

**Research Unit for Statistical  
and Empirical Analysis in Social Sciences (Hi-Stat)**

**Voter Turnout and the Principle of  
"One Person, One Vote":  
Empirical Evidence from  
the Constituency Freeze in India**

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November 2012

# Voter Turnout and the Principle of “One Person, One Vote”: Empirical Evidence from the Constituency Freeze in India<sup>1</sup>

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October, 2012

## Abstract

This paper uses panel data from national and state elections in India during the period 1977–2007 to examine the effect of inequality in constituency population size on voter turnout. During this period, constituency boundaries in India remained fixed. As a result, differences in population size between constituencies increased, thus changing the value of a single vote. Using this large variation in population size and informative data, this paper carefully distinguishes the effect of population size from other factors. We find that an increase of 100,000 electorates decreases voter turnout by 1.6%. In addition, we find that the share of votes gained by national political parties is greater in small-population constituencies. This suggests that political parties direct their efforts in electoral campaigns preferentially to less populous constituencies; as a result, voters in small constituencies are more likely to participate in elections.

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<sup>1</sup> The author wishes to express her appreciation to Takashi Kurosaki, Daiji Kawaguchi, Norihito Sakamoto, and the participants of the Political Economy of Institutions and Expectations III (Waseda University) and Japanese Economic Association 2012 Spring Meeting (Hokkaido University) for their very helpful comments and suggestions. This work was supported by JSPS Grant-in-Aid for JSPS Fellows 246375.

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## 1. Introduction

The democratic principle of “one person, one vote, one value” supposes that one person’s vote should not have a greater weight than another’s. In a representative system, where each constituency elects a single representative or a fixed number of representatives, preserving this principle requires that constituencies have roughly the same population. However, in some countries, such as the United States, Japan, and India, there are huge inequalities in population size across constituencies<sup>3</sup>. While these cases have generated significant controversy about fair representation—that is, about inequalities in the value of a single vote—little is known about whether population inequalities affect voting behavior. The purpose of this paper is to examine the effect of population size on voter turnout and further investigate how inequality in the value of a vote distorts political conditions.

Why do people vote? This question has spawned an enormous amount of scholarly attention, both theoretically and empirically. According to the traditional approach (Riker and Ordeshook, 1968), the probability of a vote being pivotal, which relates directly to population size, is an important factor in the decision to vote. Effects

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<sup>3</sup> The inequality in population size between states in U.S. Senate elections is huge, since the number of seats allocated to states is fixed at two. In Japan, too, there are large differences in population sizes, especially in the upper house. India, which this paper focuses on, has staggering inequalities even in lower house elections. The distortion due to population size inequality has been studied in the context of redistribution (Atlas et al., 1995; Hoover and Pecorino, 2005; Porto and Sanguinetti, 2001). Most studies show that constituencies with larger populations get lower fiscal transfers from their governments.

of population size on voter turnout have been studied in a variety of contexts. A study by Geys (2006), which surveyed the research about voter turnout using aggregate data from constituencies, states, and countries, found that more than half of population size estimates had a negative sign (67 among 120 regressions). Thus, Geys concluded that population size is an important factor affecting voter turnout.<sup>4</sup>

Although there are many studies about the relationship between population size and voter turnout, few estimate the causal effect of population size. There are two fundamental problems in generating an unbiased and significant estimate for the effect of population size on voter turnout: lack of variation in constituency population size and endogeneity caused by omitted variable bias. The former problem occurs because most countries draw constituency borders to achieve equal population size across constituencies. Little variation in explanatory variables makes it difficult to get significant estimators. The latter problem can occur, for example, when constituencies include large urban areas where voter turnout is usually low; thus, the negative correlation between voter turnout and population size may not be because of the large population size but because of low voter turnout in urban areas.

To deal with these problems, this study focuses on the electoral system in India,

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<sup>4</sup> Aldrich (1993), Muller (2003) and Feddersen (2004) reviews literature about turnout. Some recent papers use laboratory experiments to find the negative effects of population size on turnout, although the size of population is always very small (For example, Levine and Palfrey (2007)).

where the borders of constituencies for both national and state elections remained almost static from 1977 to 2007. Due to the constituency freeze, large variations in population sizes developed across constituencies. For example, in national elections, the largest constituency had 86 times as many voters as the smallest one.

Another advantage of focusing on India is that we can minimize the bias by comparing the voter turnout of a single constituency in different elections, thus eliminating a variety of heterogeneous factors. In this study, two strategies are employed to control for heterogeneity across constituencies. One is to use the fixed effect model with long panel data for approximately 30 years.<sup>5</sup> While most studies use only panel data for aggregate units such as states and countries, this study uses data at the constituency level. However, while the fixed effect estimate reduces the endogeneity problem, the coefficient of population size could still have a bias. The fixed effect model uses the variation of population change to identify the effect of population size. When the population growth is concentrated in urban area, it is also difficult to determine whether the negative correlation between population growth and voter turnout is caused by a change in the value of each vote or by a change in demographic variables.

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<sup>5</sup> Coat et al. (2008) also use long panel data from Texas liquor referenda. However, they focus on small-scale elections and do not consider heterogeneities of districts.

To deal with the above problem, this paper uses an alternative strategy, which is to compare voter turnout between different elections, a national election and a state election, in the same constituency. In India, one national constituency is integrated by several state constituencies. Since there is also inequality in population size between state constituencies within a national constituency, we can examine the effect of population size in state constituencies on voter turnout in state elections. To control for heterogeneities among state constituencies, voter turnout in a national election is used as a proxy variable for the state constituency fixed effect. In other words, since the value of a single vote is different between two elections even in the same state constituency, we can estimate the effect of differences in the value of a single vote on voter turnout between the two elections. This identification strategy is possible because the Election Commission of India provides data on voter turnout in national elections on a state constituency basis. Using these data, we can observe a state constituency's voter turnout for national as well as state elections.

Using these two empirical strategies, we find that the larger a constituency's population, the lower the voter turnout rate. More specifically, in national elections, an increase of one million electorates decreases voter turnout by 18%. In the context of state elections, the fixed effect model shows that an increase of 100,000 electorates,

which is around the mean size, decreases voter turnout by 4.7%. The estimation using voter turnout in national elections as a proxy variable shows that an increase of 100,000 electorates decreases voter turnout by 1.6%. The difference between the two results suggests that the simple estimation by fixed effect model causes an omitted variable bias.

We also investigate one possible explanation of why people are more motivated to vote in small-population constituencies. Our hypothesis is based on work by Shachar and Nalebuff (1999), who use voting data from a U.S. presidential election to show that an increase in population size leads to reduced effort by political campaign organizations, which in turn results in decreased voter turnout. To examine whether this mechanism applies in India, we investigate the relationship between population size and vote share by political party. We find that increased population size decreases the vote share of national parties (defined as parties that are active in more than four states). This result indirectly supports the hypothesis that the effort of political parties is lower in large constituencies.

The remainder of this paper is structured as follows. Section 2 discusses the hypothesis that population size has a negative effect on voter turnout. Section 3 explains the structure of the electoral system in India and provides an overview of inequalities in

population size. Section 4 presents empirical strategies. Section 5 shows the study results and analyzes the political party-related mechanism in the negative effects of population size. Section 6 summarizes these findings and concludes.

## **2. Why Does Population Size Decrease Voter Turnout?**

There are two main reasons why population size has a negative effect on voter turnout.

The first is described by the traditional model of Riker and Ordeshook (1968), which crystallizes insights from Downs (1957). This model assumes that the decision to participate is based on whether the expected benefit exceeds the private cost of voting.

The expected benefit increases with (1) the expected difference in utility from the voter's favorite candidate winning, versus the opponent winning, and (2) the probability of affecting the election result. The latter element is especially relevant to population size, since the larger the population size in a constituency, the smaller the probability that one voter will make a difference. Therefore, we hypothesize a negative relation between population size and voter turnout.

Although the probability changing the election result by turnout of one voter is positive, the magnitude of influence is close to zero. There are, therefore, many attempts to try to explain the positive turnout (for example, Muller, 2003). One of the alternative



mechanism is the mobilization model (Feddersen, 2004). This model assumes that political leader determinants the level of resources allocating to voters which is a decisive variable for turnout decision. Based on this mechanism, Shachar and Nalebuff (1999) explain the negative correlation between population size and turnout. The costs of campaigning in constituencies with large populations are thought to be higher. For example, the total costs of advertising on television, in newspapers, and through posters increase with audience size. Using state-level voting data from U.S. presidential elections and applying structural estimation, Shachar and Nalebuff (1999) show that an increase in population size leads to less effort by political leaders, which in turn results in a decrease in voter turnout<sup>6</sup>.

The political conditions in India are different than in the U.S., especially in the diversity of political parties and the scale of population (around 700 million eligible voters in India). However, it is to be expected that political parties in India are strategic in their behavior when it comes to population size in constituencies. In particular, national parties (i.e., those active in more than four states) find it necessary to select constituencies where they will expend their resources to get a large share of legislative seats at a possibly lower cost. McMilan (2000) suggests the possibility that the

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<sup>6</sup> Shachar and Nalebuff (1999) mainly focus on how close an election is expected to be and show that the amount of effort expended by political leaders in a given state is based on the chance of that state's being pivotal.

constituency freeze has had an impact on the behavior of major parties such as the Indian National Congress (INC) and Bharatiya Janata Party (BJP) in national elections. In addition, it is reasonable to expect that political campaigning encourages people to vote: to illustrate, Banerjee et al. (2010) showed that a campaign with information on the qualifications of candidates increased voter turnout in Delhi<sup>7</sup>. Therefore, the results of the Shachar and Nalebuff (1999) study might apply to national parties in India. For this reason, we also hypothesize that population size has a negative effect on voter turnout.

In the following sections, we estimate the effect of population size. In addition, the correlation between population size and the vote share of national parties is also investigated.

### **3. Institutional Background**

The states and union territories of India are divided into constituencies electing a single representative in state elections (*Vidhan Sabha*). For national elections (*Lok Sabha*), several constituencies are combined into one. National and state elections are constitutionally scheduled to take place every five years. In some cases, elections have

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<sup>7</sup> In the case of Pakistan, Gine and Mansuri (2011) also show that information campaign promotes women to vote.

been called before the five-year term, mostly owing to shifting political alignments. The minimum voting age has been 18 since 1989; before that time, it was 21.

The Indian constitution states that two independent national-level commissions are responsible for implementing election systems. One is the Election Commission, which oversees state and national elections. The other is the Delimitation Commission, which is responsible for redistricting and is constituted whenever new census estimates are announced.

In 1976, the 42nd Constitutional Amendment instituted a freeze on the readjustment of constituencies for national and state legislature elections until the first census after the year 2001. Accordingly, in 2001 the 91st Constitutional Amendment Bill stipulated the delimitation of constituencies for national and state legislatures, although the number of legislators allocated to each state was not changed and the readjustment has been delayed until 2026<sup>8</sup>. In national and state elections, where some seats can be contested by Scheduled Caste or Scheduled Tribe candidates (SC/ST), the constituencies reserved for SC/ST were also fixed (with a few exceptions). The constituency freeze was implemented in the first place because redrawing constituencies or changing the allocation of seats would have discriminated against states that

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<sup>8</sup> There are discussions about the validity of the freeze (McMilan, 2000; Sivaramakrishnan, 2001).

successfully carried out family planning programs. Until the borders were readjusted in 2008, national and state constituencies had been almost completely fixed, from 1977 to 2004 and from 1977 to 2007, respectively<sup>9</sup>.

Owing to the freeze, population size inequalities between constituencies became quite large. Figure 1 shows the relative population sizes of constituencies in the national elections for each election year during the freeze. We can observe enormous population inequalities even in 1977 and an expansion of these inequalities from 1977 to 2004. The population size of the most populous constituency in the 1999 election, Outer Delhi, with 3,101,838 voters, was more than 86 times larger than that of the smallest constituency, Lakshadweep, with 35,716 voters.

Figure 2 shows the relative population sizes of the state election constituencies, using voting data from the latest elections until 2007. There are huge population inequalities among the constituencies at the state level as well as the national level. For example, the largest constituency in Gujarat, Jalalpur, with 1,593,907 voters, was more than 24 times larger than the smallest constituency, Kalpur, with 64,594 voters (note: Figure 2 does not show relative inequalities greater than 10).

Using data from the 2004 national election, we plot the relationship between

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<sup>9</sup> There were 542 national constituencies in 1977. This number went up to 543 in 2004.

population size and voter turnout in Figure 3. The predicted value from a nonparametric regression of voter turnout on population size without any additional control variables is also reported via the solid line<sup>10</sup>. From the graph, we can observe that the larger the population size of a constituency, the lower voter turnout. At this stage, the possibility that this negative correlation is caused by other factors, relating to heterogeneity between constituencies, must be considered. Therefore, we try to estimate the causal effect of population size on voter turnout in the following section.

#### **4. Empirical Strategy**

Since previous studies investigating turnout suggest that demographic variables influence voter turnout (Wolfinger and Rosenstone 1980), the coefficients might be biased if we do not control the heterogeneities of constituencies. For example, if large-population constituencies are likely to be urban areas, where voter turnout is usually low, the negative correlation between voter turnout and population size is not because of large population size itself but because of low voter turnout in urban areas.

To see the heterogeneous of constituencies in India, the population size in a constituency is regressed on various demographic variables. In Table 1, the column (1)

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<sup>10</sup> We use local weighted regression smoothing method.

and column (2) show the results with and without state dummies, respectively. The coefficients of population share of rural residents are minus both in column (1) and column (2) although an estimate in column (2) is statistically insignificant. It is also shown that the population share of cultivator workers has negative correlation to population size. These results suggest that the value of a single vote in rural area is larger than that in urban area.

To acquire an unbiased estimation, controlling the heterogeneities of each constituency, we compare the voter turnout of one constituency in different elections using alternative data. First, the fixed effect model is employed using long panel data. In this specification, we compare the voter turnout of one constituency in different election years. Second, we use unique data from the 2004 national election, which can be observed on a state election constituency basis. Using these data, we can compare one constituency's voter turnout in a national election and a state election. The details of the identification strategies are as follows.

#### **4.1 Panel Data Analysis**

We conduct an analysis of all national election constituencies over the period 1977–2004. In that period, nine national elections were held: 1977, 1980, 1984, 1989,

1991, 1996, 1998, 1999, and 2004. State elections are examined over the period 1977–2007<sup>11</sup>. We exclude union territories from the state election regressions, since there are no elections in most union territories. Data about voter turnout and the number of electorates come from the Election Commission of India<sup>12</sup>.

The basic empirical specifications for national and state elections are presented in equations (1) and (2) as follows.

(1) National Elections:

$$\textit{turnout}(\textit{national})_{nt} = \alpha_0 + \alpha_1 \textit{population size}_{nt} + NC_n + Y_t + \textit{trend}_t * NC_n + \varepsilon_{nt}.$$

(2) State Elections:

$$\textit{turnout}(\textit{state})_{st} = \beta_0 + \beta_1 \textit{population size}_{st} + SC_s + Y_t + \textit{trend}_t * SC_s + \nu_{st},$$

where *turnout (national/state)* is voter turnout as a percentage of the total number of eligible voters in the national/state constituency; *population size* is the number of electorates (in millions) living in each national/state constituency; *NC/SC* are fixed

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<sup>11</sup> In 2000, Jharkhand, Chhattisgarh, and Uttaranchal were carved out of Bihar, Madhya Pradesh, and Uttar Pradesh, respectively. Since dividing states affects the situation of political competition and voting behavior, as shown by Chakrabarti and Roy (2007), the period is restricted to 1977–1999 for a robustness check. The results are similar to those from regressions focused on the period 1977–2004.

<sup>12</sup> The website is [[http://eci.nic.in/eci\\_main/index.asp](http://eci.nic.in/eci_main/index.asp)].

effects for national/state constituencies, and  $Y$  is the year effect<sup>13</sup>.

In a fixed effect model, the effect of population size is estimated using the time variation of population size: that is, population growth. One concern with fixed effect models is that other trends related to population size may affect voter turnout. For example, if population growth is concentrated in urban areas, where voter turnout is lower than in rural areas, as shown by Kondo (2003), then decreases in voter turnout are not attributed to population size but to the expansion of the urban population. It is difficult to observe demographic variables such as urban population, literacy rate, and others by constituency since constituency borders differ from boundaries used by the census, which would be the data source for investigating demographic variables. To reduce omitted variable bias that might originate from other demographic trends, we include an interaction term for the trend and constituency fixed effect. While the interaction term can decrease omitted variable bias, it might be insufficient to control the heterogeneities between constituencies by linear trend. Therefore, we employ an alternative specification to capture heterogeneities, using more detailed information on a by-constituency basis.

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<sup>13</sup> In some cases, there are no elections owing to political instability or conflicts. Although there are some missing observations and unbalanced panels, we include these constituencies for the purpose of collecting various data.



## 4.2. Voter Turnout in State Elections on a per Constituency Basis

An alternative way to control for a constituency fixed effect and so identify the impact of population size is to compare the turnout in one constituency in different elections; in this case, a national election and a state election. Since state constituencies are the components of national constituencies, the borders coincide. However, population sizes differ in state election constituencies versus national election constituencies, so the voter is faced with a difference in the value of a vote between national and state elections. The Election Commission of India has made turnout data in national elections available not only on a national constituency basis but also on a state constituency basis since the 2004 elections. Using that unique data, we employ following model:

$$\textit{turnout}(\textit{state})_{st} = \gamma_0 + \gamma_1 \textit{population size}_{st} + \gamma_2 \textit{turnout}(\textit{national})_{s2004} + NC_n + u_{st}, \quad (3)$$

where  $\textit{turnout}(\textit{state})_{st}$  is voter turnout for a state election in a state constituency  $a$  in year  $t$ ,  $\textit{population size}$  is the number of electorates (in millions) belonging to the state constituency  $s$ ,  $\textit{turnout}(\textit{national})_{s2004}$  is the voter turnout for the 2004 national election in the state constituency  $a$ ,  $NC$  represents fixed effects for the national constituency, and  $Y$  is the year. The election year  $t$  is the closest year to the 2004 national election.

Since national constituency fixed effects ( $PC$ ) are controlled,  $\gamma_1$  is estimated using variation in the population size of state election constituencies within a national election constituency. However, there are other factors that are correlated with population size and have an effect on voter turnout. To control these omitted variables, we include voter turnout in national elections by state election constituencies. In this specification, we assume that voter turnout in a national election captures the heterogeneities of state election constituencies. In other words,  $\gamma_1$  represents the difference in voter turnout between a national election and a state election owing to the difference of inequality in the value of a single vote.

## **5. Results**

### **5.1 Panel Data**

The summary statistics are reported in Table 2. There is large variation in voter turnout and population size. The mean of voter turnout is around 60% in both national and state elections.

The results from the regression using panel data from national elections are given in Table 3. As shown in column (1), the coefficient of population size from the regression including only year effects is -10.0 and is statistically significant. Column (2)

and column (3) report the estimates from the regression including states or national constituency fixed effects. The coefficients of population size are -9.0 and -12.2, respectively. In column (4), we estimate population size from the regression including both national constituency fixed effects and national constituency specific trend effects. The coefficient is about -17.7. This result demonstrates that if the population size increases by one million, which is the mean of population size, voter turnout decreases by 17.7%. This effect is politically significant compared with the mean value of the national turnout rate, 60.1 %. The difference in the coefficients of population size among the three specifications confirms that there are heterogeneities between the national constituencies.

Table 4 reports the results of the regression using panel data from state elections. The estimate from the regression with state fixed effects, as shown in column (1), is -74.5 and is statistically significant. Column (2) shows the estimate derived from the regression with state constituency fixed effects, and the coefficient of population size is -41.5. As shown in column (4), the estimate from the regression with state constituency fixed effects and state constituency specific trend effects is around -46.9 and is statistically significant. This result demonstrates that if population size is increased by 100,000, which is twice the mean of population size in state constituencies,

voter turnout might decrease by 4.69%.

## **5.2 Voter Turnout in State Elections on a per Constituency Basis**

The results from the regression using equation (3) are shown in Table 5. The estimates without national constituency fixed effects are shown in column (1). The coefficient of population size is around -21.4. On the other hand, the estimate from the specification with national constituency fixed effects, as shown in column (2), is around -16.6, which is smaller in absolute value than the estimate in column (1). The coefficients of voter turnout in the 2004 national election are 0.55 to 0.60, as shown in column (1) and in column (2), and both are statistically significant, which confirms that there is a correlation between voter turnout in national and state elections. While the coefficient of population size is -46.9 in column (3) of Table 4, the coefficient in column (2) of Table 5 is -16.6. The fixed effect model using panel data as written in equation (2) proxies the constituency specific heterogeneous trend with only a linear trend term. However, equation (3) uses more detailed information on a state election constituency basis. For this reason, the preferable specification in this study is represented in the estimates in column (2) of Table 5.

Voting behavior in state elections might be affected by the results of national

elections since the power balance among political parties in state legislative races is affected by political conditions in national legislative races. For the robustness check, we classify state elections as being before or after the 2004 national election. Columns (3) and (4) report the results. Since several state elections were not held from 2004 to 2007, the number of observations after the 2004 elections is less than the number before the 2004 elections<sup>14</sup>. The coefficient of population size from the regression using data from before the 2004 elections is -19.06, which is similar to the estimate in column (2) and is also statistically significant. The coefficient from the regression using data from after the 2004 elections is -9.5, which is also statistically significant<sup>15</sup>. In addition, the coefficient of voter turnout in the 2004 national election is similar in columns (2) through (4). This result confirms that voter turnout in national elections can proxy persistence characteristics that are correlated with voter turnout.

### **5.3 Population Size and Vote Share of National Parties**

In this section, we examine the effects of population size on the behavior of political

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<sup>14</sup> Since several constituencies did not hold elections, the observations in columns (2) and (3) are different.

<sup>15</sup> The difference in the coefficients between columns (2) and (4) is mainly due to the sample difference. If the states used for estimation in column (2) are restricted to the states used for estimation in column (4), the coefficient of population size from the regression using data from around the 2004 national elections is similar to that in column (4).

parties. As discussed in section 2, population size inequality might cause differences in the amount of effort political parties exert in various constituencies. The Election Commission of India defines some political parties as national parties which are active in more than four states<sup>16</sup>. It is reasonable to expect that national parties might vary the intensity of their efforts in different voting constituencies in a strategic way. In contrast, it may be the case that other small parties are not able to select constituencies for high or low effort, because their support tends to derive from specific population segments or regions (Roy and Wallace, 2007).

In this section, we indirectly investigate the effect of population size on parties' efforts. Since the competitiveness between political parties is different between states, we focus on national elections. The specification is similar to equation (1). The dependent variable is the vote share of national parties. The main explanatory variable is the population size of national constituencies, as in the previous section. The period is 1977–2004. Since the number of parties involved in an election affects competition and is related to population size, we control for that factor.

Table 6 reports the results. Column (1) shows the result from the regression where the dependent variable is the vote share of all national parties. The coefficient of

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<sup>16</sup> National parties include the Indian National Congress, the Bharatiya Janata Party, the Janata Party (includes Janata, Lok Dal, and Janata Dal), the Communist Party, the Communist Party of India (Marxist), and the Bahujan Samaj Party.

population size is -21.1 and is statistically significant. This result implies that if population size increases by one million, the vote share of a given national party decreases by 21%, which is a considerable impact.

Columns (2) and (3) focus on the vote share of two major parties in India, the Indian National Congress (INC) and the Bharatiya Janata Party (BJP). While the INC has been dominant since independence, the BJP has been in power since the 1980s. Our estimates show that for both parties the coefficients of population size are negative and statistically significant. The INC's population size coefficient is -11.9, which is statistically significant. The BJP's is similar at -9.3 and is also statistically significant. Although the regressions in this section do not directly test the hypothesis that large population size decreases these parties' campaign efforts (we cannot observe actual efforts), the results suggest a correlation. This finding implies that the constituency freeze of 1977–2004 distorted the power balance of political parties.

## **6. Conclusion**

In this paper, we investigated how inequality in population size between constituencies affects voter turnout. Based on the unique political situation in India, where the borders of constituencies for national and state elections were fixed during 1977–2007, we

empirically analyzed the relationship between population size and voter turnout. The finding derived from this study is that large population size decreases voter turnout. This result is shown both in national and state elections and is robust with alternative specifications. In addition, the results suggest that the vote share of national parties in larger constituencies is less than in smaller constituencies. This implies that national parties intensify their efforts in small constituencies since they can gain vote share more efficiently.

As is often the case of political science, it is difficult to observe voting behavior with voters' characteristics owing to a lack of detailed information. Therefore, we cannot analyze the mechanism of the relationship between population size and voter turnout. Despite these limitations, this paper does support the suggestion that a constituency freeze distorts political participation and the behavior of political parties.

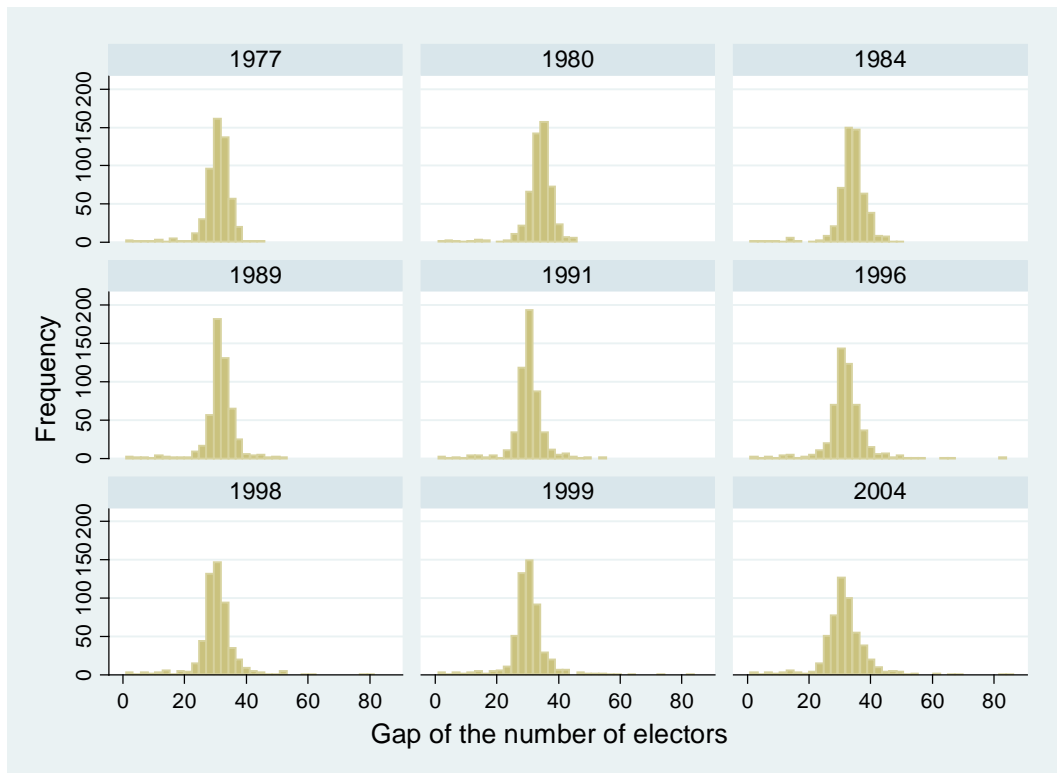


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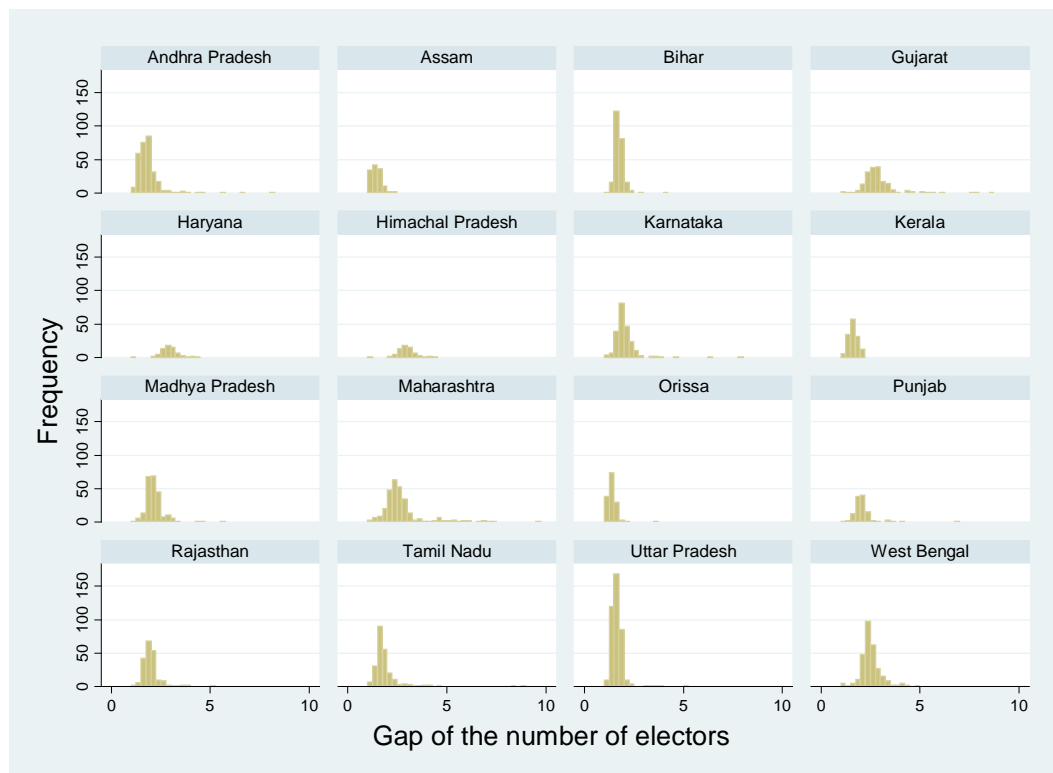
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Figure 1. Inequality of Population Size among Constituencies in National Elections



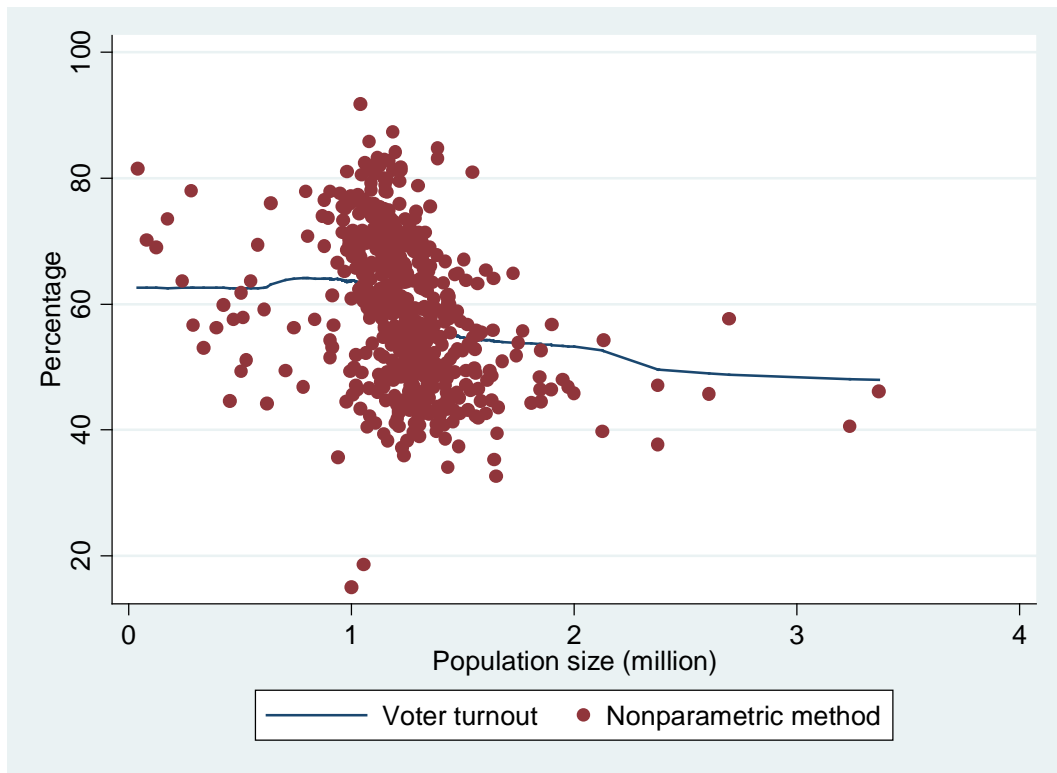
Note: Horizontal axis represents how many times larger the population size is relative to the smallest-population constituencies. Vertical axis represents the number of constituencies in each size class.

Figure 2. Inequality of Population Size among Constituencies in State Elections, 2002-2007



Note: Horizontal axis represents how many times larger the population sizes are relative to the smallest-population constituencies. Constituencies with more than 10 times the population of the smallest constituencies are not included in the graphic. Vertical axis represents the number of constituencies in each size class. Data are from latest state elections until 2007.

Figure 3. Constituency Population Size and Voter Turnout, 2004 National Election



Note: Horizontal axis represents the numbers of electors in national constituencies, in millions. Vertical axis represents voter turnout for the 2004 national election as a percentage. The solid line displays the fitted value from nonparametric regression of voter turnout on population size using local weighted regression smoothing method without any additional control variables.

Table 1. Constituency Population Size and Demographic Variables

	(1)	(2)
Population share of rural residents	-0.821 (0.356)	-0.616 (0.462)
Population share of SCs	-0.139 (0.352)	-0.034 (0.493)
Population share of STs	0.133 (0.208)	0.168 (0.262)
Literacy rate	-0.418 (0.281)	-0.497 (0.435)
Population share by industry:		
Cultivators	-1.503 (0.606)	-2.078 (0.893)
Agricultural laborers	-0.664 (0.402)	-0.466 (0.708)
Livestock	-0.566 (1.970)	-1.794 (2.216)
Mining & quarrying	-1.838 (4.909)	0.166 (5.584)
Household industry	-0.780 (2.779)	-0.183 (3.043)
Manufacturing	1.642 (1.839)	2.507 (2.011)
Construction	7.157 (8.738)	1.744 (11.566)
Trade & commerce	-4.897 (6.216)	-3.757 (7.523)
Transport, storage, & communicate.	-16.654 (10.968)	-18.904 (12.858)
Other services	-2.823 (2.651)	-1.196 (3.337)
State fixed effect	No	Yes
Observations	511	511
R-squared	0.05	0.07

Note: Standard errors are in parentheses. Dependent variable is the population in a constituency (million).

Table 2. Summary Statistics

(a) National election

Variable	Observation	Mean	Std. Dev	Min	Max
Voter turnout	4,843	60.11	11.46	5.07	91.77
Population size (million)	4,843	0.94	0.30	0.02	3.37

(b) State election

Variable	Observation	Mean	Std. Dev	Min	Max
Voter turnout	26,159	62.66	13.29	0.39	98.87
Population size (million)	26,159	0.14	0.06	0.0035	1.59

Table 3. Constituency Population Size and Voter Turnout in National Elections

	(1)	(2)	(3)	(4)
Population size (million)	-9.988 (0.762)	-9.008 (0.692)	-12.18 (0.982)	-17.67 (2.170)
Year fixed effect	Yes	Yes	Yes	Yes
State fixed effect	No	Yes	No	No
National constituency fixed effect	No	No	Yes	Yes
Trend * national constituency fixed effect	No	No	No	Yes
Observations	4,843	4,843	4,843	4,843
R-squared	0.078	0.505	0.704	0.805

Note: Standard errors are in parentheses.



Table 4. Constituency Population Size and Voter Turnout in State Elections, 1977–2007

	(1)	(2)	(3)	(4)
Population size (million)	-74.54 (1.264)	-41.47 (1.462)	-28.23 (1.750)	-46.87 (4.219)
Year fixed effect	Yes	Yes	Yes	Yes
State fixed effect	No	Yes	No	No
State constituency fixed effect	No	No	Yes	Yes
Trend * state constituency fixed effect	No	No	No	Yes
Observations	26,159	26,159	26,159	26,159
R-squared	0.363	0.539	0.773	0.855

Note: Standard errors are in parentheses

Table 5. Constituency Population Size and Turnout in Different Election Types  
(dependent variable: voter turnout for state election)

	(1)	(2)	(3)	(4)
	around 2004	around 2004	before 2004 national election	after 2004 national election
Population size (million)	-21.43 (1.797)	-16.63 (1.648)	-19.06 (1.579)	-9.528 (1.747)
Voter turnout for 2004 national election	0.550 (0.0117)	0.603 (0.0134)	0.616 (0.0130)	0.667 (0.0150)
National constituency fixed effect	No	Yes	Yes	Yes
Observations	3,504	3,504	3,513	2,961
R-squared	0.784	0.893	0.847	0.927

Note: Standard errors are in parentheses. Regressions of column (1) and column (2) use data from state elections closest to the 2004 national election. Regression of column (3) uses state elections before 2004 national election. Regression of column (4) uses state elections after the 2004 national election.

Table 6. Constituency Population Size and Vote Share of National Parties (dependent variable: vote share as %)

	(1)	(2)	(3)
Party	national parties	INC	BJP
Population size (in millions)	-21.12 (6.002)	-11.94 (4.753)	-9.303 (3.828)
Observations	4,840	4,840	4,840
R-squared	0.804	0.722	0.793

Note: Standard errors are in parentheses. Dependent variable of column (1) is the vote share of national parties. Dependent variables of column (2) and column (3) are vote shares of the Indian National Congress (INC) and Bharatiya Janata Party (BJP).