-0.023** (2.18)	-0.017 (1.58)
Δ in Effective Number of Parties (ENP)	0.318** (2.74)	0.307** (2.61)	0.308** (2.76)	0.589*** (2.81)	0.572** (2.8)	0.569** (2.83)
Assembly size	0.199 (0.78)	0.078 (0.29)	0.089 (0.34)	1.46** (3.15)	1.31** (2.72)	1.34** (2.92)
Δ in Voter turnout	-0.235 (1.44)	-0.179 (1.25)	-0.183 (1.29)	-0.186 (0.85)	-0.093 (0.47)	-0.149 (0.67)
Years since election	-0.114 (1.66)	-0.105 (1.49)	-0.106 (1.52)	-0.058 (0.56)	-0.034 (0.28)	-0.047 (0.43)
Number of parties in government	-0.067* (1.87)	-0.07* (1.98)	-0.071* (2.07)	-0.192** (2.87)	-0.195** (2.83)	-0.197** (2.9)
Congress government	-0.034 (0.78)	-0.049 (1.14)	-0.049 (1.04)	-0.129 (1.54)	-0.151* (1.83)	-0.146? (1.71)
Election after emergency	0.24*** (4.04)	0.266*** (4.17)	0.266*** (4.08)	0.513*** (6.26)	0.538*** (6.89)	0.536*** (6.49)
President's rule	0.001 (0.03)	0.014 (0.3)	0.011 (0.26)	0.05 (0.52)	0.076 (0.78)	0.059 (0.63)
Fiscal space	-0.198 (1.39)	-0.132 (0.91)	-0.136 (0.93)	-0.443* (1.95)	-0.358 (1.56)	-0.378 (1.64)
Election years	-0.004* (2.01)	-0.004* (1.9)	-0.004* (1.86)	-0.013*** (3.61)	-0.014*** (3.4)	-0.013*** (3.45)
Constant	6.6 (1.46)	6.96 (1.47)	6.71 (1.42)	18.02** (2.32)	20.31** (2.38)	18.49** (2.26)
R <sup>2</sup>	0.29	0.32	0.32	0.38	0.38	0.38
F-Stat	28.73***	48.53***	41.02***	105.13***	57.79***	77.16***
Elections (States)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)

Notes: See notes to table 2.

## 4.2 *Type A and Type B Volatilities*

Following Birch (2003), Golosov (2004), Sikk (2005), Tavits (2008), Powell and Tucker (2014), and Mainwaring et al. (2017), we divide assembly-level vote volatility into vote volatility arising from vote transfers among established parties (Type B Volatility) and vote volatility arising from votes shifting from parties exiting to parties that are entering the political system (Type A Volatility).<sup>18</sup> The literature that focuses on this separation predicts that the poor economic performance should destabilize the existing parties by making the entry of new parties easier. Hence economic circumstances should affect Type A volatility more than Type B. The results of estimating our three models on Type A and then Type B volatility are presented in Table 3.

The results in Table 3 show that per capita income growth rates across Indian states do impact Type A and Type B volatilities somewhat differently. However only in column (4) is a higher income growth rate associated with a significant reduction in volatility and this is with respect to Type B volatility rather than Type A. That is the data is consistent with a fall in average income growth rates over the prior governing period increasing volatility by generating more vote shifting among existing parties. The data is somewhat more favorable to the destabilizing hypothesis if only the rate of per capita income growth in the period immediately prior to the election is considered. However even here the data cannot distinguish the size of effect produced on Type A volatility from that arising in Type B. The results do indicate, however, that volatility arising from the entry and exit of parties did increase dramatically following the emergency declaration and fall with the existence of greater fiscal space in state budgets. Greater fiscal space has a similar effect on Type B volatility. In the case of voter turnout the results are quite different. An increase in voter turnout is associated with a significant decrease in Type A volatility while Type B volatility does not decrease and comes close, in the case of last period income growth, to becoming significantly larger. That is, the data suggests that voter turnout is associated with the consolidation of votes among the established parties with the desire for change satisfied through internal vote shifting. Finally, while the data suggests that both volatility types have fallen through time, the overall fall as indicated in Tables 1 and 2 is not due primarily to the decrease in volatility arising from the entry of new parties. Rather it is through a reduction in vote switching between established parties, Type B volatility, that overall volatility has significantly decreased.

---

<sup>18</sup> We have followed Powell and Tucker (2014) to calculate Type A and Type B volatilities. Calculating Type A and Type B volatilities at the constituency level is complicated because of the difficulty in differentiating between new and established parties (when some choose to contest specific constituencies and not others). Incompatibilities arise when aggregating upwards because the same party can be established in one constituency and new in another. This problem does not arise at the assembly level.

**Table 3**  
**Decomposing Volatility: The impact of income growth rates on Type A and Type B volatilities**  
**Indian States: 1957 - 2013**

	Volatility (Type A)			Volatility (Type B)		
	(1)	(2)	(3)	(4)	(5)	(6)
Per capita income growth rate (prior Tenure)	0.001 (0.01)		0.035 (0.96)	-0.032** (2.25)		-0.029 (1.55)
Per capita income growth rate (Last year)		-0.02 (1.28)	-0.03? <sup>2</sup> (1.70)		-0.011 (1.52)	-0.003 (0.32)
Δ in Effective Number of Parties (ENP)	0.529 (1.22)	0.517 (1.24)	0.518 (1.19)	0.827** (2.52)	0.849** (2.5)	0.826** (2.49)
Assembly size	0.145 (1.18)	1.3 (1.07)	1.31 (1.13)	0.625 (1.12)	0.613 (0.97)	0.604 (1.05)
Δ in Voter turnout	-2.08** (2.18)	-2.07* (2.09)	-1.8* (2.00)	0.186 (0.8)	0.361 (1.57)	0.202 (0.85)
Years passed since election	-0.086 (0.33)	-0.112 (0.49)	-0.044 (0.18)	-0.183 (1.21)	-0.145 (0.93)	-0.18 (1.17)
Number of parties in government	-0.169 (0.94)	-0.205 (1.11)	-0.205 (1.14)	-0.09 (1.31)	-0.098 (1.42)	-0.092 (1.33)
Congress government	-0.114 (0.5)	-0.125 (0.55)	-0.146 (0.63)	-0.137 (1.53)	-0.162? <sup>2</sup> (1.7)	-0.142 (1.63)
Election after emergency	1.09*** (5.13)	1.17*** (4.96)	1.18*** (5.21)	-0.256 (1.47)	-0.239 (1.3)	-0.249 (1.36)
President's rule	-0.183 (0.97)	-0.229 (1.19)	-0.187 (1.06)	0.08 (0.82)	0.11 (1.16)	0.082 (0.82)
Fiscal space	-0.721** (2.34)	-0.541 (1.34)	-0.491 (1.2)	-0.303? <sup>2</sup> (1.7)	-0.258 (1.57)	-0.287* (1.76)
Election years	-0.01 (1.24)	-0.008 (1.07)	-0.01 (1.28)	-0.008* (2.04)	-0.01** (2.34)	-0.008* (2.00)
Constant	12.38 (0.95)	8.68 (0.69)	12.14 (0.94)	11.22 (1.25)	15.06 (1.59)	11.25 (1.25)
R <sup>2</sup>	0.34	0.35	0.36	0.2	0.18	0.2
F-Stat	25.22***	24.03***	27.14***	98.88***	19.12***	1430.7***
Elections (States)	111 (14)	111 (14)	111 (14)	163 (14)	163 (14)	163 (14)

Notes: See notes to table 2.

### 4.3 *Neighborhood Effects*

To evaluate the performance of a government in a democracy, voters can compare not only the economic performance of their own government over time, they can also compare its performance to other governments at the same point in time. Here we consider to what extent own government performance relative to neighboring states influences vote volatility. Stated somewhat differently, to what extent would a state's relatively poor growth performance (however good) encourage its voters to switch their vote from the incumbent to alternative established parties or new arrivals. To do so we calculate the difference in the average per capita growth rate between each state's SGDP and the average of its adjacent neighbors over the time period of the prior government's tenure. The difference is called a *neighborhood effect*. Here SGDP growth rates are used instead of income growth rates because most interstate growth comparisons are made in GDP terms rather than income levels. The economic voting literature then predicts that while improvements in own economic performance will produce the primary effect in reducing electoral volatility, volatility will also decrease (as contentment with the incumbent and established parties rise) with a positive increase in the difference between the own and one's neighbor's growth rate. The results involving *neighborhood effects* results are presented in Table 4.

As the results in Table 4 indicate, none of the neighborhood effects in any of the six models is significant or even approaches significance. It follows that there is little evidence that over our time period growth rate differences from those in neighboring states made any difference to how voters evaluated the performance of the party running their own state government and produced any effect on their voting. The introduction of neighborhood effects to our six models did not improve the explanatory power of the model nor did it produce any major change in the basic results of Table 1, including the results for own per capita income growth rates.

**Table 4**  
**The impacts of income growth on volatility with neighborhood effects**  
**Indian states: 1957 – 2013**

	Volatility (Constituency)			Volatility (Assembly)		
	(1)	(2)	(3)	(4)	(5)	(6)
Per capita growth rate (Tenure)	-0.011 (1.38)		0.002 (0.28)	-0.031** (2.53)		-0.018 (1.46)
Per capita growth rate (Last year)		-0.012** (2.52)	-0.012** (2.32)		-0.016* (1.93)	-0.013 (1.44)
SGDP growth rate differences neighborhood effects (Tenure)	-0.008 (1.06)	-0.006 (0.72)	-0.007 (0.92)	0.006 (0.49)	-0.002 (0.16)	0.007 (0.56)
Δ in Effective Number of Parties (ENP)	0.314** (2.8)	0.308** (2.67)	0.309** (2.66)	0.586** (2.86)	0.588** (2.9)	0.58** (2.78)
Assembly size	0.158 (0.63)	0.072 (0.28)	0.071 (0.27)	1.39** (2.89)	1.3** (2.75)	1.3** (2.68)
Δ in Voter turnout	-0.232 (1.39)	-0.18 (1.29)	-0.169 (1.19)	-0.234 (1.23)	-0.08 (0.39)	-0.168 (0.87)
Years passed since election	-0.128* (1.86)	-0.116 (1.65)	-0.115 (1.64)	-0.068 (0.62)	-0.048 (0.41)	-0.055 (0.48)
Number of parties in government	-0.061 (1.63)	-0.068* (1.87)	-0.069* (1.87)	-0.178** (2.61)	-0.188** (2.72)	-0.186** (2.63)
Congress government	-0.029 (0.73)	-0.046 (1.01)	-0.048 (1.02)	-0.11 (1.38)	-0.141 <sup>?</sup> (1.73)	-0.129 (1.57)
Election after emergency	0.243*** (3.93)	0.269*** (4.17)	0.27*** (4.05)	0.504*** (6.3)	0.542*** (6.93)	0.532*** (6.6)
President's rule	0.006 (0.13)	0.011 (0.25)	0.013 (0.29)	0.06 (0.61)	0.078 (0.81)	0.067 (0.69)
Fiscal space	-0.203 (1.46)	-0.142 (1.01)	-0.141 (1.00)	-0.44* (1.92)	-0.37 (1.68)	-0.376 (1.69)
Election years	-.004* (2.00)	-.004* (1.85)	-0.004* (1.86)	-.012*** (3.05)	-.013*** (3.2)	-0.012*** (2.99)
Constant	7.74 (1.6)	7.25 (1.49)	7.66 (1.53)	16.53* (2.01)	19.68** (2.24)	16.46* (1.95)
R <sup>2</sup>	0.29	0.32	0.32	0.37	0.38	0.38
F-Stat	140.62***	739.36***	362.94***	90.02***	63.56***	48.97***
Elections (States)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)

Notes: See notes to table 2.

## 5. Concluding Remarks:

This paper tests the economic voting hypothesis on Indian states in the context of how economic conditions impact electoral outcomes as represented by vote shifting and measured through changes in vote volatility. Information from 179 assembly elections held over the 1957–2013 time period within 14 major Indian states was used to calculate vote volatility both at the tradition level of the state assembly but also at the individual constituency level before aggregating to construct a state average. This political data was then combined with economic and budget information from a variety of sources to form a cross-state panel based on state assembly elections. Using per capita income growth as our measure of the economic condition most relevant to state voters, we investigate the effects of income growth on both vote volatilities. The results suggest first that increasing income growth rate will play a significant role in reducing net vote switching between assembly elections and second that volatility constructed upwards from the constituency level is more sensitive to income growth rates than is the volatility measure constructed at the assembly level. By finding that vote volatility responds more strongly to the growth rate arising in the final period of the incumbent government than to the average growth arising over the full life of the incumbent government we also find support for the presence of a ‘deteriorating memory of voters’ (Ferris and Dash, 2016) in the context of vote switching.

As with Nooruddin and Chhibber (2008), we find that increases in fiscal space reduce volatility, but with results that are not as significant as those found earlier. We also find other significant determinants of volatility including: the expected number of political parties, ENP, the size of the state assembly, and the number of coalition parties. At a purely political level, the period immediately following the declaration of the emergency stands out for its contribution to increasing volatility. Finally, the level of vote volatility has slowly declined over the years suggesting that within each state the political party system is stabilizing as the country matures. All these results pass a variety of robustness checks.

From our benchmark case we turn to consider a number of recent extensions to the traditional economic voting literature. By studying the impact of good and bad economic conditions on vote shifting, we find in common with the literature that Indian state voters punish the negative growth outcomes more severely than they reward for similar sized positive outcomes. Here too it is the negative growth rate in the final year of governing tenure matters more than the average growth rate over the entire tenure. When we decompose total vote volatility to assess different voting responses to income growth we find results on Type A and Type B volatilities that suggest that the average income growth rate over the entire governing tenure influences only vote switching among established parties (Type B volatility). Growth in the last year of the tenure is indicated as influencing volatility coming both from voters switching amongst established parties and from the entry of new parties and exit of old parties. However, neither of these indicated effects are significant at standard levels of significance. Thirdly, after investigating the relative effects of neighbor states’ growth performance on own state’s volatility the data give no support to the hypothesis that growing faster than one’s neighbor reduces own state vote shifting.

It is often argued that for voters in developing countries, less electoral attention will be paid to economic conditions than to other underlying issues matter more, such as political factors like the type of party system or political ideology and/or ethnic considerations such as those involving caste or social class, religion, language, and culture. This approach forms the basis for writers such as Bratton and Van de Walle (1997), Lindberg and Morrison (2008), and Ferree (2010) in Africa, and both Chandra (2004) and Wilkinson (2004) in India. While not minimizing the importance of any these considerations, our findings imply that economic conditions in India do matter and play an important role in determining voting behavior. More generally, our work suggests that theories of economic voting have an important role to play in understanding electoral outcomes and hence politics in developing countries.

## References

- Acharya, A., J.E. Roemer, and R. Somanathan (2015). Caste, corruption and political competition in India. *Research in Economics*, 69(3): 336-352.
- Aisen, A., and F.J. Veiga (2013). How does political instability affect economic growth?. *European Journal of Political Economy*, 29(1): 151-167.
- Alesina, A., and R. Perotti (1996). Income distribution, political instability, and investment. *European Economic Review*, 40(6): 1203–1228.
- Arcelus, F., and A.H. Meltzer (1975). The effect of aggregate economic variables on Congressional elections. *American Political Science Review*, 69(4): 1232-1239.
- Arulampalam, W., S. Dasgupta, A. Dhillon, and B. Dutta (2009). Electoral goals and center-state transfers: A theoretical model and empirical evidence from India. *Journal of Development Economics*, 88(1): 103-119.
- Banerjee, A., D. Green, J. McManus, and R. Pande. (2014). Are poor voters indifferent to whether elected leaders are criminal or corrupt? A vignette experiment in Rural India. *Political Communications*, 31(3): 391-407.
- Basu, D.D. (2004). *Introduction to the constitution of India*. New Delhi: Wadhwa and Company.
- Bengtsson, A. (2004). Economic voting: The effect of political context, volatility and turnout on voters' assignment of responsibility. *European Journal of Political Research*, 43(5): 749-767.
- Birch, S. (2003). *Electoral systems and political transformation in Post-communist Europe*. Basingstoke: Palgrave Macmillan.
- Blakeslee, D.S. (Forthcoming). Politics and public goods in developing countries: Evidence from the assassination of Rajiv Gandhi. *Journal of Public Economics*.
- Bloom, H.S., and H.D. Price (1975). Voter response to short run economic conditions: The asymmetric effect of prosperity and recession. *American Political Science Review*, 69(4): 1240-1254.
- Bratton, M., and N. Van de Walle (1997). *Democratic experiments in Africa: Regime transitions in comparative perspective*. United Kingdom: Cambridge University Press.
- Brender, A., and A. Drazen (2008). How do budget deficits and economic growth affect re-election prospects? Evidence from a large panel of countries. *American Economic Review*, 98: 2203-2220.
- Campbell, A. (1966). Surge and decline: A study of electoral change. *Public Opinion Quarterly*, 24(3): 397-418.
- Chakraborty, P., and B.B. Dash (2017). Fiscal Reforms, Fiscal Rule and Development Spending: How Indian States have performed?. *Public Budgeting & Finance*, 37(4): 111-133.
- Chandra, K. (2004). *Why ethnic parties succeed: Patronage and ethnic headcounts in India*. Cambridge, England: Cambridge University Press.
- Chowdhury, A.R. (1993). Political Surfing over Economic Waves: Parliamentary Election Timing in India. *American Journal of Political Science* 37: 1100–18.
- Dash, B.B., J.S. Ferris, and S.L. Winer (2018). Measuring electoral competitiveness: With application to the Indian States. Unpublished Manuscript.
- Dassonneville, R., and D. Stiers (2018). Electoral volatility in Belgium (2009-2014). Is there a difference between stable and volatile voters?. *Acta Politica*, 53(1): 68-97.



- Dassonneville, R., and M. Hooghe (2017). Economic indicators and electoral volatility: economic effects on electoral volatility in Western Europe, 1950–2013. *Comparative European Politics*, 15(6): 919-943.
- Dassonneville, R., and M.S. Lewis-Beck (2014). Macroeconomics, economic crisis and electoral outcomes: A national European pool. *Acta politica*, 49(4): 372-394.
- Dunning, T., and J. Nilekani (2013). Ethnic quotas and political mobilization: Caste, parties, and distribution in Indian village councils. *American Political Science Review*, 107(1): 35-56.
- Evans, G., and R. Andersen. (2006). The political conditioning of economic perceptions. *Journal of Politics*, 68(1): 194-207.
- Ferree, K.E. (2010). *Framing the race in South Africa: The Political origins of racial census elections*. New York: Cambridge University Press.
- Ferris, J.S., and B.B. Dash (2016). Expenditure visibility and voter memory: A compositional approach to the political budget cycle in Indian States, 1959–2012. Carleton Economic Papers No. 16-14.
- Golosov, G.V. (2004). *Political parties in the regions of Russia: Democracy unclaimed*. Boulder: Lynne Rienner.
- Gupta, P., and A. Panagariya (2014). Growth and election outcomes in a developing country. *Economics and Politics*, 26(2): 332-354.
- Hansford, T.G., and B.T. Gomez (2010). Estimating the electoral effects of voter turnout. *American Political Science Review*, 104(2): 268-288.
- Harriss, J. (1999). Comparing political regimes across Indian States: A preliminary essay. *Economic and Political Weekly*, 34(48): 3367-3377.
- Heath, O. (2005). Party systems, political cleavages and electoral volatility in India: A state-wise analysis, 1998-1999. *Electoral Studies*, 24(2): 177-199.
- Jaffrelot, C. (2012). Caste and political parties in India: Do Indians vote their caste – while casting their vote?. In A. Kohli and P. Singh (Eds.), *Routledge handbook of Indian politics*. Routledge, New York.
- Katz, R.S., H. Rattinger, and M.N. Pedersen (1997). The dynamics of European party systems. *European Journal of Political Research*, 31(1): 83-97.
- Khemani, S. (2004). Political cycles in a developing economy: Effect of elections in the Indian States. *Journal of Development Economics*, 73(1): 125-154.
- Khemani, S. (2007). Does delegation of fiscal policy to an independent agency make a difference? Evidence from intergovernmental transfers in India. *Journal of Development Economics*, 82(2): 464-484.
- Kuenzi, M., J.P. Tuman, M.P. Rissmann, G.M. Lambright (Forthcoming). The economic determinants of electoral volatility in Africa. *Party Politics*.
- Laakso, M., and R. Taagepera (1979). The "effective" number of parties: A measure with application to West Europe. *Comparative Political Studies*, 12(1): 3-27.
- Lalvani, M. (2005). Coalition governments: fiscal implications for the Indian economy. *American Review of Political Economy*, 3(1): 127-163.
- Lau, R.R. (1985). Two explanations for negativity effects in political behavior. *American Journal of Political Science*, 29(1): 119-138.
- Lewis-Beck, M.S., and M. Stegmaier (2000). Economic determinants of electoral outcomes. *Annual Review of Political Science*, 3: 183-219.

- Lindberg, S.I., and M.K.C. Morrison (2008). Are African voters really ethnic or clientelistic? Survey evidence from Ghana. *Political Science Quarterly*, 123(1): 95-122.
- Maddala, G.S., and S. Wu. (1999). A comparative study of unit root tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 61: 631-652.
- Mainwaring, S., C. Gervasoni, and A. España-Najera (2017). Extra- and within-system electoral volatility. *Party Politics*, 23(6): 623-635.
- Mukherji, R. (2010). A Tiger despite the Chains: The state of reform in India. *Current History*, 109(726): 144-150.
- Nadeau, R., M.S. Lewis-Beck, and E. Belanger (2012). Economics and elections revisited. *Comparative Political Studies*, 46(5): 551-573.
- Nannestad, P., and M. Paldam (1997). The grievance asymmetry revisited: A micro study of economic voting in Denmark, 1986-1992. *European Journal of Political Economy*, 13(1): 81-99.
- Nooruddin, I., and P. Chhibber (2008). Unstable politics: Fiscal space and electoral volatility in the Indian States. *Comparative Political Studies*, 41(8): 1069-1091.
- Pacek, A., and B. Radcliff (1995). The political economy of competitive elections in the developing world. *American Journal of Political Science*, 30(3): 745-759.
- Pedersen, M.N. (1979). The dynamics of European party systems: Changing patterns of electoral volatility. *European Journal of Political Research*, 7(1): 1-26.
- Powell, E.N., and J.S. Tucker (2014). Revisiting electoral volatility in Post-communist countries: new data, new results, and new approaches. *British Journal of Political Science*, 44(1): 123-147.
- Przeworski, A., and J. Sprague (1971). Concepts in search of an explicit formulation: A study in measurement. *Midwest Journal of Political Science*, 15(2): 183-218.
- Roberts, K.M., and E. Wibbels (1999). Party systems and electoral volatility in Latin America: A Test of economic, institutional, and structural explanations. *American Political Science Review*, 93(3): 575-590.
- Sikk, A. (2005). How unstable? Volatility and the genuinely new parties in Eastern Europe. *European Journal of Political Research*, 44(3): 391-412.
- Singer, M. (2011). Who says "it's the economy"? Cross-national and cross-individual variation in the salience of economic performance. *Comparative Political Studies*, 44(3): 284-312.
- Tavits, M. (2008). Party systems in the making: the emergence and success of new parties in new democracies. *British Journal of Political Science*, 38(1): 113-133.
- Vaishnav, M., and R. Swanson (2015). Does good economics make for good politics? Evidence from Indian States. *India Review*, 14(3): 279-311.
- Van Der Meer, T., R. Lubbe, E. Van Elsas, and W. Van Der Brug (2012). Bounded volatility in the Dutch electoral battlefield: A panel study on the structure of changing vote intentions in the Netherlands during 2006-2010. *Acta Politica*, 47(4): 333-355.
- Wilkinson, S.I. (2004). *Votes and violence: Electoral competition and ethnic riots In India*. United Kingdom: Cambridge University Press.
- Yadav, Y., and S. Palshikar (2003). From hegemony to convergence: Party system and electoral politics in the Indian States, 1952–2002. *Journal of Indian School of Political Economy*, 15(1-2): 5-44.

## Appendix

**Table A1**  
**Summary statistics and data sources**

Variables	Obs.	Mean	SD	Min.	Max.	Sources
Per capita growth rate (Tenure)	163	2.86	3.26	-6.42	16.43	Central Statistical Organization (CSO), India, and calculation of authors
Per capita growth rate (Last year)	163	2.06	6.64	-18.18	17.53	Central Statistical Organization (CSO), India, and calculation of authors
SGDP growth rate (Tenure)	163	4.9	3.2	-3.9	19.66	Central Statistical Organization (CSO), India, and calculation of authors
SGDP growth rate (Last year)	163	4.02	6.67	-16.31	20.07	Central Statistical Organization (CSO), India, and calculation of authors
Volatility (Constituency)	163	0.39	0.13	0.12	0.72	Election Commission of India and calculation of authors
Volatility (Assembly)	163	0.24	0.15	0.03	0.56	Election Commission of India and calculation of authors
Volatility Seats (Assembly)	163	0.38	0.23	0.02	0.95	Election Commission of India and calculation of authors
Effective Number of Parties (ENP)	163	2.79	0.51	2.06	4.16	Election Commission of India and calculation of authors
Assembly size	163	229.98	92.36	81	430	Election Commission of India
Voter turnout	163	0.61	0.08	0.41	0.84	Election Commission of India
Years passed since election	163	4.43	1.12	1	7	Election Commission of India and calculation of authors
Number of parties in government	163	2.04	1.81	1	8	Lalvani (2005) and calculation of authors
Congress government	163	0.46	0.5	0	1	Election Commission of India and calculation of authors
Election after emergency	163	0.08	0.28	0	1	Election Commission of India
President's rule	163	0.26	0.44	0	1	Basu (2004) and calculation of authors
Fiscal space	163	38.12	11.3	20.42	79.89	Reserve Bank of India (RBI) Bulletin and calculation of authors
Same election year	163	0.44	0.5	0	1	Election Commission of India and calculation of authors
Nexus	163	0.54	0.5	0	1	Election Commission of India and calculation of authors
Volatility (New and Old parties)	163	0.08	0.11	0.00	0.48	Election Commission of India and calculation of authors
Volatility (Established parties)	163	0.16	0.09	0.02	0.5	Election Commission of India and calculation of authors
Positive per capita growth rate (Tenure)	163	3.2	2.75	0	16.43	Central Statistical Organization (CSO), India, and calculation of authors
Negative per capita growth rate (Tenure)	163	-0.33	0.96	-6.42	0	Central Statistical Organization (CSO), India, and calculation of authors
Positive per capita growth rate (Last year)	163	3.7	4.13	0	17.53	Central Statistical Organization (CSO), India, and calculation of authors
Negative per capita growth rate (Last year)	163	-1.61	3.82	-18.18	0	Central Statistical Organization (CSO), India, and calculation of authors
SGDP growth rate difference with neighbor states (Tenure)	163	-0.13	2.81	-7.14	7.69	Central Statistical Organization (CSO), India, and calculation of authors

**Table A2**  
**States and elections included in the analysis**

State	Time frame	Number of Elections
Andhra Pradesh	1957–2009	12
Bihar	1957–2010	13
Gujarat	1962–2012	12
Haryana	1966–2009	12
Karnataka	1957–2013	13
Kerala	1957–2011	14
Madhya Pradesh	1957–2008	12
Maharashtra	1962–2008	11
Orissa	1957–2009	13
Punjab	1957–2012	13
Rajasthan	1957–2008	12
Tamil Nadu	1957–2011	13
Uttar Pradesh	1957–2012	15
West Bengal	1957–2011	14

**Table A3**  
**Panel Unit root test**

Variables	Fisher's Unit root test	
	Level	1 <sup>st</sup> Difference
Per capita growth rate (entire prior Tenure)	117.1***	347.86***
Per capita growth rate (Last year)	169.32***	424.97***
SGDP growth rate (entire prior Tenure)	146.77***	356.72***
SGDP growth rate (Last year)	189.16***	438.31***
Volatility (Constituency)	56.57***	267.31***
Volatility (Assembly)	50.72***	243.66***
Volatility Seats (Assembly)	76.67***	198.39***
Effective Number of Parties (ENP)	114.39***	323.89***
Assembly size	138.24***	261.32***
Voter turnout	75.87***	308.19***
Years since last election	102.98***	263.69***
Number of parties in government	63.24***	200.34***
Fiscal space	52.6***	133.18***
Volatility (New and Old parties)	55.92***	102.97***
Volatility (Established parties)	120.42***	286.89***
Positive per capita growth rate (entire prior Tenure)	116.13***	321.37***
Negative per capita growth rate (entire prior Tenure)	236.54***	313.15***
Positive per capita growth rate (Last year)	176.78***	475.22***
Negative per capita growth rate (Last year)	249.09***	423.24***
SGDP growth rate difference with neighbor states (Tenure)	213.34***	365.45***

Note: (\*), (\*\*), and (\*\*\*) indicate significance at 10%, 5%, and 1%. The null hypothesis for both tests assumes that all series are non-stationary. The Stata commands for the test is *xtfisher*.

**Table A4**  
**The impact of income growth on volatility in Indian states, 1957–2013**  
**(Interacted with Post-1991 growth rates)**

	Volatility (Constituency)			Volatility (Assembly)		
	(1)	(2)	(3)	(4)	(5)	(6)
Per capita growth rate (prior Tenure)	-0.013 (1.33)		0.007 (0.67)	-0.018 (1.04)		0.004 (0.26)
Per capita growth rate (Last year)		-0.016** (2.77)	-0.018*** (3.09)		-0.018* (1.97)	-0.020** (2.34)
Per capita growth rate since 1991 (prior Tenure)	-0.01 (0.57)		-0.029 (1.33)	-0.035 (1.35)		-0.063* (1.76)
Per capita growth rate since 1991 (Last year)		0.009 (0.93)	0.019 (1.56)		0.006 (0.39)	0.028 (1.23)
Δ in Effective Number of Parties (ENP)	0.314** (2.83)	0.328** (2.69)	0.341** (2.71)	0.579** (2.71)	0.602** (2.82)	0.621** (2.68)
Assembly size	0.169 (0.67)	0.074 (0.28)	0.089 (0.33)	1.41** (2.88)	1.3** (2.74)	1.33** (2.7)
Δ in Voter turnout	-0.264 (1.56)	-0.156 (1.05)	-0.181 (1.11)	-0.265 (1.38)	-0.064 (0.3)	-0.176 (0.93)
Years since election	-0.114* (1.8)	-0.117* (1.82)	-0.109 (1.69)	-0.048 (0.43)	-0.051 (0.46)	-0.045 (0.38)
Number of parties in government	-0.061 (1.6)	-0.075* (2.08)	-0.083** (2.28)	-0.179** (2.62)	-0.193** (2.67)	-0.208** (2.81)
Congress government	-0.027 (0.65)	-0.046 (0.98)	-0.045 (0.93)	-0.114 (1.47)	-0.14 (1.69)	-0.132 (1.59)
Election after emergency	0.232*** (4.05)	0.282*** (3.91)	0.281*** (3.76)	0.488*** (6.35)	0.552*** (6.52)	0.545*** (6.18)
President's rule	0.012 (0.26)	0.002 (0.06)	0.004 (0.01)	0.079 (0.85)	0.071 (0.81)	0.065 (0.77)
Fiscal space	-0.186 (0.26)	-0.134 (0.93)	-0.099 (0.73)	-0.399* (1.8)	-0.366 (1.59)	-0.3 (1.34)
Election years	-0.003 (1.38)	-0.005* (1.96)	-0.003 (1.24)	-0.009** (2.53)	-0.014*** (3.2)	-0.009** (2.63)
Constant	4.33 (1.02)	8.81 (1.68)	4.88 (0.99)	10.3 (1.3)	20.9** (2.26)	10.83 (1.34)
R <sup>2</sup>	0.29	0.32	0.33	0.38	0.38	0.40
F-Stat	41.52***	88.53***	75.6***	137.18***	48.35***	65.32***
Elections (States)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)

Notes: See notes to table 2.

**Table A5**  
**Impacts of income growth on volatility in Indian states, 1957–2013 (With Scheduled Elections Sample)**

	Volatility (Constituency)			Volatility (Assembly)		
	(1)	(2)	(3)	(4)	(5)	(6)
Per capita growth rate (prior Tenure)	0.002 (0.18)		0.01 (0.97)	-0.013 (0.74)		-0.009 (0.45)
Per capita growth rate (Last year)		-0.007 <sup>?</sup> (1.7)	-0.009* (1.76)		-0.006 (0.77)	-0.004 (0.49)
Δ in Effective Number of Parties (ENP)	0.351** (2.47)	0.346** (2.3)	0.354** (2.41)	0.628** (2.91)	0.636** (2.87)	0.629** (2.87)
Assembly size	0.109 (0.38)	0.015 (0.05)	0.031 (0.11)	1.09* (1.96)	1.07* (1.95)	1.05* (1.93)
Δ in Voter turnout	-0.135 (0.66)	-0.14 (0.74)	-0.088 (0.48)	-0.11 (0.3)	-0.044 (0.12)	-0.088 (0.24)
Years since election	0.333 (1.08)	0.257 (0.92)	0.273 (0.93)	1.01 (1.41)	0.994 (1.46)	0.98 (1.41)
Number of parties in government	-0.055 (1.03)	-0.062 (1.18)	-0.061 (1.19)	-0.165 <sup>?</sup> (1.73)	-0.168 <sup>?</sup> (1.74)	-0.168 <sup>?</sup> (1.71)
Congress government	-0.073 (1.17)	-0.072 (1.12)	-0.077 (1.2)	-0.172 (1.62)	-0.178 (1.65)	-0.174 (1.63)
Election after emergency	0.209** (2.42)	0.234** (2.82)	0.238** (2.86)	0.462*** (3.12)	0.478*** (3.56)	0.475*** (3.55)
President's rule	-0.043 (0.86)	-0.041 (0.88)	-0.031 (0.67)	-0.059 (0.7)	-0.045 (0.51)	-0.053 (0.61)
Fiscal space	-0.105 (0.73)	-0.093 (0.64)	-0.071 (0.49)	-0.33 (1.36)	-0.296 (1.17)	-0.314 (1.28)
Election years	-0.007*** (3.07)	-0.005** (2.52)	-0.006** (2.91)	-0.016*** (3.66)	-0.017*** (3.57)	-0.016*** (3.55)
Constant	11.41** (2.4)	9.52* (1.86)	11.17** (11.16)	23.88** (2.53)	25.16** (2.5)	23.77** (2.46)
R <sup>2</sup>	0.25	0.27	0.27	0.39	0.39	0.39
F-Stat	29.27***	23.98***	52.16***	34.07***	36.16***	31.45***
Elections (States)	129 (14)	129 (14)	129 (14)	129 (14)	129 (14)	129 (14)

Notes: See notes to table 2.

**Table A6**  
**Impacts of SGDP growth on volatility in Indian states, 1957–2013**

	Volatility (Constituency)			Volatility (Assembly)		
	(1)	(2)	(3)	(4)	(5)	(6)
Per capita growth rate (prior Tenure)	-0.015* (2.13)		-0.001 (0.09)	-0.027* (1.94)		-0.012 (0.75)
Per capita growth rate (Last year)		-0.012** (2.86)	-0.013** (2.42)		-0.015* (2.05)	-0.013 (1.47)
Δ in Effective Number of Parties (ENP)	0.317** (2.83)	0.313** (2.68)	0.311** (2.67)	0.588** (2.92)	0.592** (2.88)	0.581** (2.85)
Assembly size	0.143 (0.57)	0.065 (0.24)	0.075 (0.28)	1.35** (2.9)	1.29** (2.72)	1.28** (2.73)
Δ in Voter turnout	-0.242 (1.5)	-0.167 (1.21)	-0.179 (1.34)	-0.199 (1.02)	-0.067 (0.33)	-0.134 (0.68)
Years since election	-0.122* (1.95)	-0.108 (1.59)	-0.108 (1.66)	-0.074 (0.7)	-0.045 (0.39)	-0.059 (0.54)
Number of parties in government	-0.062 (1.63)	-0.07* (1.88)	-0.069* (1.85)	-0.18** (2.67)	-0.19** (2.75)	-0.188** (2.68)
Congress government	-0.029 (0.69)	-0.049 (1.05)	-0.046 (0.97)	-0.117 (1.49)	-0.144 <sup>?</sup> (1.75)	-0.135 (1.67)
Election after emergency	0.239*** (4.24)	0.265*** (4.21)	0.266*** (4.18)	0.511*** (6.71)	0.54*** (7.07)	0.538*** (7.02)
President's rule	0.008 (0.18)	0.017 (0.37)	0.014 (0.33)	0.063 (0.65)	0.083 (0.83)	0.07 (0.72)
Fiscal space	-0.205 (1.44)	-0.142 (0.99)	-0.136 (0.94)	-0.455* (1.99)	-0.377 (1.66)	-0.384 <sup>?</sup> (1.73)
Election years	-0.004* (2.05)	-0.004* (1.94)	-0.004* (1.86)	-0.013*** (3.58)	-0.014*** (3.53)	-0.013*** (3.47)
Constant	6.97 (1.58)	7.29 (1.55)	6.66 (1.43)	18.68** (2.48)	20.19** (2.5)	18.36** (2.34)
R <sup>2</sup>	0.28	0.31	0.32	0.37	0.38	0.38
F-Stat	30.26***	39.65***	40.18***	91.15***	50.26***	56.26***
Elections (States)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)

Notes: See notes to table 2.

**Table A7**  
**Impacts of income growth on volatility in Indian states, 1957–2013 (With Seat Volatility)**

	Volatility Seats (Assembly)		
	(1)	(2)	(3)
Per capita growth rate (prior Tenure)	-0.044* (1.99)		-0.029 (1.14)
Per capita growth rate (Last year)		-0.021*** (3.1)	-0.013? (1.73)
Δ in Effective Number of Parties (ENP)	1.04*** (3.11)	1.06*** (3.17)	1.03*** (3.1)
Assembly size	0.239 (0.42)	0.157 (0.31)	0.148 (0.28)
Δ in Voter turnout	-0.456 (1.26)	-0.226 (0.68)	-0.387 (1.2)
Years since election	-0.307 (1.53)	-0.259 (1.13)	-0.295 (1.42)
Number of parties in government	-0.26? (1.74)	-0.274* (1.85)	-0.268* (1.83)
Congress government	-0.19 (1.52)	-0.23* (1.88)	-0.21* (1.78)
Election after emergency	0.512** (2.7)	0.552*** (3.09)	0.541** (2.86)
President's rule	0.034 (0.28)	0.07 (0.58)	0.041 (0.36)
Fiscal space	-0.291 (0.91)	-0.197 (0.6)	-0.227 (0.69)
Election years	-0.003 (0.64)	0.001 (0.21)	0.003 (0.65)
Constant	-6.96 (0.63)	-2.97 (0.25)	-6.83 (0.61)
R <sup>2</sup>	0.21	0.21	0.22
F-Stat	31.34***	17.25***	23.87***
Elections (States)	163 (14)	163 (14)	163 (14)

Notes: See notes to table 2.



**Table A8**  
**The impact of income growth on volatility in Indian states, 1957–2013**  
**(With Additional Variables)**

	Volatility (Constituency)			Volatility (Assembly)		
	(1)	(2)	(3)	(4)	(5)	(6)
Per capita growth rate (prior Tenure)	-0.018** (2.35)		-0.004 (0.49)	-0.031** (2.21)		-0.018 (1.11)
Per capita growth rate (Last year)		-0.013** (2.81)	-0.011* (2.1)		-0.016* (2.11)	-0.011 (1.21)
Δ in Effective Number of Parties (ENP)	0.343** (2.74)	0.335** (2.58)	0.333** (2.57)	0.645** (2.99)	0.643** (2.98)	0.636** (2.91)
Assembly size	0.041 (0.11)	-0.024 (0.07)	-0.028 (0.07)	1.24** (2.26)	1.19** (2.18)	1.17** (2.15)
Δ in Voter turnout	-0.227 (1.44)	-0.136 (0.98)	-0.16 (1.14)	-0.219 (0.86)	-0.05 (0.18)	-0.155 (0.59)
Years since election	-0.114 <sup>?</sup> (1.72)	-0.102 (1.39)	-0.106 (1.54)	-0.066 (0.56)	-0.039 (0.29)	-0.058 (0.47)
Number of parties in government	-0.044 (1.04)	-0.054 (1.22)	-0.053 (1.21)	-0.151* (2.12)	-0.164** (2.16)	-0.159* (2.11)
Congress government	-0.083 (1.6)	-0.1 <sup>?</sup> (1.73)	-0.098 (1.66)	-0.207* (1.98)	-0.23* (2.1)	-0.221* (2.07)
Election after emergency	0.247*** (4.44)	0.272*** (4.38)	0.271*** (4.35)	0.529*** (5.94)	0.556*** (6.36)	0.552*** (6.29)
President's rule	0.02 (0.39)	0.025 (0.48)	0.022 (0.44)	0.072 (0.7)	0.088 (0.84)	0.074 (0.72)
Fiscal space	-0.203 (1.36)	-0.14 (0.93)	-0.144 (0.96)	-0.447* (1.92)	-0.372 (1.62)	-0.391 <sup>?</sup> (1.73)
Election years	-0.004 (1.59)	-0.004 (1.66)	-0.004 (1.53)	-0.013*** (3.13)	-0.014*** (3.34)	-0.013*** (3.1)
Same election year	-0.011 (0.11)	-0.013 (0.13)	-0.013 (0.14)	-0.085 (0.45)	-0.084 (0.45)	-0.087 (0.47)
Nexus	0.139* (1.88)	0.117 (1.49)	0.121 (1.56)	0.205 (1.3)	0.171 (1.07)	0.188 (1.17)
Same election year × Nexus	-0.064 (0.53)	-0.036 (0.3)	-0.041 (0.34)	-0.042 (0.17)	-0.001 (0.00)	-0.019 (0.08)
Constant	6.73 (1.39)	7.36 (1.47)	6.83 (1.35)	18.72** (2.19)	21.07** (2.4)	18.81** (2.17)
R <sup>2</sup>	0.30	0.33	0.33	0.39	0.39	0.39
F-Stat	25.26***	37.7***	36.04***	90.02***	48.67***	50.4***
Elections (States)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)	163 (14)

Notes: See notes to table 2. All variables in logs except *Congress government*, *Emergency*, *President's rule*, *Election years*, *Same election year*, and *Nexus*.

## **A2. Linking constituencies with administrative districts to deal with redistricting**

Our volatility measure at the constituency level is an aggregated construct of volatilities derived at the level of individual constituencies. Measuring volatility of a constituency becomes problematic when the constituency is redistricted. A new constituency has no past and a past is required to measure volatility.

In India the constitutionally appointed body given responsibility for redistricting constituencies is the Delimitation Commission. As of the present, Delimitation Commissions have met in the years: 1952, 1963, 1973 and 2002 with recommendations implemented in the years: 1957, 1967, 1974 and 2008. Constitutionally a new commission was to be established every 10 years; however, in 1976 the federal government postponed implementation of the 1974 recommendations until after the 2001 census so that the family planning programs of the federal government would not be affected by a change in political representation at the constituency level. Further, the constitution of India was amended in 2002 and this led to the postponement of the next delimitation of constituencies till the first census following 2026. It follows that the next round of constituency redistricting will not take place until after 2031 population census. Taken together this means that no redistricting arose at the constituency level between the years 1974 and 2008.

In this paper we use administrative districts to overcome constituency redistricting problem. All Indian states are divided into administrative districts whose size is typically much larger than an electoral constituency. On average, an administrative district consists of 5 to 7 constituencies. The Delimitation Commission reports provide details on which constituencies were redistricted and which were not and are available online at [http://eci.nic.in/eci\\_main1/delimitation\\_pub\\_rpt.aspx](http://eci.nic.in/eci_main1/delimitation_pub_rpt.aspx). From these reports we constructed a district-constituency code linking each electoral constituency with their administrative district. For constituencies that were not redistricted, the linking of their current and past historical data is quite straightforward. For constituencies that were redistricted, however, the district-constituency code was used to construct a past history based on the average of that district's non-redistricted constituencies electoral outcomes. That is, in lieu of a constituency past we use the past of a representative constituency from the same district.

Because no redistricting was done in years between 1974 and 2008, the list of districts existing between 1974 and 2008 were used to establish the district-constituency linking code. The code was then used both backwards from 1974 to generate a set of electoral outcomes for 1974 and earlier redistricted constituencies and forward for those elections following 2008. Because there was only a marginal increase in the number of constituencies in the elections between 1962 and 1967, and the number of constituencies in each state has remained constant since, we could use the coding to construct historical measures of our competitive measures all the way back to the state assembly elections held in 1962 without difficulty. However, for elections held before 1962, complications arose because a number of constituencies elected two members and considerable variation arose in both the names and numbers of constituencies. Given these difficulties, our method for addressing the information loss associated with constituency redistricting here is likely to be somewhat less useful.