Election outcomes and empirical evidence

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Introduction

- For the first time, we are focusing narrowly on one type of institution: democracy.
- We're going to focus on a few key questions.
  - How can we **predict** what will happen in an election?
  - How can we evaluate what will happen from a social or policy perspective?
  - What is a good election outcome? What is a good way to aggregate preferences?
  - How can election outcomes be manipulated?

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Spatial formulations of majority rule

- Assume a group of voters has to pick a point on a line: e.g., a income tax rate between 0 and 100.
- Imagine each individual has a most-preferred point on the line, and preferences that decline as points further in either direction are taken up.
- Each individual has a bliss point, denoted x_i, and preferences are assumed to be single peaked.
- Definition: alternatives under consideration can be represented as points on a line, and each of the utility functions representing preferences has a maximum on the line and slopes away from the maximum on other side.

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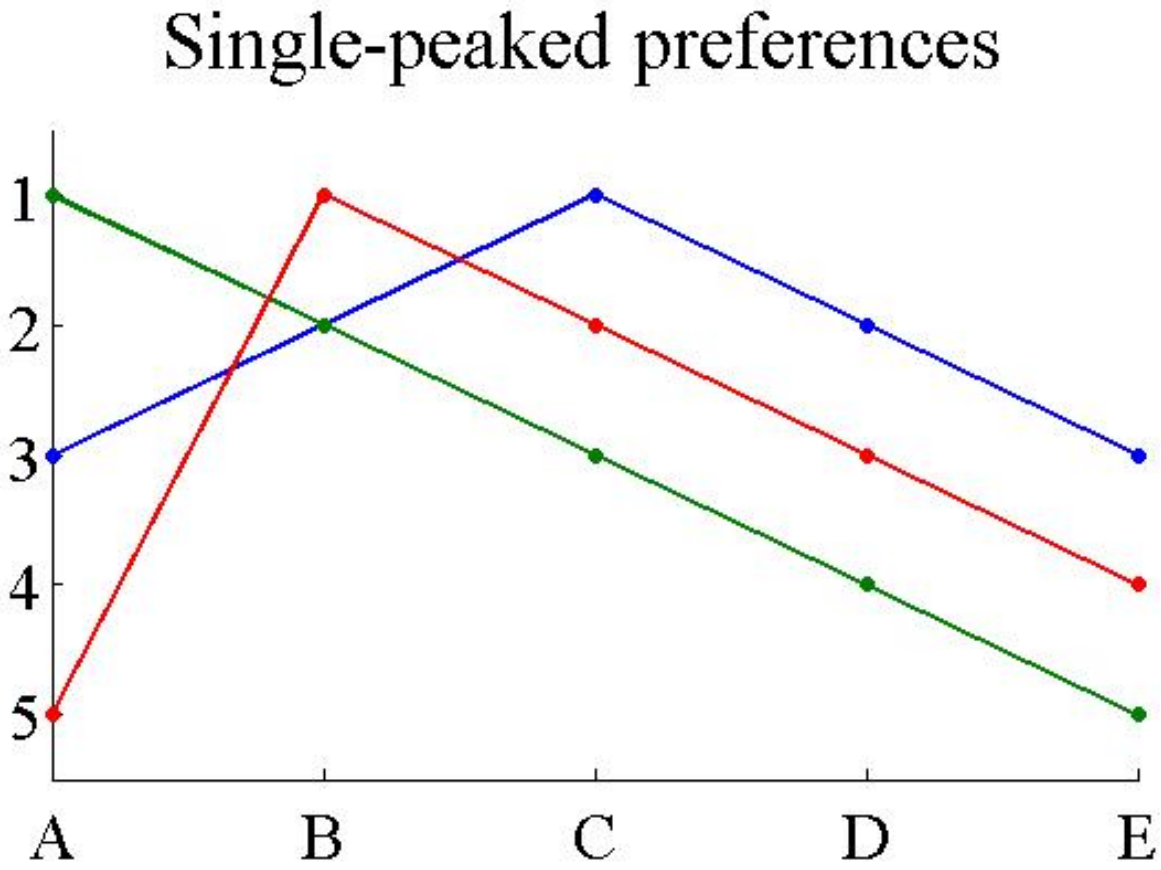
Single-peaked preferences



Defining win set

- For each point y on the line, define the winset of y as W(y).
- Let M be the set of majorities in the group; the winset is the set of points that some majority in M prefers to y.
- Intuitively: every point in the winset can plausibly beat y in a majority vote.
- In our example: B is in the winset of A, because both red and blue prefer B to A.
- If some alternative x has an empty winset ($W(x) = \varnothing$), then it is a plausible candidate for the group's choice.

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Median voter theorem

- What if no alternative has an empty winset? What then?
- Under what circumstances does an alternative x with an empty winset exist?
- Black's median voter theorem: if members of a group G have single-peaked preferences, then the ideal point of the median voter has an empty winset - no alternate proposed point can beat this point in a majority vote.
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Caveats

- There are some additional assumptions embodied in this exposition of the median voter theorem.
- The number of voters is odd.
- There is full participation by voters.
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Real-world contradictions of the median voter theorem

- What type of voting behavior would violate the assumptions of the MVT, and potentially render its predictions invalid?
- First, abstention - many voters do not vote.
- Second, some voters may vote strategically - voting for a certain candidate not because they prefer that candidate, but to avoid another candidate. (i.e., Green party voters in the U.S. may vote for the Democrats).

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- Let's assume, for now, none of these problems exist and we do have an election in which this analysis applies - the outcome will be that preferred by the median voter.
- Is this "best"? Does it have a clear welfare interpretation?
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Multidimensional preferences

- In almost every real-world case, voters **do** in fact have preferences in more than one dimension.
- Accordingly, the preceding analysis does not apply - preferences can't be summarized in one dimension.
- There are more precise conditions that can be placed on the distribution of ideal points in a multidimensional setting in order to generate a majority rule empty-winset point.
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Chaos theorem

- In multidimensional spatial settings, except in the case of a rare distribution of ideal points, there will be no majority rule empty-winset point.
- Instead, there is chaos - anything can happen, because there is always a policy that is preferred by the majority to any proposed policy.
- What does this suggest about the value of elections? If anything can happen, why do we hold elections?
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Game trees

- A useful way to analyze this challenge, which you will see in your problem set, is game trees.
- Let's say there are three options, A, B and C, and you know people's preferences.
- The agenda setter states we will vote on A and B first, and then the winning proposal will be pitted against C in the final vote.
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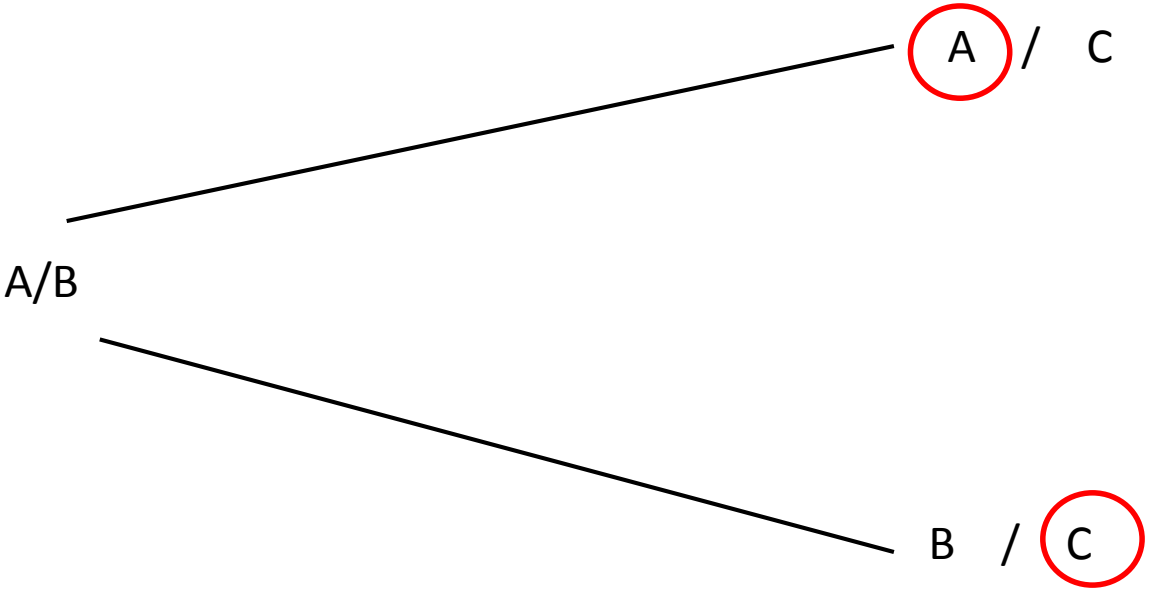
Example



Understanding this election

- Clearly, the results here may be very different if everyone knows at the beginning the planned sequence of votes.
- Altering the sequence of votes may also affect the ultimate outcome.
- The problem set will take you through an example of this phenomenon.
- Thus while the median voter seemed to have a very neat, intuitive prediction, if the assumptions don't hold, all bets are off!

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Testing the median voter theorem

- Despite its shortcomings, the median voter theorm is commonly used as a reference point in both theoretical and empirical analysis.
- What are testable implications of the median voter theorem?
  - First, if the preferences of the citizens change, then observed policy outcomes should also change.
  - Second, policy outcomes should be more responsive to voter preferences (or the voter preferences of those who vote) when the median voter is pivotal.
- We are going to evaluate both predictions in turn, beginning with a paper focused on the historical United States.

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- Women's enfranchisement led to an enormous change in the composition of the voting public, and thus in their preferences.
- In the U.S., women's suffrage laws were passed in different years in a different states.
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Empirical strategy: dif-in-dif

- The empirical strategy employed in this paper is a difference-in-difference.
- Essentially, this strategy compares the difference in policies in a state before and after women's enfranchisement, to the comparable difference over time in a state that did not enfranchise women.
- Let's begin with a simple example of dif-in-dif.
- Assume we have two states and two years: in 1869, women in Wyoming were allowed to vote, while in neighboring Utah they were not. Let's compare across 1868 and 1869 and Wyoming and Utah.

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Notational framework

- Assume that a policy outcome (e.g., public health spending) in the absence of treatment (women's suffrage) is a linear combination of a state effect and a period effect.

$$E[Y_{0ist}|s,t] = \gamma_s + \lambda_t$$

- Let D_{st} be a dummy for women's suffrage states and years.
- Then we can write outcomes Y_{ist} as follows:

$$Y_{ist} = \gamma_s + \lambda_t + \delta D_{st} + \epsilon_{ist}$$

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Calculating the difference-in-difference

- Using this notation, it's relatively clear how we can calculate the causal effect.

$$\begin{aligned} E[Y_{ist}|s = UT, t = 70] - E[Y_{ist}|s = UT, t = 69] &= \lambda_{70} - \lambda_{69} \\ E[Y_{ist}|s = WY, t = 70] - E[Y_{ist}|s = WY, t = 69] &= \lambda_{70} - \lambda_{69} + \delta \end{aligned}$$

- Thus if we employ the dif-in-dif, we have the following:

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Identifying assumptions for dif-in-dif

- The key assumption here is that trends in policy outcomes over time are otherwise constant across states: i.e., λ_t is the same for Wyoming and Utah.
- In the absence of women's suffrage, the change in public health spending in the two states should be identical.
- The regression equation we would estimate to capture this specification is simple.

$$Y_{ist} = \alpha + \gamma WY_s + \lambda d_t + \delta(WY_S \times d_t) + \epsilon_{ist}$$

  where WY_s is a dummy for Wyoming and d_t is a time dummy.
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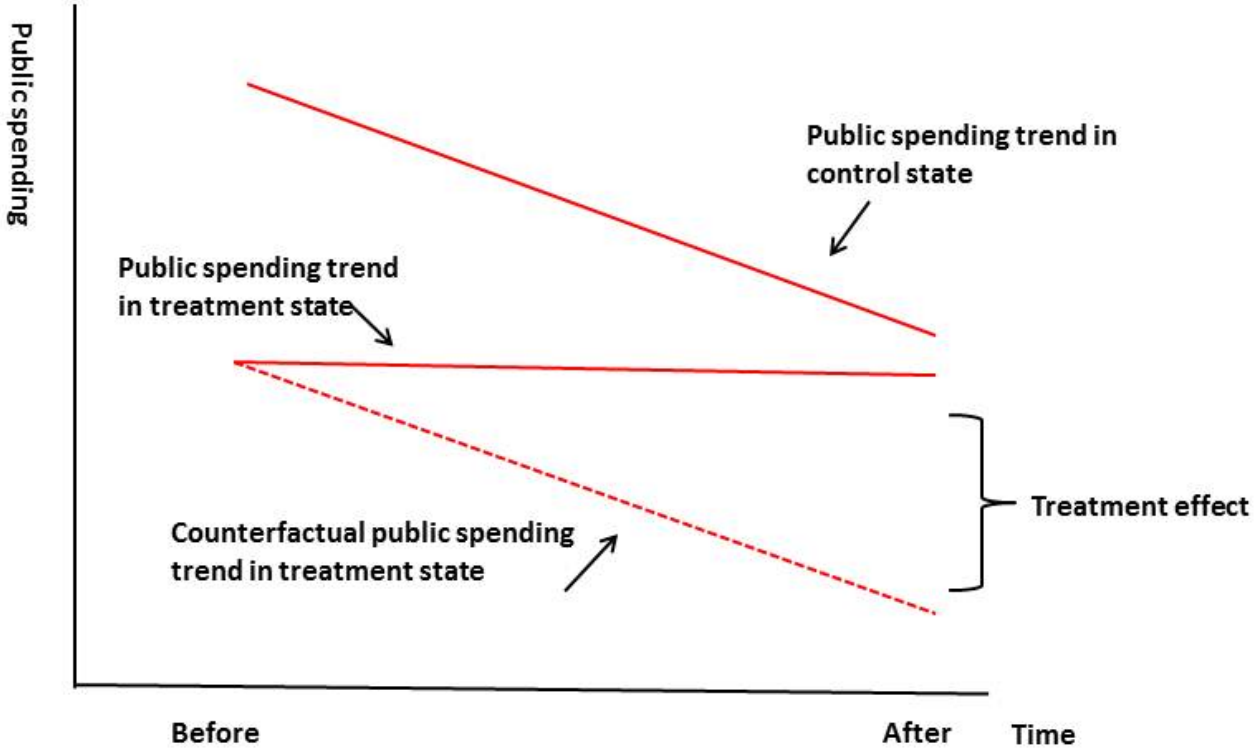
Identification assumption: Graphic



Returning to Miller

- Miller estimates a very similar equation, but he has more than two states and more than two years.

$$\ln(d_{sy}) = \alpha + \beta v_{sy} + \delta_y + \delta_s + \delta_s \times t + \epsilon_{sy}$$

  where d is outcome of interest in state s and year y, v is a dummy variable for female suffrage; δ_y and δ_s are state and year fixed effects, and $\delta_s \times t$ is a state-specific trend.
- What do we need to assume? Timing of state suffrage laws is exogenous.

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Core graphical insight of the paper

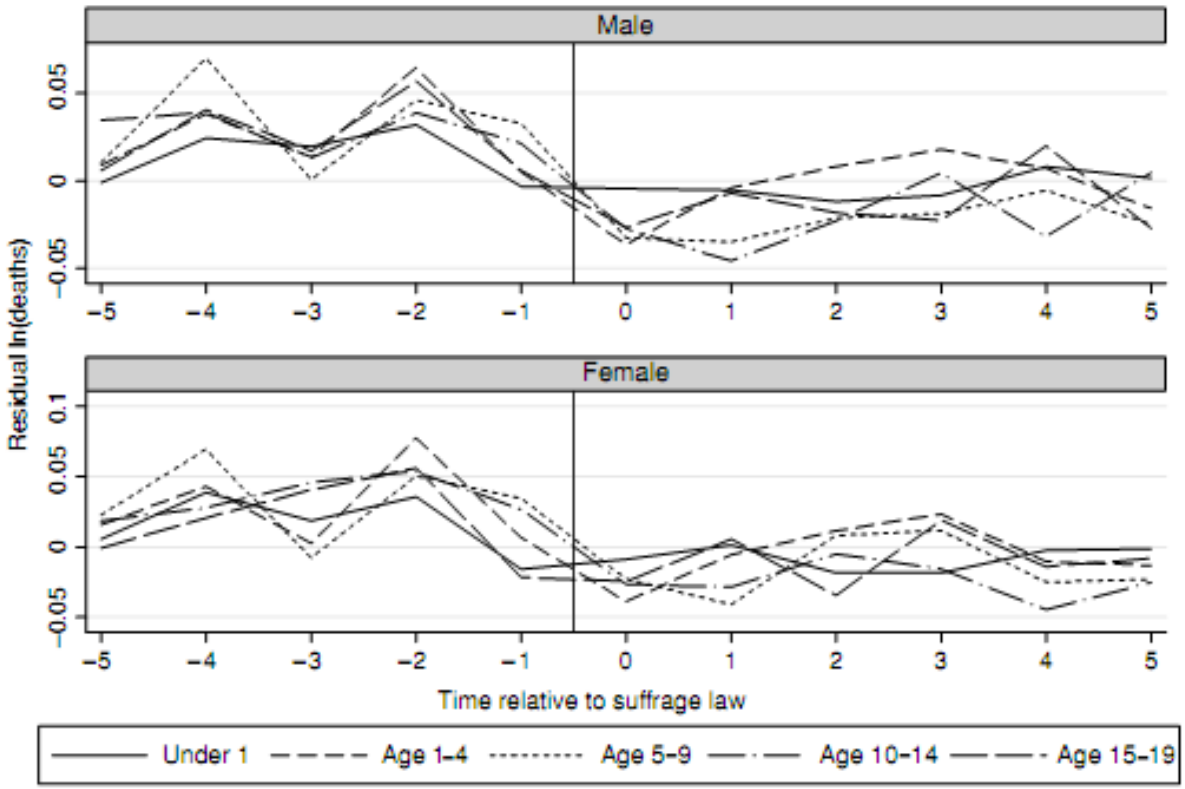

FIGURE IV
Deaths by Age and Sex and the Timing of Suffrage Laws
Mortality data from the U.S. Bureau of the Census's annual *Mortality Statistics*. Residual means shown relative to the year of women's suffrage laws in each state (year 0) obtained by estimating equation (1) without the suffrage dummy variable.

Discussion questions

- Miller presents evidence of an impact of women's suffrage across a wide range of outcomes: what outcomes did you find most interesting/compelling?
- He also presents an abundant number of robustness checks to rule out alternate channels.
  - Any favorite robustness checks?
  - Additional robustness checks you would like to see? Do you find Miller's story as a causal impact of women's suffrage credible?
- What is the welfare interpretation here? Is the shift in policy outcomes following the enfranchisement of women a positive sign? Is this evidence elections are working well?

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Beyond the median voter model

- The simple models previously introduced assumed that candidates did not care about policy at all; they cared only about winning.
- Thus they shifted their positions toward the median position in order to maximize their votes.
- A very different modelling approach is to consider candidates to be identical to citizens (hence the name): they have similar preferences, and they can choose whether or not to enter a race.
- We can express preferences as follows, where c^i is citizen consumption, and g is government spending.

$$w^i = c^i + H(g)$$

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Citizen-candidate model: timing

- First, every citizen decides whether or not to run for office, at cost ϵ.
- An election is held; each citizen chooses the candidate for whom to vote by maximizing expected utility, given how every other citizen votes.
- Candidate who wins the most vote wins.
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Analyzing this model

- Fully analyzing this model is a game-theory problem that is beyond our scope here.
- However, we can quickly make some simple observations that we can take to the data.
- At the last stage, the citizen who is elected will simply do what s/he wants!
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A simple equilibrium

- There are many equilibria in this model: i.e., there are many possible sets of actions by citizens in which each citizen is maximizing his/her utility conditional on others' decisions.
- One simple equilibrium is an election in which a median voter runs unopposed.
- Will any other candidate choose to run, given that the median voter is running? No, because the median voter's ideal policy beats every other policy.
- Will the median voter find it optimal to run? Yes, if the following condition is satisfied, where ϵ is the cost of running:

$$W^m(g^m) - W^m(\bar{g}) \geq \epsilon$$

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A surprising result!

- Even given a completely different set of assumptions about how elections unfold, the same result emerged!
- The preferred policy of the median is implemented.
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Changing the politician pool

- In the real world, ϵ probably is not the same for all citizens: it may be much higher for individuals from historically disadvantaged groups (women, minorities, etc.), for individuals of lower income, for younger people, etc.
- Different characteristics of the electoral system (public funding of campaigns, political mentoring, quotas for female candidates) can significantly alter ϵ. How will this affect policy?
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Duflo et al., Women as policymakers

- In India, some local government seats are randomly reserved for women.
- The primary empirical prediction of the model in the paper (a more complex variant of the model described above) is that policy outcomes will differ in GPs reserved for women: more specifically, they should be closer to the preferences of women.
- This requires a measure of average preferences of women and men; here, this is derived from data on formal requests and complaints brought to the pradhan (village leader).

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Data and empirical strategy

- The primary equation of interest tests the proposition that in reserved GPs, there is more investment in goods mentioned more frequently by women.

$$Y_{ij} = \beta_1 + \beta_2 \times R_j + \beta_3 D_i \times R_k + \sum_{i=1}^{N} \beta_l d_{il} + \epsilon_{ij}$$

where d_{il} are good-specific dummies and D_i is the average difference between the fraction of requests about good i from women and from men.

Discussion questions

- Measuring voters' preferences is notoriously challenging. Did you find this measurement strategy plausible?
- Did you believe the core result that female policymakers better reflect female preferences? Are there any alternate stories?
- Note while on a superficial level the results seem similar to the Miller paper, the channel is entirely different: women were already voting here, and the difference is attributed to female policymakers. (In the Miller paper, there were no female policymakers.) Is there any understanding of politics that can reconcile these results?

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Welfare interpretation

- Reserving seats for women or other underrepresented minorities is a controversial measure; it's not common in the industrialized democracies, but is more common in the developing world.
- Based on these results, would you characterize the policy as a success or a failure?
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Pande, Mandated political representation for minorities

- This paper uses a fundamentally similar empirical strategy, but exploits political reservation for scheduled castes and scheduled tribes (abbreviated SC/ST) at the state level in India.
- SC/ST populations are historically, and currently disadvantaged; in India, some legislative seats at both the state and federal level are reserved for SC/ST candidates.
- The question of interest is whether this reservation affects state public finance decisions.

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Summary statistics: SC/ST population

TABLE 3—ECONOMIC CHARACTERISTICS OF SCHEDULED CASTES AND SCHEDULED TRIBES: 1991

Variable	Scheduled castes	Scheduled tribes	Non-SC/ST population
Overall population share	16.4	7.9	75.4
Within-group characteristics:			
Urban population share	18.7	7.3	29.2
Literacy rate	37.4	29.6	57.8
Labor force participation rate	36	42	32.8
Percent labor force in the primary sector	77.1	90	62.1
Percent population below poverty line	48.3	52.0	31.4

Notes: All numbers are from 1991 census, except poverty figures which are from the Indian National Sample Survey (1993–1994), Planning Commission Estimates. The primary sector includes those employed in agricultural and allied activities. Within-group characteristics are reported as a percentage of the group population.

Data and descriptive statistics

- Unit of observation is the state; the dataset spans 16 states from 1960 to 1992.
- Political reservation for a given group is measured as the fraction of jurisdictions reserved for that group.
- As dependent variables, Pande considers both of the following.
  - Tax rate, which is a state-level variable. Pande uses the state-level tax rate on land as the dependent variable.
  - Pande also uses the number of projects, which is a village-level variable. Pande uses the number of projects as the dependent variable.

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  - General policies: size of state government, spending on education (the largest category of social-sector spending), and asset-based redistribution (land reform).
  - Pande's proxies for the preferences of the median voter: the fraction of the population belonging to the group, and the fraction of the population belonging to the group in the state.

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Empirical strategy

- The empirical analysis exploits variation over time in the extent of political reservation enjoyed by a group in a state; the proportion of jurisdictions reserved for SC/ST should equal the population share of those communities in the state, updated periodically in accord with new population censuses.
- Primary equation of interest is the following:

$$Y_{st} = \alpha_s + \beta_t + \gamma R_{st} + \epsilon_{st}$$

where Y is a policy outcome, α_s and β_t are state and time fixed effects; R_{st} is a vector of dummies for reservation at the state and year level.

- Main threat to identification strategy is lagged effect of underlying population changes that lead to change in reservation.

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- In order to address this threat to identification, the primary specification controls for census population shares (P_{st}), current population shares (P^*_{st}), and covariates X_{st}.

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Primary results

- Results suggest a positive effect on reservation on overall government spending, but a negative effect on education.
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Effects of reservation on public goods provision

TABLE 6—POLITICAL RESERVATION AND GENERAL POLICY OUTCOMES

	Total spending				Education				Land reform			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SC reservation	−0.005	−0.009	−0.006	−0.004	−0.15	−0.141	−0.129	−0.115	0.007	0.008	0.01	0.016
	(0.005)	(0.005)	(0.005)	(0.007)	(0.122)	(0.121)	(0.116)	(0.146)	(0.013)	(0.013)	(0.013)	(0.015)
ST reservation	0.023***	0.028***	0.019***	0.019***	−0.542***	−0.385***	−0.252*	−0.380**	0.008	0.007	0.003	0.013
	(0.003)	(0.006)	(0.006)	(0.006)	(0.082)	(0.136)	(0.151)	(0.155)	(0.010)	(0.019)	(0.019)	(0.019)
SC census population share		0.011***	0.006	0.006		−0.039	−0.044	−0.068		−0.001	−0.005	−0.007
		(0.004)	(0.006)	(0.006)		(0.050)	(0.070)	(0.079)		(0.006)	(0.008)	(0.008)
ST census population share		−0.004	−0.011**	−0.011**		−0.168	0.015	0.078		0	−0.001	0.001
		(0.005)	(0.005)	(0.005)		(0.104)	(0.128)	(0.121)		(0.015)	(0.016)	(0.017)
SC current population share			0.012	0.011			0.025	0.17			0.01	0.016
			(0.008)	(0.009)			(0.101)	(0.141)			(0.015)	(0.015)
ST current population share			0.028***	0.029***			−0.587***	−0.691***			0.009	−0.014
			(0.007)	(0.008)			(0.177)	(0.192)			(0.020)	(0.020)
Other controls	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
Adjusted R^2	0.96	0.96	0.96	0.96	0.72	0.73	0.76	0.78	0.11	0.11	0.11	0.11
Number of observations	519	519	519	505	513	513	513	499	519	519	519	505

Effects of reservation on public goods provision

TABLE 7—POLITICAL RESERVATION AND TARGETED POLICY OUTCOMES

	Job quotas				SC welfare spending				ST welfare spending			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
SC reservation	0.539***	0.493***	0.659***	0.675***	0.011	0.082	0.083	0.126	−0.524	−0.511	−0.436	−0.305
	(0.120)	(0.115)	(0.108)	(0.135)	(0.181)	(0.196)	(0.200)	(0.198)	(0.324)	(0.324)	(0.289)	(0.301)
ST reservation	0.199*	−0.316	−0.301	−0.371*	0.092	0.067	0.076	−0.024	0.713**	0.693**	1.019***	0.863***
	(0.109)	(0.204)	(0.225)	(0.223)	(0.103)	(0.104)	(0.108)	(0.127)	(0.335)	(0.330)	(0.301)	(0.325)
SC census population share		0.188***	−0.071	−0.113		−0.052	−0.055	−0.104		−0.063	−0.145	−0.195
		(0.065)	(0.073)	(0.081)		(0.077)	(0.080)	(0.068)		(0.151)	(0.170)	(0.169)
ST census population share		0.559***	0.842***	0.861***		−0.033	−0.028	0.07		0.033	0.19	0.317*
		(0.170)	(0.190)	(0.192)		(0.077)	(0.080)	(0.081)		(0.138)	(0.161)	(0.187)
SC current population share			0.648***	0.699***			−0.052	−0.092			−0.435**	−0.347**
			(0.132)	(0.172)			(0.121)	(0.123)			(0.189)	(0.172)
ST current population share			−0.675**	−0.689**			−0.12	−0.163			−0.576**	−0.706***
			(0.294)	(0.313)			(0.136)	(0.131)			(0.233)	(0.257)
Other controls	NO	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	YES
Adjusted R^2	0.88	0.9	0.9	0.91	0.76	0.76	0.76	0.76	0.83	0.83	0.84	0.84
Number of observations	519	519	519	505	274	274	274	274	298	298	298	298

Summing up: welfare implications

- These results do not necessarily suggest that SC/ST populations are better off.
- There could be other effects: candidate quality could be lower; restrictions may limit the ability of voters and candidates to punish candidates; non-minority citizens may disengage from politics.
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