The Impact of Electoral Process on Democracy and Development*

Debnath, Sisir
sisir_debnath@isb.edu †

Kapoor, Mudit
mudit_kapoor@isb.edu ‡

Ravi, Shamika
sravi@brookings.edu §

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Abstract

Free and fair elections is a cornerstone of democracy. In India electronic voting machines (EVMs) were introduced with the objective of reducing incidents of rigging and electoral fraud. We exploit the phased roll out of the EVMs in the state assembly elections to study its impact on democracy and development. In terms of democratic outcomes we find that introduction of EVMs led to a very significant decline in total number of voters and the voter turnout, particularly in states which were more prone to criminality in politics. It led to a very significant decline in total number of rejected votes. The introduction of EVMs had large impact on development outcomes. Using the luminosity data we find that EVMs led to better provision of electricity. In addition it led to a significant decline in crime, in particular, murder and violence towards women.

Key Words: Voting Technology, Electoral Fraud, Political Responsiveness

JEL Codes: P16, H1

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†Indian School of Business

‡Indian Statistical Institute

§Brookings Institution and Indian School of Business

1 Introduction

In a democracy it is extremely important to conduct free and fair elections to establish the legitimacy of political leaders. India is by far the largest democracy in the world with more than 800 million voters, and the conduct of free, fair and fast elections is a very challenging and a daunting task.[1] Electronic Voting Machines (EVMs) were introduced as an effort to improve and strengthen the method of electoral process. In particular its objective was to minimizing incidences of human error, reduce instances of rigging and manipulation, prevent abuse of government power in polls. In addition, the use EVMs were also justified in terms of "commendable" reduction in cost and time involved in the conduct of elections. We exploit the phased roll out of EVMs in state assembly elections in the late 1990s to study its impact on democracy and development. In terms of democratic outcomes we find that introduction of EVMs led to very significant decline in total number of voters and voter turnout, and this decline was much larger in those states that are more prone to criminality in politics. While analysis of a post poll survey data collected by an independent organization shows that the probability of a voter to be able to cast her vote did not decrease with the introduction of EVMs. Rather the likelihood of being able to cast vote increased for the vulnerable sections (illiterates, females, scheduled castes and tribes). Moreover, voters were less likely to report that they did not cast their vote due to fear of violence, vote capture or were prevented from voting. We also find that it also led to a drop in total number of rejected or error-ridden votes. These results indicate presence of corruption and manipulation in the electoral process. However, it had no significant impact on vote share or winning margin. In terms of development outcomes we study its impact on provision of basic public good such as electricity and law and order condition both of which are the responsibility of the state governments. Using the luminosity as a proxy for electricity we find that EVMs significantly improved the provision of electricity. It also led to a significant improvement in the law and order condition by reducing incidents of crime, in particular, murder and

[1] In terms of the electorate India is more than four times larger than the second largest democracy, the Unites States (US).

violence towards women in states that are more likely to have elected representatives with severe criminal charges.

This paper makes an important contribution to the literature on institutions. It provides empirical evidence on the casual impact of institutions on development and economic outcomes. North (1990) defined institutions as rules of games or man made constraints that shape economic, social and political interaction. The institutional arrangements play a fundamental role in long term economic growth and perhaps explain the phenomenal rise of the Western world. More recently, (Acemoglu et al., 2005) provide a general framework to explain the relationship between institutions and long term economic growth. They argue that existing political institutions and distributions of resources determine the de-jure and de-facto political power. This subsequently influences future political and economic institutions leading to economic performance and future distribution of resources. More importantly, they rank political institutions on top in the "hierarchy of institutions". This paper provides credible evidence that if there is a "shock" to the political institution ironing out it's inefficiencies then it could lead to major changes in economic outcomes. In light of this argument the introduction of EVMs is a change in the existing political institutions, that increases cost of electoral frauds legitimizing political power. It is also important to mention that it was not introduced by a particular political party but was initiated and introduced by the Election Commission of India (ECI) a permanent constitutional body vested with the responsibility of conducting elections in India. Furthermore, EVMs were introduced by amending the constitution, making it a legitimate and exogenous change in political institution allowing us to study it's impact on economic outcomes. Our empirical analysis confirms the key prediction of this framework. We do find that EVMs did have a positive impact on economic growth by looking at the luminosity data. The relationship between luminosity and pre capita GDP growth is well established by Henderson et al. (2012).

Our results can also be studied from the perspective of "political economy of good government" put forth by Besley (2006). In this framework politicians are agents who deliver basic governance and services to the voting population. Some of these agents are

corrupt while others are not. The corrupt politicians are self serving and work primarily in their selfish interest while the good politicians work in the larger interest of society. Under asymmetric information the voters cannot identify the politician types at the time of voting, but can observe the policies introduced by them in the past. Based on the history of policies they can infer politician's types. Using this framework, Besley argues that if reelection incentives are present then some of the corrupt politicians would mimic the good politicians by providing governance and services improving their chances of reelection and extract higher political rents in the future. Therefore, reelection incentives lead to better economic outcomes. However, if electoral process can be rigged then this framework would predict that corrupt politicians would have no incentive to mimic the other type. They would simply use corrupt means to get reelected. Subsequently, in terms of economic outcomes the society would be worse off with a rigged electoral system even though there are same proportion of corrupt and non-corrupt politicians. Our analysis compares economic outcomes in constituencies using EVMs with those using postal ballots, confirms the main predictions of the model. If the introduction of the EVMs reduces electoral manipulations then reelection incentivizes the corrupt politicians to work in the larger interest of society. Even though we do not find direct evidence of reduction of corruption, our results do confirm better provision of public goods. The fact that reelection outcomes were not affected by the introduction of EVMs highlights that when the electoral process can be manipulated, it will be, however, if the electoral process is less corrupt then relatively more public goods will be provided.

The selectorate theory of political incentives by Bueno de Mesquita et al. (1999) could also explain our results. As per their argument the central objective of political leaders is to acquire and retain power and to achieve this they need support of a costly winning coalition. Political leaders would like to minimize the price paid to the members of the winning coalition. The size of this coalition largely determined by it's cost determines allocation of resources. For example, in an autocracy leaders rely on a small winning coalition and spend disproportionately on private goods (at the expense of public goods) that would buy the loyalty of their supporters. In contrast, in a democracy where political

leaders have to rely on a much larger winning coalition (the public at large), political leaders are incentivized to provide more public goods because their value does not decrease as the size of the winning coalition increases. In our setting, the introduction of EVMs is a change in the selection process. Prior to the EVMs, the electoral process was based on a paper ballot which was subjected to rigging and manipulation. Therefore, political leaders needed a much smaller winning coalition, consisting of those who would help them to rig the election. Politicians had no incentives to provide public goods, they only needed to provide private benefits in the form of political patronage to a select few people. Our results provide empirical evidence in favor of this theory. Provision of public goods such as law and order and electricity was lower in constituencies where EVMs were not introduced and elections were more prone to manipulation and rigging. Furthermore, the introduction of EVMs did not influence reelection outcomes which seems to suggest that the incentives of the political leaders to inhibit or promote social welfare is a function of the selection process (the size of the winning coalition). It is important to contrast the "selectorate" theory (Bueno de Mesquita et al., 1999) with that of "political economy of good government" (Besley, 2006) - in Besley's model the political leaders are either good (who work in the larger interest of society) or bad (rent seekers) whereas in BSSM there is only one type of political leaders who wish to acquire and retain power but behave strategically depending on the selectorate. Unfortunately, our empirical results cannot distinguish between these two theories. Nevertheless, a common prediction of these two model is that as the electoral process becomes more democratic the larger will be the provision of public goods and promotion of social welfare.

Another relevant argument in institutional design was promulgated by Bentham in 1820 which has been summarized more recently by (Elster, 2013).[2] According to this view, the institutional design should be such that it has a pure negative aim - "security against misrule, or the prevention of mischief, the removal of obstacles that will thwart the realization of the greatest good for the greatest number". By this logic introduction of EVMs had a negative aim because its primary objective was to minimizing incidences

[2]Securities against misrule and other Constitutional Writings for Tripoli and Greece, The Collected works of Jeremy Bentham (1990).

of human error (intentional or non intentional), reduce instances of rigging and manipulation, prevent abuse of government power in polls, in other words prevention of mischief.

Fujiwara (2015) studies the impact of electronic voting technology on health outcomes in Brazilian elections. He finds that electronic voting reduced error-ridden and uncounted votes. Prior to the electronic voting, citizens were required to follow written instructions and write down their vote and given that 23% of adults in Brazil were "unable to read or write" it resulted in large number of blank ballots being cast. Under such setting electronic voting led to de facto enfranchisement of less educated people. He finds following the introduction of the technology substantial fraction of government spending was directed towards health. In particular he finds positive effects on utilization of health services and new born health for less educated mothers and not for educated mothers. In contrast, we highlight that in India prior to the electronic voting the citizens had to put a stamp on the symbol of the candidate they were supporting. There were no written instructions or any form of writing involved. As a result there was no disenfranchisement of people who could not read or write. As mentioned earlier EVMs were introduced with the objective to reduce instances of rigging and manipulation where a large number of ballots could be cast by a few citizens. Our results do confirm that introduction of EVMs resulted in a significant decline in number of voters and voter turnout particularly in those states where criminality in politics was pervasive, suggesting that prior to the EVMs the electoral process was rigged. Moreover, the outcomes we study are public goods like law and order and electricity and similar to what Fujiwara found on health outcomes we find a positive impact on provision of these public goods.

Another closely related paper that studies the impact of electoral process on economic outcomes is by Ferraz and Finan (2011). They find that mayors serving in their first term with reelection incentives when compared to those whose faced a term limit, were significantly less corrupt. What is unique in their paper is that they use random audit reports of the local governments to construct new measures of political corruption. They combine this with the electoral process of term limits of mayors. In contrast in our paper we do not have a measure of political corruption but what we measure is the provision of

public goods like electricity and law and order. Less corruption would imply less misuse of public funds.

2 Electronic Voting Machines in India

Introduction of the Electronic Voting Machines (EVMs) in India was part of Election Commission of India's (ECI) objective to strengthen the democratic electoral process. The ECI used the voting machines for the first time, as an experimental measure, in the 1982 Parur Assembly poll in the state of Kerala. Subsequently, ECI procured 150,000 EVMs, made by Bharat Electronics Ltd., Bangalore and Electronic Corporation of India, Hyderabad, in the year 1990. However, these machines were not put to use till 1998. Political parties were suspicious that the machines could be doctored to favor a particular party or candidate. A petition was filed questioning the statutory authority of the ECI to use EVMs. The Supreme Court ruled that voting machines could not be used without a necessary provision under the law. After the necessary amendments in the constitutions in December 1998, these machines were used in the state elections of Delhi, Madhya Pradesh, and Rajasthan. The Commission selected 16 assembly constituencies spread over the three states on the basis of their compact character and adequate infrastructure to manage the logistics for introducing EVMs. Availability of good road connectivity played an important role so that in the event of malfunctioning of EVMs could be promptly addressed or replaced, if necessary. The ECI publicised the usage of EVMs heavily to make sure the process of casting vote using EVMs is well understood.

In June 1999 general election was held for the Goa legislative assembly with 40 assembly constituencies. On the basis of the previous success the Commission decided to cover an entire state assembly elections with the use of EVMs. Accordingly, Goa was selected as the first state for this initiative in June 1999. Subsequently in the 1999 Parliamentary elections, EVMs were introduced in 45 constituencies, spread over 17 States and covering 60 million voters. Among all the state assemblies constituencies scheduled to hold elections in 1999 simultaneously with the Parliamentary elections, only those that

were within the confinement of the 45 parliamentary constituencies used EVMs. For the state elections in the following year, 2000, again the constituencies that were within the confinement of the 45 parliamentary constituencies used EVMs.[3] In February, 2000, the Commission ordered use of EVMs in 45 out of 90 Assembly seats in the state of Haryana. Table A.1 in the Appendix shows the dates of introduction of EVMs in state assembly elections by constituency. Figure 2 plots the time line of introduction of EVMs in state assembly constituencies in India.

Introduction of EVMs simplified the voting procedure and quickened the process of ascertaining the results. It also made the electoral process cheaper as printing of millions of paper ballot papers were no longer required. Another advantage of these machines was that the number of rejected votes were reduced significantly. A paper ballot could be rejected if the stamp on the ballot is ambiguous and the voter's choice is not clear. Since EVMs could record only one response by the voter the possibility of rejected votes was virtually eliminated.

EVMs used in India can record a a maximum of 3840 votes. As normally the total number of electors in a polling station will not exceed 1500, the capacity of EVMs is more than sufficient. EVMs can cater to a maximum of 64 candidates. Election officers, who covers on an average ten polling stations, carries spare EVMs and has the responsibility of replacing faulty EVMs. In the event of a break down votes recorded until the EVM went out of order remain safe in the memory of the control unit and it is not necessary to start the poll from the beginning.[4] EVMs run on an ordinary 6 volt alkaline battery, therefore, can be used in areas without power connections. All EVMs are provided with an "end of poll" switch which once pressed unable EVMs to record votes.

2.1 Prevention of Electoral fraud using EVMs

In the case of ballot papers, the miscreants can distribute ballot papers assigned to a polling station, among themselves, stamp them, stuff them into the ballot boxes and run away before the police reinforcements arrive. However, in the case of EVMs such frauds

[3]These results are reported in Table 2.
[4]Failure rate of EVMs is less than 0.5 percent.

can be controlled if not ruled out completely. The EVMs are programmed such that the machines will record a maximum of five votes in a minute. As recording of votes has necessarily to be through the control unit and the balloting unit, whatever be the number of miscreants they can record vote only at the rate of 5 false votes per minute. Further, the presiding office or one of the polling officers can always press the "close" button as soon as they see some intruders inside the polling station. After that it will not be possible to record any vote when once the 'close' button is pressed.

A vote once recorded in an EVM is incapable of being tampered with. Thus, eliminating manipulation of results by irregularities in the counting process.

There are no invalid votes under the system of voting with EVMs. Invalid votes under the the ballot paper system were result of improper stamping of the ballot. This is important as the number of invalid votes is often more than the winning margin. Therefore, the choice of the electorate will be more correctly reflected when EVMs are used.

If the machine is tampered with, in any respect, either during the course of the poll or any time before the counting of votes, that would be easily detectable. Thus a fresh poll can be taken at the affected polling station(s).

The signature/thumb impression of a voter is now obtained in a register (instead of on the counter foil of the ballot paper as under the existing system). This register can be made open to inspection for collection of documentary evidence by any person desiring to file an election petition to challenge an election on the ground of impersonation of bogus voting. This facility is not available under the present system as the counterfoils of used ballot papers are not open to inspection except under the orders of a competent court.

3 Data

3.1 Election Data

The Constitution of India confers the Election Commission of India to oversee, direct, and control the election process of Parliament and State Legislative Assemblies. The ECI

publishes the results of every parliamentary and state assembly elections in the Statistical Report on the General Election to the Legislative Assembly of States. These reports publish total number of electors and voters by gender, name and gender of each contestant, contestants' party affiliation, and total number of votes secured at the constituency level.[5] We collect and use these data to construct voter turnout, rejected votes and winning margin.[6] The ECI also reports postal ballots albiet inconsistently for each constituency. We use postal ballot data for the period 1994–2009 for checking the robustness of the main results.

As per the constitutional and legal provisions the total number of legislative assembly seats in all states is to remain unaltered till the first census after 2026. Given the fixed number of constituencies and differential population growth across regions constituency boundaries have to be redrawn periodically to reduce the variation in constituency sizes. The Delimitation Commission of India is responsible to redraw constituency boundaries based on current census to keep them uniform in terms of population. The representation from each state is not altered during this exercise. However, the number of reserved seats (by caste) in a state may change in accordance with the most recent census. Till date the Delimitation Commission has been set up four times: 1952, 1963, 1973 and 2002. The recommendations of the third Delimitation Commission were implemented in the year 1976 and the recommendations of the fourth Delimitation Commission were approved by the President of India in 2008.[7] Therefore, assembly boundaries did not change between the period 1976–2007, even though new states came into existence. Given the dates of effective delimitations we restrict our analysis to the state elections held between 1976–2007. A total of 195 state elections were held during this period covering all 30 states and union territories and 4,119 assembly constituencies.[8] We use the state assembly election data as there are more variations in the introduction of electronic voting machines for them.

[5]This data is available at the ECI's website for every general election held since 1951.

[6]Voter turnout is the ratio of valid votes and electors; rejected vote is the difference between total voters and valid votes; winning margin is the difference between the fraction of votes of the winning and runners up candidate.

[7]The first election after delimitation was held in the state of Karnataka in 2008.

[8]Pondicherry is the only Union Territory that has its assembly election and is included in our analysis.

The dates of introduction of the EVMs are collected from ECI orders and several newspaper archives. Table A.1 in the Appendix documents the sources. The map in Figure 2 shows the time-line and spatial variation in the introduction of EVMs in state assembly constituencies.

3.2 Nighttime Lights

We use annual satellite nighttime lights images to construct a proxy measure of electricity provision and use at the state assembly constituency level for the period 1992-2007. The satellite raster images were obtained from the National Aeronautics and Space Administration's (NASA) Defense Meteorological Satellite Programs Operational Linescan System (DMSP-OLS), a set of military weather satellites orbiting and recording high resolution images of earth each night between 20:00 and 21:30 local time. The high resolution images captured at an altitude of 830 km above the earth, record concentrations of outdoor lights, fires, and gas flares at a resolution of 0.56 km and a smoothed resolution of 2.7 km. These images are available from 1992 onwards and are used to produce annual composites during a calendar year after dropping cloud cover, aurora and solar glare (mainly near the poles), and fleeting lights such as forest fires and other noise. We use this series of the images from 1992–2007 after masking the raster data for the geographic boundary of India. These images are scaled onto a geo-referenced 30 arc-second grid (approximately 1 sq. km.). Each pixel is encoded with a measure of its annual average brightness on a 6-bit scale from 0 to 63. We use the data available on stable night lights that drop light values from pixels with unstable light signatures over time and state assembly constituency boundary maps to extract a time series of constituency level luminosity data. Figure 5 shows the nighttime lights images for the years 1992 (in Panel A) and 2007 (in Panel B) with the assembly boundaries.

Political science literature have used nighttime lights extensively as a measure of provision of electricity. Min et al. (2013) shows that night lights imagery can be used to approximate rural electrification in developing countries using DMSP-OLS and survey data from Mali and Senegal. Recent economic growth literature establishes a high degree

of correlation between the traditional measure of growth and luminosity. Henderson et al. (2012) develop a statistical framework that uses lights growth to enhance existing income measures. For countries with poor data on national accounts and unavailability of consistent data at the sub-national level nighttime lights can be a used as a plausible proxy for economic growth. Interpretation of night lights as growth numbers requires some degree of interpolation. We mainly use night lights as a measure of provision of electricity which is a state subject matter in India.

3.3 Crime Data

Data on different types of crime under Indian Penal Code in India is collated and published by the National Crime Records Bureau (NCRB) at the district level since 1973. Since law and order and police force are under state list in India we use this data to explore the effect of EVMs on crime.[9] There are concerns that the NCRB crime records are severely underreported except for heinous crimes such as murder and attempt to murder. We analyse the effects of EVMs on total crimes as defined by the Indian Penal Code (IPC), murder, attempt to murder, and rape. Since assembly constituencies do not extend to more than one district we merge the elections data to the crime results after collapsing the former at the district level. As a result while analysing the crime data our main explanatory variable measures fraction of constituencies in a district that used EVMs.

3.4 Post Poll Surveys

We use post poll surveys conducted by an an autonomous organisation Centre for the Study of Developing Societies (CSDS) to corroborate our analysis using Election Commission data. *Lokniti*, a research programme for studies on comparative democracy at the CSDS, regularly conducts large-scale scientific studies of political behaviour, opinions and attitudes of the Indian electorate. Further, the centre is considered a pioneer in large

[9]The power of the states and the centre in India under the federal structure is delineated by the Indian Constitution. State list consists of 61 items that are under the states.

scale pre, post and exit poll surveys of parliament and state legislative assembly elections. It started state assembly election studies with Kerala in 1965 but did not continue it during the 1970s and 1980s. The studies were later revived with Bihar state assembly election in 1995 and have covered most elections since then.

We focus on post-poll survey data for 24 state legislative assembly elections during the period 2000-05. Out of these EVM was used for all assembly constituencies in 20 state legislative elections, 3 used both EVM and postal ballots, and only 1 used postal ballot only. A post-poll survey is usually conducted at the place of residence of respondent between the day of polling and day of declaration of results. We use the data on whether the respondent was able to vote, and whether she was prevented from voting due to fear of violence at the polling station, vote capture, and was not allowed to vote by force along with demographic information such as age, gender, caste and education. Some of the surveys also have questions on awareness and opinion on EVM.

4 Estimation Strategy

As discussed in the previous section our sample is restricted between the period 1976–2007 covering 195 state assembly elections and 4,119 assembly constituencies. The election results are obtained from the Election Commission of India. The information on introduction of electronic voting machines are obtained from news archives and orders issued by the ECI. Since EVMs were introduced in a staggered fashion we exploit the timing of the introduction of EVMs to tease out the effects. The following empirical model is common to all major results when the sample is between 1976–2007

$$Y_{cst} = \beta_0 + \beta_E EVM_{cst} + \tau_t + \kappa_c + \varsigma_s t + \beta_{\mathbf{x}} \mathbf{x}'_{\mathbf{cst}} + \epsilon_{cst}, \tag{1}$$

where the indices c, s and t represent constituency, state and election year respectively. EVM_{cst} is a binary variable which takes the value one if the constituency c in state s used Electronic Voting Machines in year t. The coefficient β_E measuring the average effect of EVMs is the parameter of interest. Our specification also include election year (τ_t) and

assembly constituency (κ_c) fixed effects, state specific time trends ($\varsigma_s t$), and constituency characteristics ($\mathbf{x'_{cst}}$) that include total number candidates, vote share, gender of the winning candidate. By the end of 2007 EVMs were being used for all state assembly constituencies.

We use a difference-in-difference specification for the elections between 1976–2000. Table A.1 reports the percentage of constituencies that used EVMs in each election between 1990–2008. Note that given the time restriction, elections in some constituencies were held using EVMs while it was not introduced in few states. The empirical specification for this sub-sample is the following

$$Y_{cst} = \beta_0 + \beta_t Treatment_c + \beta_p Post_t + \beta_{tp} Treatment_c \times Post_t + \tau_t + \kappa_c + \beta_{\mathbf{x}} \mathbf{x'_{cst}} + \varepsilon_{cst} \tag{2}$$

where as earlier indices c ,s and t represent constituency, state and election year. $Treatment_c$ is a binary dummy which takes on the value one if the constituency c used EVMs at least once between the period 1976–2000. $Post_t$ is an indicator for elections after the year 1997. The definition of other variables remain the same as in equation 1. The coefficient β_{tp} is the parameter of interest and measures the effect of EVMs on outcomes.

The identification assumption for the estimation strategy described above is that the election outcomes were not evolving differently for the constituencies that use and did not-use EVMs between 1976–2000. In other words, a difference-in-difference estimation strategy yields an unbiased estimate of the treatment effect if preprogram trend in the outcome variable for treatment and control groups was parallel. Given that our data spans a long pre-period of about 22 years we can test for the existence of a differential trend across the EVM and non-EVM constituencies. Section 8 discusses the validity of this assumption in detail.

5 Results

5.1 Effect on Total Voters and Voter Turnout

The effect of electronic voting machines (EVMs) on the number of voters and turnout is theoretically ambiguous. Electoral manipulations may become expensive with the introduction of electronic voting machines. EVMs in India by default recorded only five votes per minute. While under the paper ballot system there were no such upper limit. This meant for elections with EVM a polling booth had to be captured for a longer period of time to cast false ballots increasing the chances of security forces to arrive at the booth. Therefore, in the absence of EVMs the total number voters and turnout could be higher on account of false votes. Second, voters may turn out in greater numbers in constituencies where EVMs were introduced as the Election Commission heavily publicized the event. Voter turn out may also improve as voters may perceive their votes less susceptible to fraud with EVMs. We present the results of EVMs on the number of voters and voter turnout in Table 3 and 4. Finally, if voting under EVMs were not systematically different from postal ballots we should not expect any changes in the election outcomes. Voting procedures with electronic machines used in India emulated the paper ballot system. As shown in Figure 1 the interface of the machines were similar to a paper ballot. Under the new system voters had to press the button against their favorite candidate as opposed to using a stamp.

Panel A in Table 3 reports the effects of EVMs on log of total voters, male voters, and female voters for the period 1976-2007 using the specification in equation 1. The coefficient of -0.068, significant at 5 percent level, reported in Column 1 suggests that introduction of EVMs reduced the number of voters by 6.5 percent.[10] The effects are similar for male and female voters measured at 6.8 and 5.3 percentage drop, respectively. One explanation for the estimated decline in the number of voters could be that the number of total electors declined with the introduction of EVMs. Note that all specifications in Panel A control for log of total, male and female electors, respectively. Therefore, the

[10]Since the dependent variable is in logarithmic scale the coefficient estimate of -0.068 translates into $(exp^{-0.068} - 1)$ -6.5 percent.

drop in voters is not on account of a spurious correlation between introduction of EVMs and drop in the electorates. In Panel B we report the effect of EVMs on voter turnout, defined as the ratio of voters and electorates in a constituency. The effects continue to be negative and statistically significant at 1 percent. Given the average winning margin for the period of 1976-97 (pre-EVM period) was at 15.8 percentage, a drop in turnout by 4.5 percentage points could affect election outcomes substantially.

We exploit the inter-state variation in the roll out of EVMs to further substantiate our results using a difference-in-difference strategy as specified in equation 2 for the elections between 1976–2000. The effects of EVM on voters are reported in Panel A of Table 4. The coefficient on the interaction between *treatment* and *post* on log of total voters is estimated at -0.072 ($p < 0.05$) suggesting a decline in total voters by 6.9 percent.[11] The estimated decline for male and female voters, reported in Columns (2) and (3) are 5.8 ($p < 0.10$) and 8.5 ($p < 0.05$) percent respectively. The reported DiD estimates in Column (1) of Panel B suggests that introduction of EVMs reduced voter turnout by 4.4 percent. The point estimate is precise at 1 percent level. The DiD estimates on male and female voter turnouts are also estimated precisely at -4.17 and -4.78 percent. This strongly suggests that the use of EVM reduced voter turnout significantly in comparison to the paper ballot system.

5.2 Effect on Rejected Votes

Under paper ballot system voters had to stamp their votes against the election symbol of their preferred candidate. A ballot could be rejected if the stamp was not clearly marked. Unless a voter consciously chooses to waste his vote by marking the ballot in a confounding manner, which seems rather unlikely, rejected votes generate inefficiencies in the democratic system. EVMs could prevent the total number of rejected votes substantially as voters had a single chance to push only one button indicating their preference. We analyze the effect of EVMs on rejected votes for all state elections between 1976-2007 using the specification in equation 1.

[11] *Treatment* is a binary dummy which takes on the value one if a constituency used EVMs at least once between the period 1976–2000. *Post* is an indicator for elections after the year 1997.

Table 5 reports the effect of EVMs on rejected votes. All specifications control for election year fixed effects. The binary variable *EVM* takes the value one if election in a constituency was held using EVMs. The estimated coefficient of *EVM* on rejected votes (without any additional control) reported Column (1) suggests that constituencies that used EVMs had 2075.1 fewer rejected votes compared to those which did not use them. The coefficient is significant at 1 percent level. In Column (2) we additionally control for assembly constituency fixed effects. The coefficient estimate increases marginally to -2025.9, but it continues to be significant at 1 percent. In the following two columns, (3) and (4), we additionally control for total number of electors and number of contestants, respectively. The coefficient estimate change marginally and continues to remain highly significant. These results suggest that introduction EVMs resulted in 2058.6 fewer rejected votes in the most restricted specification. This is a 2.7 percent increase in the number of valid votes at the baseline. Being a multi-party system with narrow winning margins an increase in valid vote counts can potentially change election outcomes.[12]

6 Heterogeneity in the Effects of EVMs

In the previous section we show that introduction of EVMs lead to a decline in the number voters and voter turnout. In this section we present the differential effects of the EVMs by states where elections were more likely to be rigged. Since there are no objective measure(s) available to rank states by their likelihood of electoral frauds we use affidavits filed by contestants reporting their criminal background as per the ECI rules.[13] Table A.2 ranks all states in India by fraction of Member of Legislative Assembly (MLAs) with criminal background. We create a dummy (*criminal legislatures*) for the four states of India with highest fraction of MLAs with serious criminal charges against them.[14] In this

[12]Out of all elections held between 1976–97 (pre-EVM elections) 9.2 percent of constituencies had a winning margin lower than 2.7 percent.

[13]Since 2003 candidates contesting elections in India are required to submit an affidavit detailing their criminal background, asset information and educational qualifications to the Election Commission of India (ECI). These affidavits are publicly available on the Commissions website. The Association for Democratic Reforms (ADR), an election watchdog, has compiled information from these affidavits.

[14]These four states (Bihar, Jharkhand, Maharashtra, and Uttar Pradesh) are densely populated with 21.9 percent of the landmass and 36.9 percent of total population in India.

section we report differential effects of EVMs by *criminal legislatures*.

As reported in Panel A of Table 6, the coefficients of the interaction between *EVM* and *Criminal Legislatures* on log of total voters, male and female voters are at -0.10, -0.11, and -0.10, respectively. These results suggest that there were twice as much drop in the number of voters in the four states with highest fraction of MLAs with serious criminal charges following the introduction of EVMs. However, these estimates are not precise.

In Column (1) of the bottom panel of Table 6 we report that the use of EVM reduced voter turnout by additional 5.71 percent in the four legislative assemblies with highest criminal charges against their members. We find similar effects for male and female turnouts at -6.48 and -4.94 percent, respectively. These estimates are significant at 10 percent levels and suggest that the decrease in the number of total voters and voter turnout was substantially larger for the states with more criminal charges against the members of the legislative assemblies compared to the rest of India, suggesting a plausible decline in the number of fraudulent voters.

6.1 Vote Share and Winning Margin

The results discussed in the previous sections suggest that electoral fraud might have come down following introduction of EVMs. As a result one might expect changes vote share of the incumbent and winning candidate. Given the inconsistency in the spelling of candidate names in election reports, matching candidates over several years of election is computationally heavy and time consuming. Instead we explore the effects of the change in technology on incumbent and winning party.

All specifications reported in Table 7 control for for election year and assembly constituency FEs, and gender of the winning candidate; and number of contestants. As earlier *criminal legislatures* takes the value one for the state of Maharashtra, Uttar Pradesh, Bihar and Jharkhand. As reported in the first row the coefficient of EVM on all the outcome variables are negative. Vote share of the winning and incumbent party, and winning margin decline by 1.7, 0.7 and -0.42 percent, respectively, in the constituencies

where elections were held using EVMs compared to their counterparts using paper ballots. However, these estimates are not precise. The coefficient on the interaction between EVM and *criminal legislatures* are also indistinguishable from zero estimated at 0.26, -0.04 and -0.15. These results indicate that introduction of EVMs did not alter the vote share of either the incumbent or the winning party significantly.

7 Public Goods and EVMs

Results discussed in the previous sections show that introduction of EVMs might have reduced electoral frauds. We show that total voters and voter turnout decreases with the introduction of EVMs. The decrease in voter turnout is relatively larger in the states where elected members of the legislative assembly are more likely to have severe criminal charges against them suggesting abatement in electoral frauds. If electoral processes were transparent under paper ballots and EVMs did not change the way the electorate voted we have no a priori reasons to believe that EVMs would affect provision of public goods. In this section we provide credible evidence that provision of several public goods improved with the introduction of EVMs.

7.1 Effect on Crime

Article 246 of the Constitution of India designates maintenance of law and order as a state subject. We use annual district level crime data and difference-in-difference estimation strategy to study the effect of introduction of EVM. Due to data limitations we restrict our analysis to the period between 1992–2007. Since crime data is available at the district level we collapse the election data accordingly.

Table 8 reports the dynamic effects of EVM on crime for the first four years after election (Columns 1 to 4) along with average crime levels (Column 5) for the five year tenure of an elected representative. All specifications control for election year and district fixed effects, vote share and gender of the winning candidate, and the number of contestants. Errors are robust and clustered at the state level. We interact EVM with

the dummy *Criminal Legislatures* for the states where MLAs have a greater probability of having severe criminal charges against them.

The coefficients of EVM in Panel A on log of total reported crimes under the Indian Penal Code (IPC) on subsequent years after election are indistinguishable from zero except for Column (4). The estimated coefficient at -0.13 ($p < 0.10$) suggests that the total reported crime after four years since the last election declined by 12 percent in the constituencies where elections were held using EVMs compared to their counterparts using paper ballots. Note that elections in India are held every five years. This suggests that reported crimes drop significantly just before elections if elections were held using EVMs. However, the coefficient on the interaction between EVM and *Criminal Legislatures* in Column (1) is -0.25 ($p < 0.01$). The point estimate suggests following the introduction of EVMs the total IPC crime has reduced in the states with more MLAs with criminal charges in the first year after election by 22 percent. The estimated coefficients on the interactions continues to be negative for the following years but the magnitude declines and becomes indistinguishable from zero after four years since election. The effect on log of average reported crimes reported in Column (5) is -0.13 and it is measured very precisely.

Panel B reports the effect of EVMs on log of total incidences of murder. Among all measures of crime total number of murder is measured most accurately as first information reports for murder are almost always filed. As earlier the coefficient on EVM continues to be statistically indistinguishable from zero. The coefficient of -0.37 for the interaction between EVM and *Criminal Legislatures* reported in Column (1) implies total number of murders after election drops by 31 percent in the criminal legislatures compared to the rest of India after the introduction of EVMs. The estimated coefficients for the following years continues to remain negative and declines in magnitude and precision over time. Overall the number of reported murders,as reported in Column (5) declines by 23 percent in the four states that are prone to criminality in politics following the introduction of EVMs.

Panel C and D report the effects of EVMs on attempt to murder and reported inci-

dences of rape. The estimated effects of EVMs are similar for rape crimes. These results suggest that with the introduction of EVMs, criminal activities reduce but the effects are limited to the states where elected representatives are more likely to have criminal backgrounds.

7.2 Provision of Electricity

State-level corporations in India are the largest producers of electricity (41%) along with its transmission and distribution. Using transmission loss data for a major state in India Min and Golden (2013) show that transmission losses peak just prior to the state assembly elections. Electricity being one of the key issues during state elections, in this section we discuss the effects of EVMs of provision of electricity. We use annual constituency level luminosity data as a proxy for provision of electricity and the specification outlined in equation 1 to explore the effects of EVMs. Due to data limitations we restrict our analysis to the period between 1992–2007.

Table 9 reports the dynamic effects of EVMs on luminosity. All specifications control for election year and assembly constituency fixed effects, vote share and gender of the winning candidate, and the number of contestants. In Column (1) we report the effects of EVMs on log luminosity after one year of election. The coefficient on EVM at 0.05 is positive but not significant. In Columns (2), (3), and (4) we report the effects of EVMs on luminosity after 2, 3, and 4 years of election respectively. The magnitude of the coefficient increases overtime and as reported in Column (4), just before the next election the effect is estimated at 0.24 significant at five percent level. The estimated effects are much larger in the later years suggesting that provision of electricity improved in constituencies where elections were held using EVMs but the improvements were stronger two years after election. The effect on log of average luminosity reported in Column (5) is estimated at 0.10 but it is not statistically significant. The second row in the table report the estimated coefficient on the interaction between EVM and *Criminal Legislatures*. The coefficients are negative and significant at about -0.30 for the first three years after election. However, the differences in the provision of electricity between *Criminal Legislatures* and the rest

of India get narrower for the year prior to the next election following introduction of EVMs.

8 Robustness

The difference in difference estimation strategy described earlier is based on the assumption that the trends in the outcome variables for the constituencies that used EVMs between 1998–2000 were parallel to those using postal ballots. In this section we formally test that assumption and present the results. As an additional robustness check to our analysis we examine the outcomes in closely contested elections. Finally, we examine if the introduction of EVMs had any impact on the number of postal ballots as a placebo test.

8.1 Parallel Trends

Since introduction of EVMs was determined by constituencies characteristics and location of machines used in the 1999 parliamentary elections, differential pre-EVM trends may render the estimated treatment effects biased. Even though our main empirical specification include state specific time trends we test the assumption of parallel trends using election data between 1976 and 1997. Columns (1) though (6) in Table A.3 report the results on log total voters and turnout. Estimates from each model reported in the table controls for vote share and gender of the winning candidate, the number of contestants, and assembly constituency fixed effects. The indicator variable *treatment* takes the value one if a constituency used EVMs between 1976–2000 and zero otherwise. Errors for all specifications are robust and clustered at the state level. The coefficients on the interaction between *treatment* and year dummies are significantly different from zero only for the year 1984. The year 1984 was politically unstable as the fourth Indian prime minister Smt. Indira Gandhi of the Indian National Congress (INC) party was assassinated on 31st October, 1984. Among the five states that were scheduled to hold elections in December

1984 only Goa (30 out of 30) and Manipur (6 out of 60) had treatment constituencies.[15] Furthermore, INC was the incumbent party in these two states and experienced minor increase in turnout while the rest of the states ruled by regional parties experienced a huge surge in voter turnout. This explains the large negative coefficients for all outcome variables for the 1984. Apart from the 1984 coefficients on all other interactions are not significant. Therefore, we conclude that the parallel trends assumption is satisfied in this case validating the estimation strategy.

8.2 Close Elections

Political science literature often argues that elections with very small winning margin are very similar and therefore are comparable (Butler, 2009, Eggers and Hainmueller, 2009). In our case close elections are interesting as we anticipate close elections are more likely to suffer from electoral fraud. In order to visualize the election outcomes for the close elections we plot voter turnout against the winning margin for the elections with and without EVMs in Figure 3. In Panel A the sample is restricted to the states of Bihar, Jharkhand, Maharashtra, and Uttar Pradesh where electoral frauds in terms of booth capturing were more likely as a substantial fraction of elected representatives had criminal background. The figure reveals that for close elections in these states the average voter turnout is significantly lower in constituencies that used EVMs compared to their counterparts using paper ballots. However, there is no significant difference in voter turnout in Panel B where the sample is restricted to the states of Nagaland, Arunachal Pradesh, Mizoram, Goa, Manipur, Meghalaya, Tripura, Sikkim, Jammu & Kashmir, Assam, and Rajasthan where members of the legislative assemblies were less likely to have a criminal background.[16] These observations bolster our results earlier that use of EVMs reduces voter turnout.

We test this more rigorously in Table A.4. All specifications control for election year and state FEs, vote share and gender of the winning candidate, and number of

[15] Three other states were Arunachal Pradesh, Mizoram, and Tamilnadu.

[16] Table A.2 reports the state-wise percentage of members of legislative assembly with criminal cases against them.

contestants. Column (1) of Panel A reports the average differences in total turnout, male turnout, and female turnout by use of EVMs, respectively, using non-parametric models for constituencies with winning margin less than 2.5 percentage points. The estimates suggest that voter turnout was significantly lower for the constituencies that used EVMs. Column (2) reports the same estimates for a slightly higher winning margin (5 percentage points) and the differences in voter turnout continues to persist. Rest of the columns report the same estimates using parametric models with linear and quadratic controls for winning margins (along with interaction terms) and different winning margins. All estimated reports confirm that voter turnout in close elections were significantly lower if elections were held using EVMs.

Panel B reports the same estimates after restricting the data to the states of Bihar, Jharkhand, Maharashtra, and Uttar Pradesh with highest fraction of elected representatives with serious criminal charges against them. Among several specifications, the lowest estimate of the effect of EVM on voter turnout for this restricted sample is -15.3 ($p < 0.01$) which is almost three times larger than the same for the entire sample. The effects on male and female turnout is similar and all estimates are significant at 1 percent level.

Panel C reports the same estimates for the states with fewer elected representatives having serious criminal charges.[17] The estimates suggest that the effects of EVMs in close elections for these states are in the same direction but the magnitudes are much smaller and statistically less significant.

Systematic differences in the closely contested constituencies using EVMs and paper ballots may confound our results. To rule out such possibilities we plot constituencies characteristics, derived from the 2001 Census data, against winning margin by use of EVMs.[18] Figure 4 plots the predicted values (residuals after taking out the state fixed effects) of a local linear smoother estimated separately for, constituencies that used EVM and postal ballots. None of the plotted characteristics reveal any systematic differences

[17]These states are Nagaland, Arunachal Pradesh, Mizoram, Goa, Manipur, Meghalaya, Tripura, Sikkim, Jammu & Kashmir, Assam, and Rajasthan

[18]These characteristics include literacy rate (total, male and female), percent workers engaged in cultivation, urban population, schedule caste, schedule tribes and female population as per census 2001

between constituencies that use EVMs and paper ballots at close elections.

8.3 Placebo Test: Postal Ballots

As an additional falsification test we estimate the effect of the introductions of EVMs on postal ballots that is generally used by outstation voters to cast their vote.[19] We argue that the EVMs did not affect the system of postal ballots and therefore we should not observe any affect on them. We collected data on postal ballots for all state assembly elections between 1994–2000. We estimate the same model as specified in 2 and report the results in Table A.5. The coefficient on the interaction between *Treatment* and post is negative but it is not statistically significant. EVMs did not affect the share of postal ballots in total votes either.[20]

9 Alternative Explanations

One important confounding factor behind the results could be formation of long lines in polling booths due to the five votes per minute rule discouraging voters to cast their vote. One can also argue that electors were averse to using new technology and such preferences are reflected in our result of drop in voter turnout. We formally test possibility of such a situation using the *Lokniti* post poll surveys conducted by the Centre for the Study of Developing Societies (CSDS). Among many questions on political preferences some of the surveys collected data on awareness and opinion about EVMs. About 96.4 percent of the voters preferred EVMs over postal ballots. We formally test for the effects of the EVMs on ability to vote and vote capture.

Panel A in Table 10 reports the effects of EVMs on whether an eligible person was able to cast his vote. The dependent variable takes the value one if he was able to cast and zero otherwise. All specifications control for election year and state fixed effects, and demographic characteristics of a respondent. As reported in Column (1) the coeffi-

[19]The election commission sends postal ballots to service voters, special voters, electors subjected to preventive detention, voters on election duty, and notified voters.

[20]These results are not reported but available on request.

cient of EVM is 0.004 and statistically indistinguishable from zero. This suggests that introduction of EVMs did not affect the ability to cast vote eliminating the concern for the confounding factor of long lines or aversion to use new technology. In rest of the columns we interact EVM with indicators for several vulnerable groups whose votes are most likely to be captured. The coefficient of the interaction between EVM and illiterate voters, reported in Column (2) on ability to vote is 4.7 suggests that an illiterate voter was 4.7 percentage points more likely to be able to cast their vote if elections were held using EVMs. In the subsequent columns we interact EVM with indicators for females, lower caste, senior citizen, and illiterate females respectively. All reported coefficients on the interactions are positive suggesting introduction of EVMs increased the probability of being able to cast vote for these vulnerable groups, further eliminating concerns about the confounding factors discussed earlier.

In Panel B we explore the effects of EVMs on the reasons behind not being able to vote. The dependent variable measuring vote capture takes the value one if a respondent did not vote due to fear of violence, someone else casted his vote, or was prevented from voting and zero otherwise. As reported in Column (1) the estimated effect of EVM on vote capture is -0.0026, however this is not precisely estimated. Also note that estimated coefficients on the interaction between EVM and indicators for the vulnerable groups, reported in Columns (2)–(6) are negative but except for illiterate females is not measured precisely. These results rule out the alternative explanations discussed earlier and suggests that the drop in voter turnout reflects a drop in electoral fraud following introduction of EVMs.

10 Conclusion

In this paper we evaluate the effect of Electronic Voting Machines on election outcomes. Our estimates show that voter turnout surprisingly drop while the total number of rejected votes decrease when EVMs are used in Indian assembly elections. Electoral frauds are difficult to detect but these results along with the differential results for the states

that are more prone to criminality in politics strongly point out, contrary to the common belief that EVMs are one of the sources of election rigging, that they may actually reduce electoral fraud. We rule out several confounding factors that might produce similar results such as long lines at polling stations due to the default limit on the number of maximum votes under EVMs, bias against new technology. The results are also robust for closely contested elections.

This may have implications for the development policies being adopted by the elected government officials. This findings probably open up more questions than it answers. Effects of such reforms on the reelection prospect of the incumbent parties, consequences on development policy and growth are few of them. Small changes in voter turnout and rejected votes can change election outcomes in the context of India where a multiparty system has culminated in a very competitive election environment with very narrow victory margins. We find that provision of electricity was greater for the constituencies where elections were held using EVMs. The effect was strongest for the year just before the subsequent election. We also find that several measures of reported crime was lower in the constituencies where elections were held using EVMs in the states that are prone to criminality in politics.

India being a diverse and biggest democracy in the world there are lessons to be drawn by policy makers from the successful implementation of electoral reforms for similar countries. Each voting machines being one of the cheapest of its kind also makes it more attractive.

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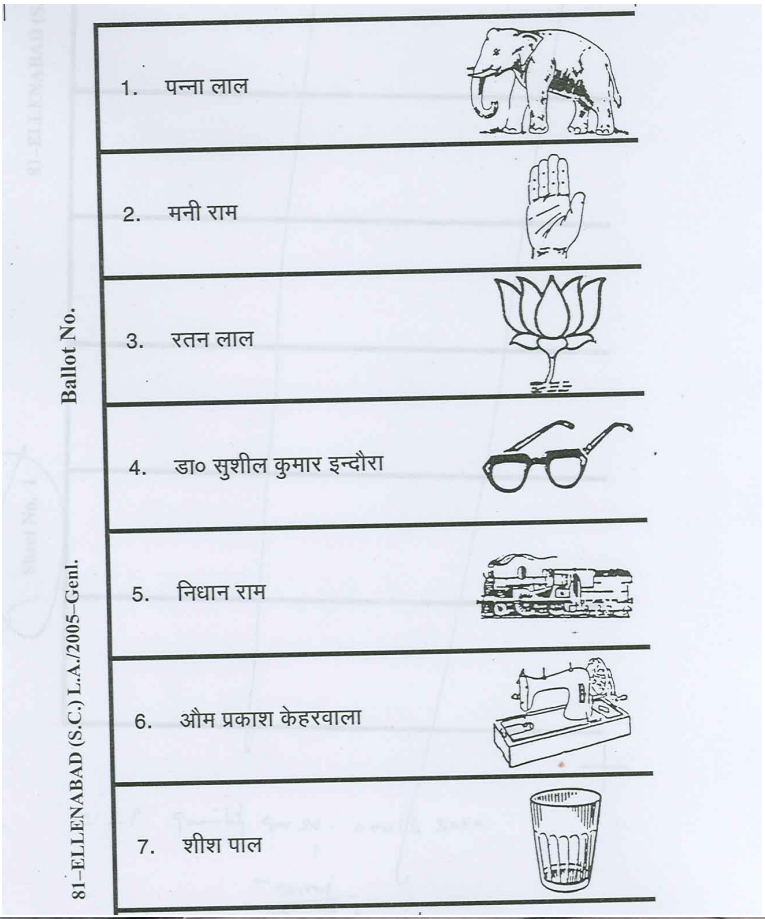
FIGURE 1: Paper Ballots and Electronic Voting Machines used in India.



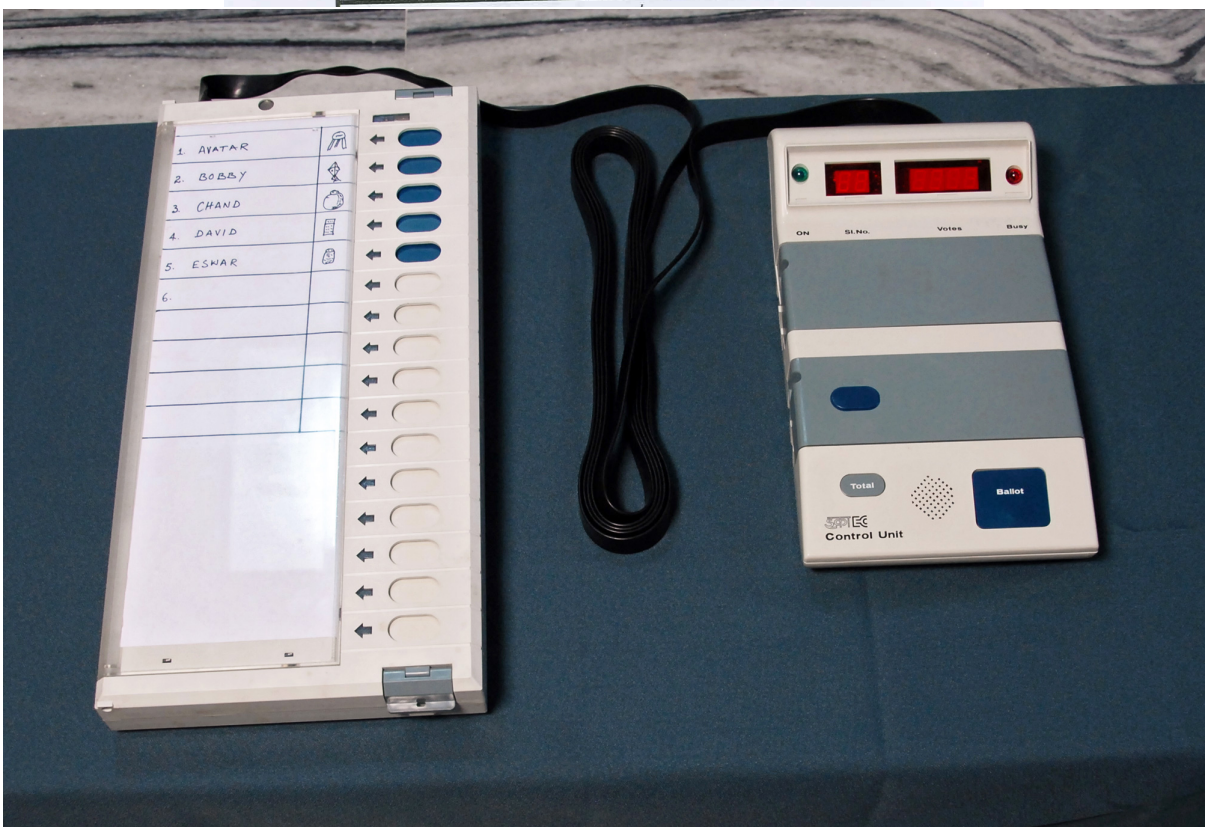


FIGURE 2: Time-line of Introduction of Electronic Voting Machines in State Assembly Constituencies in India.

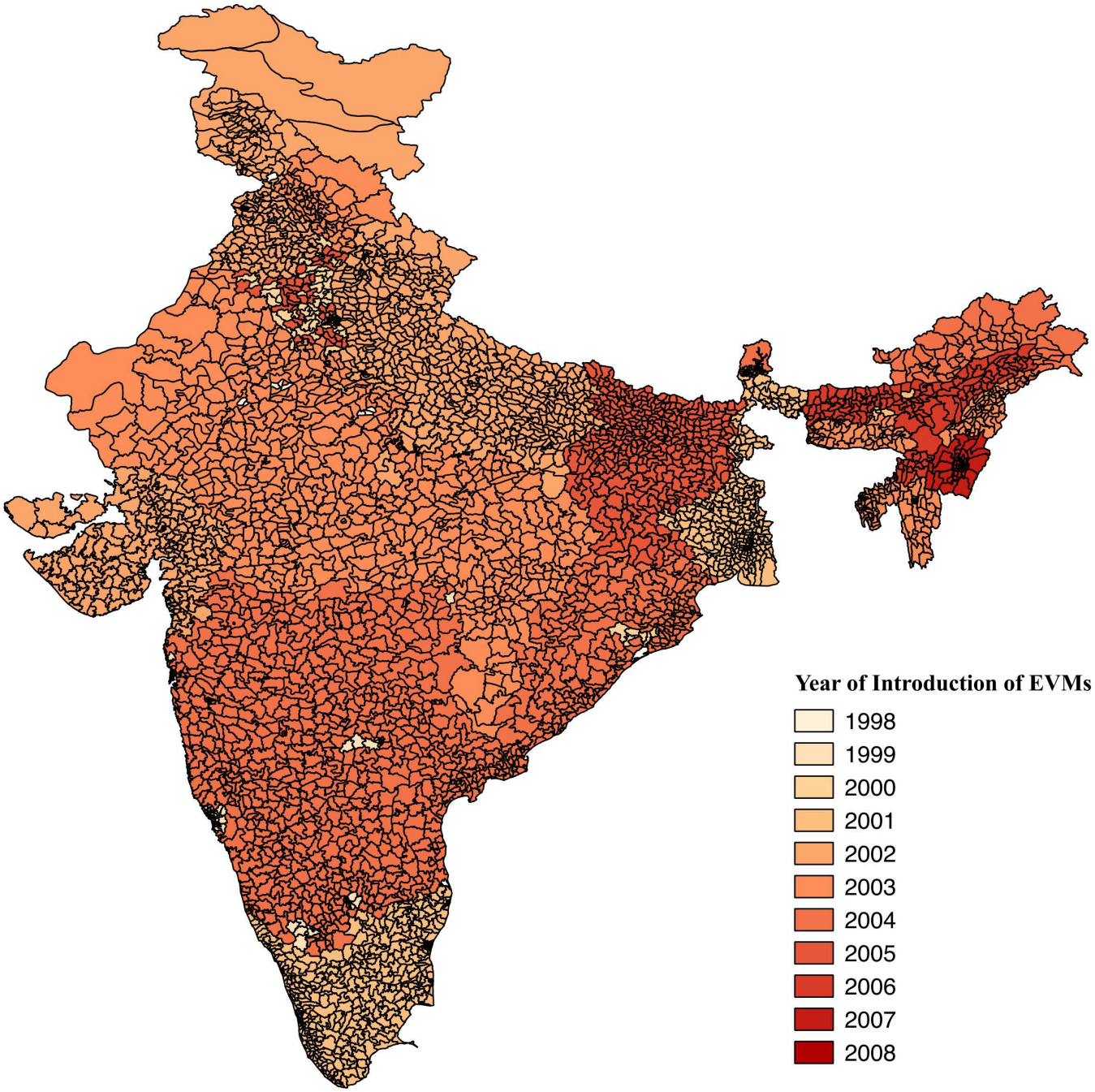
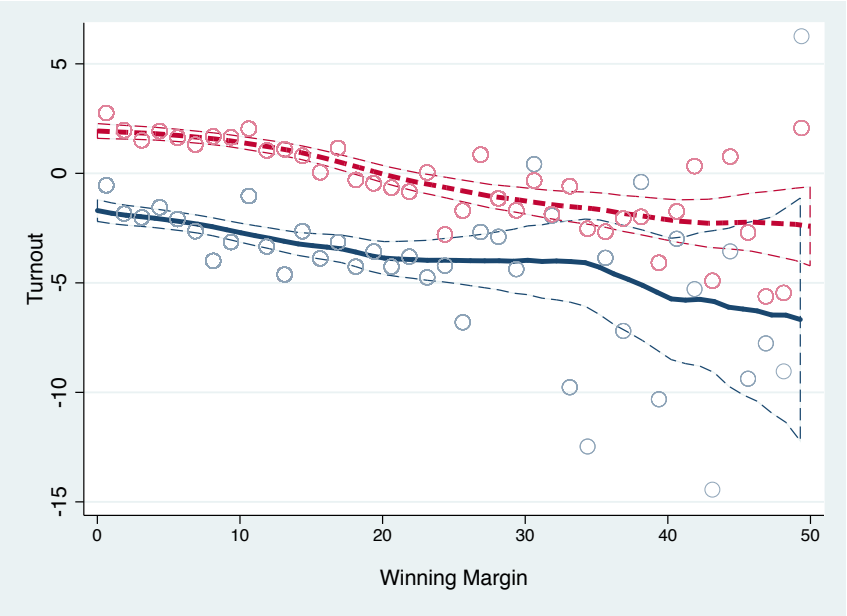
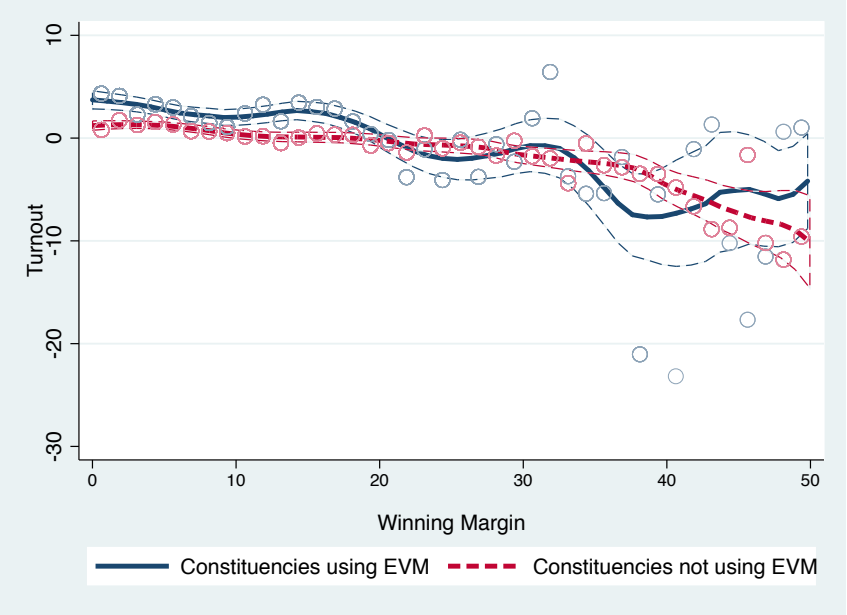


FIGURE 3: Turnout and Winning Margin by States: Local Polynomial Fit.

PANEL A: Higher Criminal Charges against MLAs

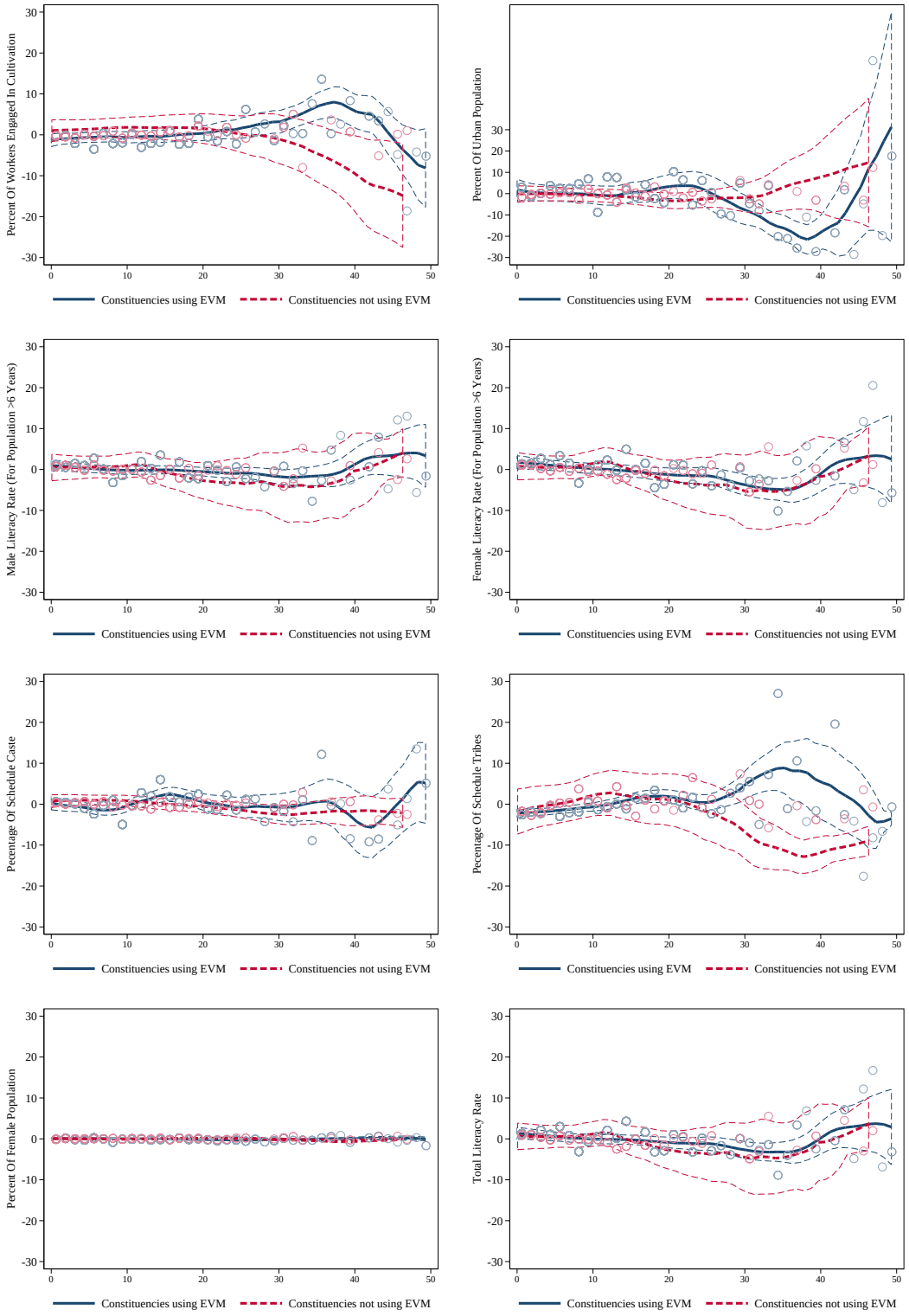


PANEL B: Lower Criminal Charges against MLAs



Notes: Data include results from state assembly elections between 1976–2007 from all states in India published by the Election Commission. In PANEL A the data is restricted to the states of Bihar, Jharkhand, Maharashtra, and Uttar Pradesh where a substantial fraction of the Members of the Legislative Assembly had serious criminal cases against them.

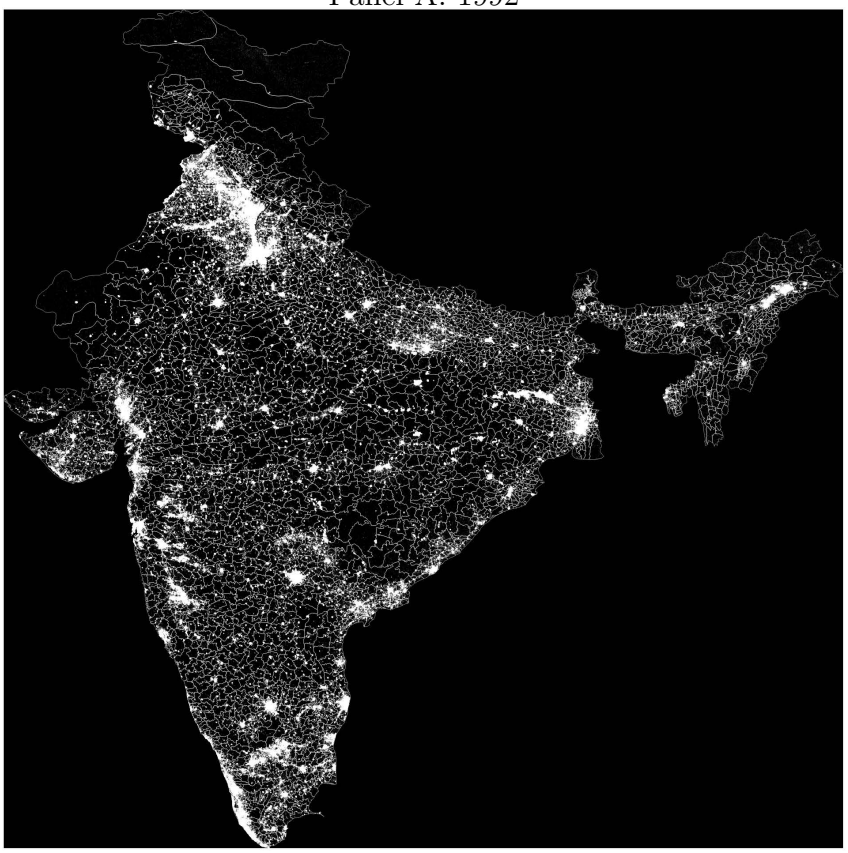
FIGURE 4: Continuity Checks for Exogenous Variables



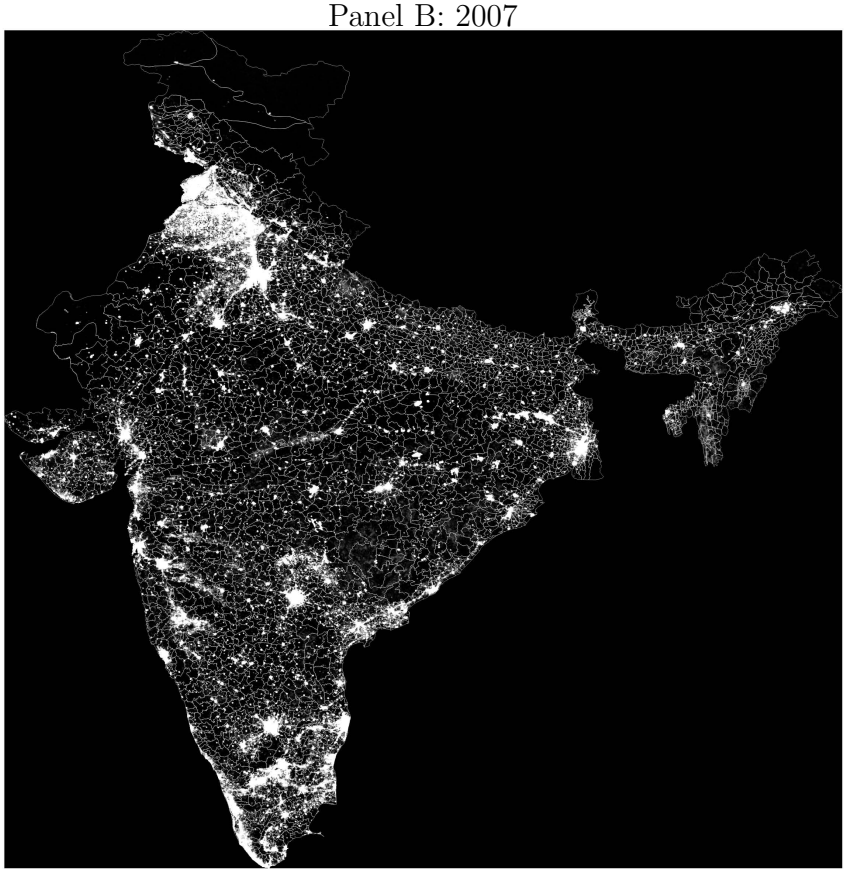
Notes: Data include results from state assembly elections between 1976–2007 from all states in India published by the Election Commission of India. Furthermore, we use the data on demography and other socio-economic indicators from Census 2001 published by Office of Registrar General, Government of India. The panel refers to the following covariates - literacy rate (total, male & female), percent workers engaged in cultivation, urban population, schedule caste, schedule tribes and female population as per census 2001. The figure shows the predicted values of a local linear smoother estimated seperately for, constituencies that used EVM and postal ballots. The running variable is winning margin of the candidate.

FIGURE 5: Nighttime Lights in India with Assembly Constituency Boundary.

Panel A: 1992



Panel B: 2007



Notes: Satellite raster images are obtained from the National Aeronautics and Space Administration's (NASA) Defense Meteorological Satellite Programs Operational Linescan System (DMSP-OLS).

TABLE 1: Summary Statistics.

	Elections with Paper Ballot	Elections with EVM	Difference
Electors	122748.3	173944.1	51195.7***
	(55235)	(86214.76)	
Male Electors	64237.8	90931.3	26693.5***
	(31366.63)	(47190.67)	
Female Electors	58510.6	83012.8	24502.2***
	(25146.51)	(39481.01)	
Voters	75686.2	107124.4	31438.2***
	(34597.36)	(45405)	
Male Voters	42151.2	57932.1	15780.9***
	(19256.97)	(25144.84)	
Female Voters	33535	49192.4	15657.4***
	(16277.79)	(21035.29)	
Turnout	62.9	64.3	1.4***
	(14.02)	(13.21)	
Male Turnout	67.1	66.5	-0.5***
	(13.36)	(12.94)	
Female Turnout	58.6	61.9	3.3***
	(18.62)	(14.23)	
Winning Margin	15.5	11.4	-4.0***
	(13.57)	(10.57)	
Vote Share of the Winning Candidate	48	45.3	-2.7***
	(11.11)	(10.09)	
Total Candidates	9.2	8.7	-0.4***
	(9.98)	(4.56)	
Gender of the Winning Candidate	1	.9	-0.0***
	(.2)	(.25)	
Rejected Votes	1926.3	76.9	-1849.4***
	(1594.46)	(362.23)	
Postal Votes	106.6	68.5	-38.1***
	(248.07)	(72.33)	

Notes: Data include results from state assembly elections between 1976-2007 from 30 states in India published by the Election Commission of India.

TABLE 2: Determinants of Introduction of Electronic Voting Machines in State Assembly Constituencies.

Dependent variable:	Use of Electronic Voting Machines			
	(1)	(2)	(3)	(4)
EVMs used in *loksabha* in 1999	0.105*	0.080	-0.019	-0.029
	(0.06)	(0.05)	(0.05)	(0.02)
Total Urban population		0.000		0.000
		(0.00)		(0.00)
Male literacy rate		-0.000		-0.000
		(0.00)		(0.00)
Female literacy rate		0.002		0.001
		(0.00)		(0.00)
Percent of workers engaged in cultivation		0.001		0.001
		(0.00)		(0.00)
Pecentage of Schedule Caste		0.004**		0.003*
		(0.00)		(0.00)
Pecentage of Schedule Tribes		0.001		0.001
		(0.00)		(0.00)
EVMs used in *loksabha* in 1999 × 1998			0.140***	0.163**
			(0.05)	(0.07)
EVMs used in *loksabha* in 1999 × 1999			0.936***	0.934***
			(0.03)	(0.04)
EVMs used in *loksabha* in 1999 × 2000			0.878***	0.869***
			(0.10)	(0.10)
EVMs used in *loksabha* in 1999 × 2001			0.159	0.164
			(0.19)	(0.20)
EVMs used in *loksabha* in 1999 × 2002			0.087	0.080
			(0.09)	(0.09)
EVMs used in *loksabha* in 1999 × 2003			-0.009	-0.012
			(0.01)	(0.01)
EVMs used in *loksabha* in 1999 × 2004			-0.009	-0.007
			(0.02)	(0.03)
EVMs used in *loksabha* in 1999 × 2005			-0.066	-0.079
			(0.06)	(0.06)
EVMs used in *loksabha* in 1999 × 2006			-0.005	-0.005
			(0.00)	(0.00)
EVMs used in *loksabha* in 1999 × 2007			0.018	0.011
			(0.03)	(0.03)
R Squared	0.935	0.942	0.956	0.957
No. of Observations	12946	12462	12946	12462

Notes: Data include results from state assembly elections between 1976–2007 from all states in India published by the Election Commission of India. All columns control for election year and assembly constituency fixed effects. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE 3: Effect of Electronic Voting Machines on Voters by Gender.

	(1)	(2)	(3)
Panel A: Effect of EVM on log Voters			
Dependent Variable	Log Voters	Log Male Voters	Log Female Voters
EVM	-0.068**	-0.071**	-0.055**
	(0.03)	(0.03)	(0.02)
R Squared	0.948	0.953	0.925
No. of Observations	27929	27929	27927
Panel B: Effect of EVM on Voter Turnout			
Dependent Variables	Turnout	Male Turnout	Female Turnout
EVM	-4.52***	-5.19***	-3.92***
	(1.47)	(1.72)	(1.25)
R Squared	0.820	0.733	0.703
No. of Observations	27929	27929	27929

Notes: Data include results from state assembly elections between 1976-2007 from all states in India published by the Election Commission of India. All columns control for election year and assembly constituency fixed effects; vote share and gender of the winning candidate; number of contestants and state specific time trends. Each specification in Panel A also controls for log of total, male and female electors respectively. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE 4: Difference in Difference Estimate of EVMs on Election Outcomes.

	(1)	(2)	(3)
Panel A: Effect of EVM on log Voters			
Dependent Variable	Log Voters	Log Male Voters	Log Female Voters
Treatment	0.016	-0.016	0.0054
	(0.07)	(0.06)	(0.07)
Post	0.13***	0.10***	0.20***
	(0.03)	(0.02)	(0.04)
Treatment × Post	-0.072**	-0.060*	-0.089**
	(0.03)	(0.03)	(0.03)
R Squared	0.938	0.945	0.910
No. of Observations	21982	21982	21980
Panel B: Effect of EVM on Voter Turnout			
Dependent Variables	Turnout	Male Turnout	Female Turnout
Treatment	5.71	4.36	7.08
	(4.34)	(4.23)	(4.72)
Post	5.68***	4.46***	6.47***
	(0.93)	(0.92)	(1.14)
Treatment × Post	-4.40***	-4.17**	-4.78***
	(1.27)	(1.51)	(1.17)
R Squared	0.795	0.696	0.674
No. of Observations	21982	21982	21982

Notes: Data include results from state assembly elections between 1976-2000 from all states in India published by the Election Commission of India. All columns control for election year and assembly constituency fixed effects; vote share and gender of the winning candidate; and number of contestants. Post is an indicator for elections after 1997. Treatment is an indicator for constituencies that used EVMs between 1991-2000. Each specification in Panel A also controls for log of total, male and female electors respectively. Errors are robust and clustered at the state level. Turnout is defined as the ratio of voters over electors (multiplied by 100). ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE 5: Effect of Electronic Voting Machines on Rejected Votes.

Dependent Variable:	Rejected Votes			
	(1)	(2)	(3)	(4)
EVM	-2075.1***	-2025.9***	-2058.6***	-2268.3***
	(591.50)	(598.54)	(605.51)	(583.92)
Election yr. FE	Yes	Yes	Yes	Yes
Assembly constituency FE	No	Yes	Yes	Yes
Electors	No	No	Yes	Yes
# Candidates	No	No	No	Yes
R Squared	0.497	0.700	0.702	0.741
No. of Observations	25360	25360	25360	25360

Notes: Data include results from state assembly elections between 1976-2000 from all states in India published by the Election Commission of India. All columns control for election year fixed effect. Post is an indicator for elections after 1997. Treatment is an indicator for constituencies that used EVMs between 1991-2007. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE 6: Heterogeneity in the Effects of EVMs.

	(1)	(2)	(3)
Panel A: Effect of EVM on log Voters			
Dependent Variable	Log Voters	Log Male Voters	Log Female Voters
EVM	-0.044**	-0.047**	-0.032*
	(0.02)	(0.02)	(0.02)
EVM × Criminal Legislatures	-0.10	-0.11	-0.10
	(0.07)	(0.07)	(0.07)
R Squared	0.948	0.954	0.925
No. of Observations	27929	27929	27927
Panel B: Effect of EVM on Voter Turnout			
Dependent Variables	Turnout	Male Turnout	Female Turnout
EVM	-3.20***	-3.70***	-2.78**
	(1.16)	(1.26)	(1.15)
EVM × Criminal Legislatures	-5.71*	-6.48*	-4.94*
	(3.18)	(3.50)	(2.71)
R Squared	0.822	0.735	0.704
No. of Observations	27929	27929	27929

Notes: Data include results from state assembly elections between 1976-2007 from all states in India published by the Election Commission of India. All columns control for election year and assembly constituency fixed effects; vote share and gender of the winning candidate; and number of contestants and state specific time trend. Each specification in Panel A also controls for log of total, male and female electors respectively. *EVM* is an indicator taking the value one if Electronic Voting Machines were used in the election and zero otherwise. *Criminal Legislatures* takes the value one for the state of Maharashtra, Uttar Pradesh, Bihar and Jharkhand. Errors are robust and clustered at the state level. Turnout is defined as the ratio of voters over electors (multiplied by 100). ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE 7: Effects of EVMs on Vote Share of the Winning and Incumbent Candidate, and Winning Margins.

Dependent variable	Vote share of winning party (1)	Vote share of the incumbent party (2)	Winning margin (3)
EVM	-1.70	-0.70	-0.42
	(1.76)	(3.50)	(1.43)
EVM × Criminal Legislatures	0.26	-0.039	-0.15
	(2.60)	(4.14)	(1.95)
R Squared	0.447	0.405	0.302
No. of Observations	29446	23434	29446

Notes: Data include results from state assembly elections between 1976-2007 from all states in India published by the Election Commission of India. All columns control for election year and assembly constituency FEs, and gender of the winning candidate; and number of contestants. *Criminal Legislatures* takes the value one for the state of Maharashtra, Uttar Pradesh, Bihar and Jharkhand. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE 8: Dynamic Effects of Electronic Voting Machines on Crime

Lead length	1 period (1)	2 periods (2)	3 periods (3)	4 periods (4)	Average (5)
Panel A: Total IPC crime (Log)					
EVM	0.060	0.043	-0.054	-0.13*	-0.0022
	(0.07)	(0.05)	(0.07)	(0.06)	(0.05)
EVM × Criminal Legislatures	-0.25***	-0.11***	-0.12*	-0.064	-0.13***
	(0.08)	(0.04)	(0.07)	(0.05)	(0.04)
R Squared	0.976	0.982	0.983	0.983	0.982
No. of Observations	1697	1541	1469	1409	1743
Panel B: Murder (Log)					
EVM	0.11	0.054	-0.19	-0.054	-0.0055
	(0.08)	(0.09)	(0.13)	(0.13)	(0.06)
EVM × Criminal Legislatures	-0.37**	-0.16**	-0.24*	-0.11	-0.26**
	(0.14)	(0.08)	(0.12)	(0.10)	(0.10)
R Squared	0.935	0.938	0.948	0.946	0.959
No. of Observations	1693	1537	1463	1405	1742
Panel C: Attempt to Murder (Log)					
EVM	0.014	-0.32*	-0.30	-0.16	-0.15
	(0.20)	(0.16)	(0.21)	(0.25)	(0.16)
EVM × Criminal Legislatures	-0.28	0.029	-0.067	-0.0032	-0.088
	(0.21)	(0.20)	(0.16)	(0.14)	(0.18)
R Squared	0.878	0.898	0.912	0.900	0.920
No. of Observations	1654	1494	1431	1369	1725
Panel D: Rape (Log)					
EVM	0.068	-0.12	-0.13	-0.18	-0.073
	(0.14)	(0.19)	(0.13)	(0.15)	(0.13)
EVM × Criminal Legislatures	-0.20*	-0.093	-0.28**	-0.14*	-0.16
	(0.11)	(0.13)	(0.10)	(0.08)	(0.10)
R Squared	0.890	0.896	0.904	0.915	0.934
No. of Observations	1651	1505	1432	1374	1728

Notes: Data include results from state assembly elections between 1991-2007 from all states in India published by the Election Commission of India. District level crime data is obtained from the National Crime Records Bureau. All specification control for election year and district FEs; vote share and gender of the winning candidate; and number of contestants. *Criminal Legislatures* takes the value one for the state of Maharashtra, Uttar Pradesh, Bihar and Jharkhand. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE 9: Effect of Electronic Voting Machines on Log Luminosity

Lead length	1 period	2 periods	3 periods	4 periods	Average
	(1)	(2)	(3)	(4)	(5)
EVM	0.049	0.14	0.21*	0.24**	0.10
	(0.12)	(0.11)	(0.11)	(0.09)	(0.12)
EVM × Criminal Legislature	-0.25*	-0.30**	-0.28***	-0.10	-0.13
	(0.12)	(0.13)	(0.08)	(0.13)	(0.12)
R Squared	0.944	0.943	0.938	0.944	0.955
No. of Observations	12851	11921	11082	10642	12859

Notes: Data include results from state assembly elections between 1992-2007 from all states in India published by the Election Commission of India. All specification control for election year and constituency FEs; vote share and gender of the winning candidate; and number of contestants. *Criminal Legislatures* takes the value one for the state of Maharashtra, Uttar Pradesh, Bihar and Jharkhand. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE 10: Effects of Electronic Voting Machines on Ability to Vote and Vote Capture

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Ability to Vote						
EVM	0.0038	-0.018	-0.018	-0.022*	-0.0018	-0.014
	(0.01)	(0.02)	(0.02)	(0.01)	(0.01)	(0.02)
EVM × Illiterate		0.047*				
		(0.02)				
EVM × Female			0.049			
			(0.03)			
EVM × Lower Caste				0.044***		
				(0.01)		
EVM × Senior Citizen					0.064	
					(0.04)	
EVM × Illiterate Female						0.069**
						(0.03)
R Squared	0.028	0.029	0.029	0.029	0.030	0.030
No. of Observations	36267	36267	36267	36267	36374	36267
Panel B: Fear of Violence, Someone Else Voted, Prevented from Voting						
EVM	-0.0026	0.0048	0.0047	0.0032	-0.0020	0.0021
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
EVM × Illiterate		-0.016				
		(0.01)				
EVM × Female			-0.017			
			(0.01)			
EVM × Lower Caste				-0.0095		
				(0.01)		
EVM × Senior Citizen					-0.0063	
					(0.01)	
EVM × Illiterate Female						-0.018*
						(0.01)
R Squared	0.021	0.023	0.022	0.022	0.021	0.022
No. of Observations	36229	36229	36229	36229	36229	36229

Notes: Data include results from post-poll surveys conducted by *Lokniti*-CSDS in Assam Bihar, Chattisgarh, Delhi , Haryana, J&K, Jharkhand, Kerala, Madhya Pradesh, Meghalaya, Mizoram, Odisha, Punjab, Rajasthan, Tamilnadu, Uttarakhand and West Bengal during the period 2000-06. All columns control for gender except(column 3), age and election year and state FEs. Lower caste takes the value one if respondent belongs to schedule caste, schedule tribes and other backward caste. Illiterate takes the value one if respondent has not completed primary education. Senior citizen takes the value one if the respondent's age is more than 60 years. Female takes the the value one if the respondent's gender is female. EVM takes the value one if the constituency used electronic voting machine and 0 otherwise. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

Appendix

TABLE A.1: Fraction of Constituencies using Electronic Voting Machines over Time.

State	Year 1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	Total
Andhra Pradesh					0.0					0.0					1.0				0.3
Arunachal Pradesh	0.0					0.0				0.0					1.0				0.3
Assam		0.0					0.0					0.0					1.0		0.3
Bihar	0.0					0.0					0.0					1.0			0.3
Chhattisgarh														1.0					1.0
Delhi				0.0					0.1					1.0					0.4
Goa					0.0					1.0			1.0					1.0	0.8
Gujarat	0.0					0.0			0.0				1.0					1.0	0.4
Haryana		0.0					0.0				0.5					1.0			0.4
Himachal Pradesh	0.0			0.0					0.0					1.0				1.0	0.4
Jammu & Kashmir							0.0						1.0						0.5
Jharkhand																1.0			1.0
Karnataka					0.0					0.1					1.0				0.4
Kerala		0.0					0.0					1.0					1.0		0.5
Madhya Pradesh	0.0			0.0					0.0					1.0					0.2
Maharashtra	0.0					0.0				0.1					1.0				0.3
Manipur	0.0					0.0					0.0		0.1					1.0	0.2
Meghalaya				0.0					0.0					1.0					0.3
Mizoram				0.0					0.0					1.0					0.3
Nagaland				0.0					0.0					1.0					0.3
Orissa	0.0					0.0					0.0				1.0				0.3
Pondicherry	0.0	0.0					0.0					1.0					1.0		0.4
Punjab			0.0					0.0					1.0					1.0	0.5
Rajasthan	0.0			0.0					0.0					1.0					0.3
Sikkim					0.0					0.0					1.0				0.3
Tamil Nadu		0.0					0.0					1.0					1.0		0.5
Tripura				0.0					0.0					1.0					0.3
Uttar Pradesh		0.0		0.0			0.0						1.0					1.0	0.4
Uttarakhand													1.0					1.0	1.0
West Bengal		0.0					0.0					1.0					1.0		0.5
Total	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.9	0.9	1.0	1.0	1.0	1.0	1.0	0.4

Sources: http://eci.nic.in/eci_main/eci_publications/books/miscell/elections-india.pdf; http://hindu.com/2001/03/01/stories/04012234.htm; http://www.hindu.com/2003/12/01/stories/2003120104381100.htm; http://eci.nic.in/eci_main/eci_publications/books/miscell/elections-india.pdf; http://www.tribuneindia.com/2000/20000126/haryana.htm#2; http://hindu.com/2001/03/01/stories/04012234.htm; http://eci.nic.in/eci_main/eci_publications/books/miscell/elections-india.pdf; http://www.tribuneindia.com/2001/20011227/main1.htm; http://www.rediff.com/news/1998/nov/24vote.htm; http://www.rediff.com/news/2000/jan/04polls.htm; http://www.tribuneindia.com/2001/20011227/main1.htm.

TABLE A.2: Statewise Percentage of Members of Legislative Assembly with Criminal Cases.

States	Constituencies	MLAs	Criminal Cases		Serious Criminal Cases		Election
		Analysed	No.	Frac.	No.	Frac.	Year
Nagaland	60	56	0	0.00	0	0.00	2008
Arunachal Pradesh	60	60	2	3.33	0	0.00	2004
Mizoram	40	38	4	10.53	0	0.00	2008
Goa	40	40	9	22.50	0	0.00	2007
Manipur	60	60	1	1.67	1	1.67	2007
Meghalaya	60	60	1	1.67	1	1.67	2008
Tripura	60	57	3	5.26	1	1.75	2008
Sikkim	32	32	1	3.13	1	3.13	2009
Jammu & Kashmir	87	60	6	10.00	2	3.33	2008
Assam	189	126	7	5.56	5	3.97	2006
Rajasthan	200	197	31	15.74	8	4.06	2008
Punjab	117	117	20	17.09	5	4.27	2007
Karnataka	225	218	44	20.18	18	8.26	2008
Delhi	70	68	29	42.65	6	8.82	2008
Chattisgarh	90	85	11	12.94	8	9.41	2008
Andhra Pradesh	293	284	74	26.06	27	9.51	2009
Uttarakhand	70	70	17	24.29	7	10.00	2007
West Bengal	307	283	45	15.90	30	10.60	2006
Tamil Nadu	237	234	77	32.91	25	10.68	2006
Himachal Pradesh	68	68	26	38.24	8	11.76	2007
Gujarat	182	182	47	25.82	22	12.09	2007
Kerala	140	139	68	48.92	17	12.23	2006
Madhya Pradesh	230	219	58	26.48	27	12.33	2008
Haryana	90	90	28	31.11	13	14.44	2005
Orissa	147	145	58	40.00	24	16.55	2004
Pondicherry	30	30	6	20.00	5	16.67	2006
Uttar Pradesh	402	402	142	35.32	75	18.66	2007
Maharashtra	288	288	132	45.83	54	18.75	2004
Jharkhand	81	72	31	43.06	18	25.00	2005
Bihar	260	233	117	50.21	68	29.18	2005

Source: Association for Democratic Reforms and National Election Watch.

TABLE A.3: Parallel Trends.

	Log voters			Turnout		
	Total	Male	Female	Total	Male	Female
	(1)	(2)	(3)	(4)	(5)	(6)
Treatment × 1977	0.023	-0.0077	0.061	2.21	1.49	2.69
	(0.10)	(0.09)	(0.11)	(4.41)	(3.93)	(4.59)
Treatment × 1978	-0.037	-0.067	-0.019	2.13	-0.26	3.56
	(0.13)	(0.12)	(0.15)	(4.92)	(4.09)	(5.90)
Treatment × 1980	-0.24	-0.25	-0.25	-7.08	-8.79	-6.92
	(0.18)	(0.16)	(0.22)	(6.27)	(5.89)	(7.04)
Treatment × 1982	0.015	0.0086	0.025	0.88	0.80	1.32
	(0.03)	(0.03)	(0.04)	(1.54)	(1.61)	(1.44)
Treatment × 1983	-0.13	-0.11	-0.15	-0.87	-1.08	-0.81
	(0.15)	(0.15)	(0.19)	(4.52)	(3.98)	(5.48)
Treatment × 1984	-0.34*	-0.34**	-0.35	-12.8**	-14.4**	-12.0
	(0.18)	(0.16)	(0.22)	(6.12)	(5.20)	(7.48)
Treatment × 1985	-0.13	-0.16	-0.10	-2.47	-4.59	-1.19
	(0.14)	(0.12)	(0.17)	(4.69)	(4.08)	(5.47)
Treatment × 1987	0.035	0.047	0.024	0.13	1.54	-0.99
	(0.03)	(0.03)	(0.03)	(2.17)	(2.00)	(2.54)
Treatment × 1989	-0.16	-0.17	-0.17	-4.78	-5.67	-5.58
	(0.16)	(0.14)	(0.20)	(4.84)	(4.18)	(5.70)
Treatment × 1990	-0.11	-0.11	-0.11	-1.43	1.75	-1.66
	(0.13)	(0.11)	(0.15)	(4.52)	(4.21)	(5.22)
Treatment × 1991	0.000013	0.013	-0.018	-0.59	0.40	-1.78*
	(0.03)	(0.04)	(0.04)	(1.11)	(1.22)	(1.02)
Treatment × 1993	-0.077	-0.070	-0.10	-0.39	0.67	-1.24
	(0.13)	(0.12)	(0.15)	(5.07)	(4.90)	(5.23)
Treatment × 1994	-0.18	-0.20	-0.19	-5.30	-6.85	-4.81
	(0.14)	(0.12)	(0.17)	(5.20)	(4.47)	(6.21)
Treatment × 1995	-0.14	-0.15	-0.15	-3.68	-3.98	-3.72
	(0.12)	(0.11)	(0.14)	(4.54)	(4.24)	(4.97)
R Squared	0.929	0.936	0.901	0.801	0.699	0.672
No. of Observations	19424	19424	19422	19424	19424	19424

Notes: Data include results from state assembly elections between 1976-1997 from all states in India published by the Election Commission of India. All specification control for election year and constituency FEs; vote share and gender of the winning candidate; and number of contestants. Column (1),(2),(3) also controls for log of total, male and female electors respectively. *Treatment* is an indicator for constituencies that used EVMs between 1991-2000. Errors are robust and clustered at the state level.

TABLE A.4: Effect of Electronic Voting Machines on Turnout in Close Elections.

	(1)	(2)	(3)	(4)	(5)	(6)
			Panel A: All Legislatures			
Turnout	-6.28***	-6.23***	-5.31**	-6.77***	-5.74**	-6.45***
	(1.17)	(1.61)	(2.06)	(2.07)	(2.16)	(2.15)
Female Turnout	-6.27***	-6.37***	-5.45**	-6.66***	-6.02***	-6.25***
	(1.28)	(1.80)	(2.01)	(1.91)	(2.14)	(2.04)
Male Turnout	-6.31***	-6.10***	-5.24**	-6.90***	-5.53**	-6.59***
	(1.19)	(1.61)	(2.23)	(2.27)	(2.33)	(2.30)
Observations	3701	7147	3701	7147	3701	7147
			Panel B: Criminal Legislatures			
Turnout	-17.2***	-19.4***	-15.5***	-18.0***	-15.3***	-18.1***
	(5.41)	(6.38)	(0.76)	(1.08)	(1.36)	(1.66)
Female Turnout	-15.6***	-17.7***	-14.7***	-16.7***	-14.1***	-16.5***
	(5.47)	(6.59)	(0.52)	(1.06)	(0.96)	(1.60)
Male Turnout	-19.1***	-21.3***	-16.6***	-19.8***	-16.8***	-19.9***
	(5.54)	(6.41)	(1.00)	(1.00)	(1.70)	(1.78)
Observations	1196	2317	1196	2317	1196	2317
			Panel C: Non-Criminal Legislatures			
Turnout	-3.80**	-2.56	-2.43	-4.63*	-2.63	-4.29
	(1.61)	(1.91)	(2.33)	(2.58)	(2.95)	(2.50)
Female Turnout	-4.59***	-3.18	-2.96	-5.34**	-3.17	-4.97*
	(1.67)	(2.01)	(2.30)	(2.47)	(3.25)	(2.49)
Male Turnout	-3.07*	-1.98	-1.90	-3.94	-2.06	-3.70
	(1.74)	(2.13)	(2.62)	(2.80)	(2.89)	(2.66)
Observations	1174	2234	1174	2234	1174	2234
Bandwidth	2.5	5	2.5	5	2.5	5
Specification	-	-	Linear	Linear	Quadratic	Quadratic
Model	Non-Param.	Non-Param.	Param.	Param.	Param.	Param.

Notes: Data include results from state assembly elections between 1976-2007 from all states in India published by the Election Commission of India. All specifications control for election year and state FEs; vote share and gender of the winning candidate; and number of contestants. Non-parametric models in Columns (1) and (2) are executed using the Stata routine `rd`. In rest of the columns the specifications are parametric. In Column (3) and (4) the model is linear in winning margin, whereas for the last two columns the model is quadratic in winning margin. In Panel B, the sample is restricted for the states of Maharashtra, Uttar Pradesh, Bihar and Jharkhand. In Panel C, the sample is restricted for the states of Nagaland, Arunachal Pradesh, Mizoram, Goa, Manipur, Meghalaya, Tripura, Sikkim, Jammu & Kashmir, Assam, and Rajasthan. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.

TABLE A.5: Placebo Test: Postal Ballots.

Dependent Variable:	Postal Votes			
	(1)	(2)	(3)	(4)
Treatment	-54.2	-55.0	-104.3	-92.3
	(47.08)	(103.18)	(93.73)	(97.42)
Post	33.7	31.5	79.0	74.5
	(26.19)	(91.17)	(80.73)	(77.87)
Treatment × Post	-74.6	-118.3	-113.3	-117.7
	(111.76)	(141.21)	(142.24)	(136.76)
Election yr. FE	Yes	Yes	Yes	Yes
State FE	No	Yes	Yes	Yes
Electors	No	No	Yes	Yes
# Candidates	No	No	No	Yes
R Squared	0.125	0.938	0.939	0.939
No. of Observations	5760	5760	5757	5757

Notes: Data include results from state assembly elections between 1994-2000 from all states in India published by the Election Commission of India. All columns control for election year fixed effects. Errors are robust and clustered at the state level. ***, **, and, * indicate statistical significance at the 1, 5, and, 10 percent level respectively.