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IZA DP No. 4386

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The Role of Employment Quota**

Nishith Prakash

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# Improving the Labor Market Outcomes of Minorities: The Role of Employment Quota

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Discussion Paper No. 4386  
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## ABSTRACT

### Improving the Labor Market Outcomes of Minorities: The Role of Employment Quota<sup>\*</sup>

The world's biggest and arguably most aggressive form of employment based affirmative action policy for minorities exists in India. This paper exploits the institutional features of federally mandated employment quota policy to examine its effect on labor market outcomes of two distinct minority groups. My main finding is that employment quota significantly increases the probability of acquiring a salaried job for one minority group and not the other. Their improved employment outcome is also reflected in their higher household consumption expenditure. Overall, the effects vary within each minority group by education, gender, and geographical location.

JEL Classification: H40, J21, J31, J45, O10

Keywords: caste, employment, wage differentials, public sector, India

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# 1 Introduction

Affirmative action refers to policies used by government and other institutions with the altruistic motive of uplifting the historically disadvantaged groups. Such policies remain to be important yet controversial. These policies have been proposed and used in many countries with the intention of compensating for the damages caused by the past discrimination. The nature and implementation of affirmative action policies differ across countries. These policies can be broadly classified into two categories. First is the policy of mandated quota system in which a certain number or share of jobs/seats are set aside for disadvantaged minorities in public sector enterprise, private sector enterprise, political spheres and educational institutions. This is used in India, Malaysia and Sri Lanka among other countries. Second is the policy of preferential treatment in which members of historically disadvantaged groups receive more favorable consideration for school admission or employment although no specific slots in the institution are actually set aside for them. Two examples of countries following the latter policy are USA and Great Britain. It remains an empirical question whether they really help the intended beneficiaries.

This paper estimates the effect of employment quotas (or reserving jobs) for historically disadvantaged groups on their labor market outcomes. In general, this is difficult to do because whether or how many jobs are set aside for minorities is likely to be endogenous. For example, institutions or places that have higher employment quota for minorities are likely more favorable to minorities in other ways too, which confounds the interpretation of the estimated coefficient for employment quota from a regression of some labor market outcome on employment quota. However, in India, the mandated employment quota is implemented in a way that facilitates the identification of the causal effect of reserving jobs. In particular, the Indian Constitution stipulates that in each state the share of public sector jobs reserved for scheduled castes and scheduled tribes –the two principal historically disadvantaged groups in India– be equal to their share of the total population in the most recently tabulated census of population. This policy rule generates plausibly exogenous variation in share of jobs reserved (or employment quota), permitting the identification of the causal effect of employment quota on labor market outcomes. The variation I use is not based on all fluctuations in minority population share; this would be erroneous because we would expect minority population share to affect labor market

outcomes not only through share of jobs reserved. Instead, the identification strategy takes advantage of the fact that the share (or quota) of jobs set aside for minorities can only change with a lag with respect to both the current population share and the population share in the most recent census. There are two sources of the lag: (1) the current population varies continuously but employment quotas are based on the census, which is taken only decennially; and (2) there is an administrative lag between when the census is taken and when the employment quotas are adjusted to reflect the new census data. These jumps and administrative lags generated by the policy rule allow me to separately identify the effect of employment quota for minorities from the effect of contemporaneous changes in their population.

I implement the identification strategy using individual-level data from multiple rounds of the National Sample Survey (NSS). First, I examine the effect of employment quota on the employment status of the people in targeted groups. Public sector employment is on average better than alternative employment opportunities for minorities—it provides a higher salary and better job security—thus it is possible that employment quotas change incentives to work or the composition of employment conditional on working (e.g., away from self-employment or casual work, toward a salaried job). Second, I examine the effect of reserving jobs on the expenditures and wages of the people in targeted groups. Third, I examine whether effects vary by sex, sector (rural/urban), age and educational attainment. My primary finding is that employment quotas do not significantly change the probability of working or working in paid employment for either scheduled castes or scheduled tribes, but do raise the probability that a scheduled caste member works in a salaried job. The effects are similar for both men and women, and benefits are more pronounced in urban areas and for the less educated. Another finding is that employment quotas do not increase wages or per capita household expenditure on average, but less educated scheduled caste members do experience significant increases in their expenditure, probably due to their greater propensity to have a salaried job. Overall then, employment quotas for scheduled tribes do not significantly improve scheduled tribe members' labor market outcomes (at least those outcomes available in the NSS data) while employment quotas for scheduled castes do enable some scheduled caste members to get better jobs.

An evaluation of the employment quota policy in India should be of interest for a number of reasons. First, I am not aware of previous studies that rigorously quantify the effects of this policy. Yet this is the largest mandated employment quota policy in the

world, and has existed for over a half century. Second, this paper adds to the existing literature on the effects of affirmative action. Affirmative action policies are the subject of heated debates in many countries, and it is important to understand whether they benefit the intended beneficiaries in the first place before adopting or continuing them. Some affirmative action policies may have different effects than others, and this case of setting aside jobs for minorities in India should be an interesting counterpoint for policies based on preferential treatment without mandates. Also, currently the Government of India is contemplating to extend this policy to private sector jobs and to new sections of the society.

The remainder of this paper proceeds as follows: Section 2 briefly discusses the related literature. Section 3 provides a background on disadvantaged minorities and the employment quota policy in India. Section 4 describes the data. Section 5 presents the empirical framework. Section 6 reports the main empirical results, and Section 7 describes some robustness checks. Section 8 concludes.

## 2 Related Literature

There is an extensive literature on affirmative action, and this paper contributes to the strand estimating the effects of employment-related affirmative action policies on the outcomes of targeted groups. Most of these studies have examined the United States experience (e.g., Freeman 1973, Ashenfelter and Heckman 1976, Brown 1984, Leonard 1990, Donohue and Heckman 1991, Myers 2007). One set of studies has focused on the federal contractor program. Under this program, targeted groups (including blacks and women) are given preferential treatment when bidding for business from the federal government (e.g., Leonard 1984b). Leonard (1984b) finds that affirmative action has not only increased minority employment among contractors, it has also increased the demand for minorities in skilled jobs in the contractor sector. The literature's consensus is that federal contractor program has had somewhat modest effects on black economic outcomes (Smith and Welch 1989, Leonard 1990).

A second set of studies estimating the effect of employment-related affirmative action policies has focused court-ordered affirmative action (e.g., Beller 1978), but as noted by Donohue and Heckman (1991), no consensus has emerged on the evidence, and the interpretation is difficult due to endogeneity problems. Leonard (1984a) estimates small

productivity impacts of court-ordered affirmative action using industry-level data on class action employment discrimination litigation, black employment, and productivity. More recently, McCrary (2007) estimates the effect of court-ordered racial hiring quotas on municipal police departments in Unites States. He finds a 14 percentage point gain in the fraction African American among newly hired officers. In another recent study Myers (2007) examines the effect of ending state affirmative action programs in California (California Proposition 209) and finds that employment among women and minorities dropped sharply suggesting that either affirmative action programs in California had been inefficient or that they failed to create lasting change in prejudicial attitudes.

To my knowledge this paper is the first to quantify the effects the employment quota policy in India on the labor market outcomes of targeted groups, and as such makes a contribution to the literature on the effects of employment-related affirmative action policies.<sup>1</sup> However, a number of recent papers have examined the effects of political reservation policy in India. In India, a certain number of seats in federal, state and local legislative bodies are set aside for minorities and women. Pande (2003) finds that changing the political representation for scheduled tribes and scheduled castes does impact policy choices, which is consistent with policy preferences differing across social groups and politicians acting upon their preferences. Duflo and Chattopadhyay (2004) finds that increasing female political representation changes the policy choices as well; local governments where a woman is randomly assigned to be a leader tend to invest more in public goods that women consider more important. Also, very few studies have attempted to estimate the net effect of affirmative action.<sup>2</sup> Thus, mandated political quotas appear to have a beneficial effect for the group for whom slots are set aside. It is of interest to find out whether mandated employment quotas, too, benefit their intended beneficiaries.

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<sup>1</sup>A qualitative discussion of the job reservation policy in India is offered by Galanter (1984). Also Duflo (2005) offers a review on the political reservation policies in India.

<sup>2</sup>Chin and Prakash (2008) finds that political reservation for minorities has reduced overall poverty in India. Bertrand, Hanna and Mullainathan (2008) estimate the effect of affirmation action in college admissions in India. They collect data on the labor market outcomes of applicants to an engineering college, and find that lower caste group applicants benefit from attending the college (which they would not have been able to attend without the reservations). However, the benefit is greater for the marginal high caste group applicant admitted compared to the marginal low caste group applicant admitted, which means that reserving college seats for lower caste group members leads to an inefficient allocation of educational slots.



## 3 Background on Disadvantaged Minorities and Employment Quota Policy in India

### 3.1 The Scheduled Castes and Scheduled Tribes in India

The scheduled castes (SCs) and scheduled tribes (STs) are the two principal historically disadvantaged minority groups in India, and together account for 24.4 percent of the total population according to 2001 census. The Constitution (Scheduled Castes) Order of 1950 and the Constitution (Scheduled Tribes) Order of 1950 lists which castes, races are designated SCs and STs respectively and provides the legal definition of these two social groups.<sup>3</sup> The definition of SCs and STs has remained stable over the time period considered in this paper.<sup>4,5</sup> The SCs, who make up 16.4 percent of the total population, is comprised of groups isolated and disadvantaged by their “untouchability”<sup>6</sup> status. The word “untouchability” refers to their low status in the traditional Hindu caste hierarchy which exposed them to invidious treatment, severe disabilities, and deprivation of economic, social, cultural, and political opportunities (Galanter 1984). The STs, who make up 7.9 percent of the total population, are distinguished by “tribal characteristics” and by their spatial and cultural isolation from rest of the population. In addition to the aforementioned characteristics, the identity of SCs and STs is historically determined. An individual is born as SC or ST and cannot change his/her caste over the lifetime. The only way to assimilate is through inter-caste marriage, in which case the children will acquire the father’s caste identity. In practice, inter-caste marriage is extremely rare for both STs and SCs. Also, interstate migration among SCs and STs is very low. Economic and social advancement of any group in a society requires an inclusive development, but the

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<sup>3</sup>Selection criteria for Scheduled Castes: 1. Cannot be served by clean Brahmans; 2. Cannot be served by barbers, water-carriers, tailors, etc who serve the caste Hindu; 3. Pollutes a high-caste Hindu by contact or by proximity; 4. Is one from whose hands a caste Hindu cannot take water; 5. Is debarred from using public amenities, such as roads, ferries, wells or schools; 6. Is debarred from the use of Temples (place of worship); 7. Will not be treated as an equal by high-caste men of the same educational qualification in ordinary social intercourse; 8. Is merely depressed on account of its own ignorance, illiteracy or poverty and, but for that, would be subject to no social disability; 9. Is depressed on account of the occupation followed and whether, but for that, occupation it would be subject to no social disability.

Selection criteria for Scheduled Tribes: 1. Tribal origin; 2. Primitive way of life and habitation in remote and less accessible areas; 3. General backwardness in all respects.

<sup>4</sup>According to Clause 2 of Articles 341 and 342 of Indian Constitution, amendments to the lists of SC and ST can be made only through Acts of Parliament. In the first 40 years after the adoption of the Constitution, such amendments were carried out only twice: first, in 1956 at the time of reorganization of the states. Second, Scheduled Caste and Scheduled Tribe Orders Act of 1976 was responsible for making the definitions of SCs and STs uniform within a state. No new castes or tribes were added.

<sup>5</sup>Individuals claiming to be SCs or STs are required to produce a Caste or Tribe certificate (a government issued document). In last 50 years very few cases has been reported and legal action can initiated if found guilty.

<sup>6</sup>The Indian Constitution prohibits the use of the word untouchability.

SCs and STs in India were excluded from every possible ritual practices and institutional rights, hence leaving them far behind the non-minorities.

The discrimination against SCs and STs over the past 1500 years is reflected today in their much worse socioeconomic status relative to the non-minorities. The poverty rate (percentage of people below Indian poverty line, measured by headcount ratio) among the disadvantaged minorities is about twice as high as for the rest of the population (see Table 1). Table 1 shows that the SCs and STs are worse off by other measures of well-being as well: infant mortality rate, literacy rate, and school enrollment rate. This systematic deprivation across all spheres has further led to their low educational achievements. According to the National Sample Survey (NSS) in 2005, only 52.4 percent of ST and 58.2 percent of SC children (age 6-14) can read and write as compared to 72.0 percent of non-minorities.

The large disparities in well-being between these two historically disadvantaged minority groups and the non-minorities has been the impetus for many government policies aimed at helping the SCs and STs. Among these policies is the employment quota policy.

### 3.2 The Employment Quota Policy in India

*“Nothing in this article shall prevent the State from making any provision for the reservation of appointments or posts in favor of any backward class of citizens which in the opinion of the State, is not adequately represented in the services under the State.”*

Article 16(4), Constitution of India.

The history of employment quota policy for disadvantaged minorities in public sector jobs dates back to 1947, when India attained Independence. Specifically, Articles 16(4), 320(4) and 335 of the Indian Constitution provides safeguards for SCs and STs in services and posts under the state with a view to ensuring their adequate representation in the public sector jobs. The percentage of quota or reservation in services/posts under the state government varies from one state to another and is fixed on the basis of percentage of SC and ST population in the respective state.<sup>7</sup> This policy of official discrimination in

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<sup>7</sup>Annual Scheduled Caste and Scheduled Tribe Commissioners Report. Also reported in Bill No. XLII of 2000 called The Scheduled Castes and Scheduled Tribes Bill as introduced in the Rajya Sabha.

favor of the worst off sections of the population is unique in the world, both in the range of benefits involved and in magnitude of the groups eligible for the benefits.

The employment quota policy in India is handled by the National Scheduled Caste and Scheduled Tribe Commission.<sup>8</sup> This Commission co-ordinates between the state government and the federal government once the fresh census population estimates by social group arrive. Before implementing the recommendation by the Commission, approval from several bodies is required. After the fresh estimates arrive, the Commission revises the percent of jobs reserved (employment quota) for SCs and STs according to the new census population estimates. Next, the Commission sends the recommendation to the President of India. Then the Ministry of Social Justice and Empowerment places the recommendation before both houses of the Parliament which gives the final approval. Only after this set of administrative steps is the percent of jobs reserved (employment quota) revised to reflect the new census population estimates. So the process generates a lag with respect to changes in the population share in the most recent census.<sup>9</sup> The details of how the employment quota policy is implemented in India will enable me to identify the effects of this policy, as I discuss in the next section.

Two additional comments are worth making about the employment quota policy in India. First, it is implemented on a flow basis. That is, the percent jobs reserved is applied to new vacancies. For example, if in a particular state 15 percent of jobs are reserved for SCs, then 15 percent of new vacancies will be set aside for SCs; only members of SCs would be eligible for these reserved jobs, though these reserved jobs may go unfilled in the absence of qualified candidates. Continuing the example, no non-minorities holding public sector jobs are removed from their jobs and replaced with members of SCs to make it true that 15 percent of the stock of public sector jobs are occupied by SCs. Second, it provides mandated employment quotas wherein the quotas are not upper limits on extent of minority employment in the public sector; indeed, minorities are free to compete for

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<sup>8</sup>Under Article 338 of the Indian Constitution, the President of India appoints a special officer known as the Commissioner for SC and ST to investigate all matters relating to the safeguards provided for the SC and ST under the various provisions of the Constitution. In 1978, the federal Home Ministry through a resolution set up a National Commission for Scheduled Castes and Scheduled Tribes, with the special officer for SC and ST as the Member Secretary. In 1990, through the sixty-fifth amendment to the Constitution (Article 338) the special officer was replaced by a National Commission for SC and ST with the powers of civil court to summon persons, files, etc. for securing evidence on oath. The new National Commission on SC and ST has a vigorous statutory mandate and the powers of a civil court.

<sup>9</sup>The actual lag between change in the percentage of jobs reserved and census count could be anywhere between 2 years to 5 years. The lag depends on when the job vacancies come up in the respective state for different class of jobs. The policy rule is then implemented and will immediately reflect in the likelihood of employment for SCs and STs. After interviewing with the official at the National SC and ST Commission and the Ministry of Social Justice and Empowerment, it is unlikely for State governments to manipulate the rule and respond to the quota before its actual implementation.

unreserved jobs, which are open to all.<sup>10</sup>

## 4 Data and Descriptive Statistics

The empirical analysis uses data assembled from a variety of sources. This section gives a brief summary of the data sources and the variables used; Appendix A provides a detailed account of the same.

The primary source is the National Sample Survey (NSS). This provides a large, nationally representative sample of households in India. I use data from the Employment and Unemployment rounds of this survey in 1983, 1987, 1993, and 1999. From the NSS, I extract the following sample: individuals who are currently aged 18-40, living in one of the 16 major Indian states named in Appendix A, and not currently attending school. The first data restriction is because only SCs and STs in this age range are eligible to apply for the reserved public sector jobs. The second restriction is because the job reservation variables that I cover in these states over the 1983-1999 time period consistently; at any rate, it should have minimal impact since these 16 states account for over 95 percent of the Indian population. All the labor market outcomes and individual demographic variables used in the empirical paper come from the NSS.

The Scheduled Caste and Scheduled Tribe Annual Commissioner's Report provides the policy variables (employment quota variables) for each state and year: percent of public sector jobs reserved for SCs and percent of public sector jobs reserved for STs. These policy variables are merged into the NSS individual-level data set by state and year.

The remaining data sources are as follows. The Census of India, Registrar General provides the data on SC and ST census population shares and current population shares.<sup>11</sup> The Census Atlas, India provides population density data. Finally, state per capita income is from the Economic and Political Weekly Research Foundation. These data are at the state-year level, and merged into the NSS data set by state and year.

Table 2 reports the descriptive statistics by social group (STs, SCs and non-minorities)

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<sup>10</sup>The following rules apply according to the safeguards provided by Constitution of India for the employment quota policy for the SCs and STs. First, post reserved for the SCs and the STs under subsection (1) of Section 3 shall be filled in such a manner as may be prescribed with the reserved candidate only and shall not be filled up by general category candidate, even in the absence of reserved category candidate not selected/not available. Second, the unfilled reserved posts or class of posts/vacancies for whatever cause may be, shall not be dereserved and shall be carried forward from time to time.

<sup>11</sup>Intercensal estimates of the population for SC and ST are obtained via liner interpolation. In many countries including US, a census is not taken every year and the government itself interpolates to arrive at annual population estimates. In case of India, the government follows the linear interpolation to estimate annual population figures as used in this paper.

for the full sample. (Appendix B provides descriptive statistics by sector and gender.) My four main outcome variables are based on the NSS question regarding usual activity: probability of being employed, probability of being in paid employment<sup>12</sup>, probability of being a salaried worker conditional on being in paid employment, and probability of being a salaried worker. These employment status outcomes are denoted as  $\Pr(\text{Employed})$ ,  $\Pr(\text{Paid Employed})$ ,  $\Pr(\text{Salaried}|\text{Paid Employed})$ , and  $\Pr(\text{Salaried})$  respectively.<sup>13</sup> These four employment outcomes are dichotomous variables.<sup>14</sup> In the sample, 77 percent of STs and 66 percent of SCs reports are employed, compared to 60 percent for non-minorities. About 60 percent of STs and SCs work in paid employment, compared to 48 percent for non-minorities. The lower employment and paid employment participation for non-minorities is not an indication of their worse opportunities. Instead, it is due to the better socioeconomic conditions for non-minorities that the women can work less and young men can study for civil service exams or engage in lengthy searches for well-matched job. Conditional on being in paid employment though, non-minorities have a larger likelihood of being in a salaried job. Also, unconditionally non-minorities have a larger likelihood of being in a salaried job.

An outcome of great interest would have been the probability of working in public sector employment, unfortunately this variable is available only in the 1999 round of the NSS and not in earlier ones. Still, I argue that it is possible to learn something about whether individuals are getting better jobs by looking at the four aforementioned employment outcomes. In particular, the different categories of employment status may be ranked as (from worse to better): not working, working, working for pay, and working in a salaried job. Public sector jobs belong to the latter category, and are among the better jobs in that category.<sup>15</sup> This ranking is based on Table 3, which displays the mean monthly wages and MPCE for each employment category for men in the urban sector in the 1999 NSS. Wages are asked only of salaried and casual workers, and it is clear that salaried workers earn considerably more than casual workers, especially those in public

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<sup>12</sup>Paid employment is comprised of salaried, self-employed, and casual workers.

<sup>13</sup>Estimated results for the outcome  $\Pr(\text{Salaried})$  is not included in the paper but available upon request.

<sup>14</sup>Below I will be estimating models using OLS, i.e., using the linear probability model. It is known that in the linear probability model, the error term will be heteroscedastic; I always use robust standard errors clustered at the state-time level. Also I estimate the logit models for each specification and the results are not sensitive to the different functional forms. The results are available upon request.

<sup>15</sup>In India, government jobs forms the largest formal sector employment, accounting for over 66 percent of all jobs. Hence a small change in employment quota or the job reservation for disadvantaged minorities can have substantial effect. The public sector employs around 18.07 million employees in India in 2004 (Ministry of Labor and Employment).

sector employment. An individual’s household’s MPCE is available for all the different employment categories, so can be used for a more complete comparison. Average monthly per capita expenditure is again highest for salaried workers. Hence, amongst the different employment categories, salaried jobs can be considered “good jobs” in a loose sense in the Indian context.

Despite the shortcomings of the NSS data—e.g., no income data for all years, earnings data not available other than for salaried and casual workers, no information on whether an individual works in the public sector until the 1999 round—the NSS is better than other sources of data and nevertheless allows us to assess whether SCs and STs’ labor market outcomes improved as a result of employment quotas for them. This is possible because the policy rule is implemented and is reflected immediately in the employment status for the SCs and STs. Employment Quotas may improve job opportunities for minorities (either because of the reserved public sector jobs themselves or because of other jobs vacated by minorities who would take those reserved jobs). This can generate effects on two margins: (1) the employment margin (moving from not employed to employed, employed to paid employed, and within paid employed from non-salaried job to salaried job); and (2) the quality of job margin conditional on being in a salaried job. The three employment status outcomes can capture the first margin. Wage for salaried workers can capture the second margin.

## 5 Empirical Analysis

### 5.1 Conceptual Framework

Theoretically, when identifiable groups are equally endowed ex ante, affirmative action can bring about a situation in which employers (correctly) perceive the groups to be unequally productive, ex post (Coate and Loury, 1993). So whether the effect of employment quota for minorities should make minorities worse off or not is not known.<sup>16</sup> There are two possible ways in which the policy of employment quota for minorities could improve

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<sup>16</sup>In the case in which non-minorities have a comparative advantage in higher level positions and minority labor is complementary with non-minority labor, then it is possible that reserving jobs at all levels will have general equilibrium effects in which there will be fewer jobs overall which hurts everybody. This is unlikely to be a concern in the Indian context since the reservations pertain to public sector employment, where the number of jobs is less responsive to market pressures. Moreover it is not clear among job applicants deemed qualified for a job vacancy whether minorities are less productive than non-minorities.

minorities' labor market outcomes.<sup>17</sup> The most direct effect is that some minorities will be employed in these reserved jobs.<sup>18</sup> But even when some minorities who do not end up getting a reserved job may nonetheless experience benefits. First, through raising the expected benefits from human capital investments (because there is a greater probability of getting a public sector job), employment quotas may induce minorities to increase their investments in human capital. Although a job may be reserved for minorities, it will be filled only if there is a qualified candidate, and moreover there may be a great deal of competition among minorities for reserved jobs with lower advertised educational requirements. To improve their chances of getting a reserved job, minorities may invest in preparation for civil service exams or lengthier searches for a better job match in the private sector with the goal of eventually getting a public sector job. Yet these investments will improve their labor market outcomes even if they fall short of securing a public sector job.<sup>19</sup> Second, employment quotas may improve opportunities for minorities even in the private sector. Although private firms are not legally required to diversify, nonetheless they may do so because the employment quota policy changes attitudes about whether minorities can perform modern jobs, or induces public/political pressure on private firms to hire more minorities.

However, there are two possible ways in which the policy can have no effect or even make minorities' labor market outcomes worse off. There can be discouragement effects since employment quotas for minorities reduces the competition for such jobs. This may reduce the incentive for investments in human capital by the minority groups. Also one can imagine a scenario when the private sector employers assume that minorities who do not take up public sector jobs are of lower quality. It then assumes it as a signal that a minority person who applies for a private sector job is of lower quality, thus reducing their likelihood of being employed.<sup>20</sup>

In addition to the foregoing theoretical considerations, how the employment quota policy is implemented will determine its effects. The Indian Constitution spells out the

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<sup>17</sup>There are other possible ways that determines the sign of the effect, however the argument I present is not entirely conclusive.

<sup>18</sup>This is because more public sector jobs are available to minorities compared to without employment quota.

<sup>19</sup>This raises the question of why minorities do not invest in more human capital even without the employment quotas. One possibility is that there is incomplete information about the benefits of human capital investments, and employment quotas reduce this information problem. Some of the reserved jobs are extremely attractive, and the lure of a large prize may be what induces minorities to get information about how formal labor markets work and how to succeed in them. A second possibility is discussed next: improved opportunities in the private sector.

<sup>20</sup>The sign of the effect of quotas on employer attitude could be either positive or negative (Coate and Loury, 1993).

intended job reservation policy to help minorities, but the de facto policy may be different from the de jure policy. The effectiveness of the policy rule can be undermined under the following circumstances. First, if there are few public sector job vacancies available or expected to be available, then the benefit will be small (and unlikely to be detectable in empirical analysis). Second, if there are not enough qualified candidates for reserved jobs (so the reserved jobs are left unfilled), then the benefit will also be small. Public sector jobs range from unskilled to very skilled. Each public sector job has a minimum set of qualifications (including educational requirements, and for some posts, civil service exam scores). Reserved jobs are drawn from all skill levels, and it is possible to imagine that some with high or unusual requirements may not have a qualified candidate. Additionally, spatial mismatch between where most public sector job vacancies are located far and where most minorities would reduce the benefits of the employment quota policy.

In summary, economic theory does not suggest whether the policy of employment quota for minorities will improve minorities' labor market outcomes, make it worse off or have no effect. How the employment quota policy is implemented will mediate these theoretical effects. Empirical work is needed to see whether, and the extent to which, employment quota policies help minorities.

## 5.2 Specification and Identification

The objective is to estimate the effect of reserving jobs (or employment quota)<sup>21</sup> for a targeted group on the labor force outcomes of the targeted group. Suppose the relationship between share of jobs reserved for a particular group and the labor market outcomes of an individual belonging to that group could be approximated as:

$$y_{ist} = \alpha_s + \beta_t + \gamma \text{Jobs Reserved}_{st} + \varphi J_{ist} + e_{ist} \quad (1)$$

where  $y_{ist}$  is the labor market outcome for individual  $i$  residing in state  $s$  observed at time  $t$ .  $\alpha_s$  is the state fixed effects, and control for any time-invariant state characteristics.  $\beta_t$  is the time fixed effects, and control for any macroeconomic shocks or national policies that affected everyone uniformly.  $\text{Jobs Reserved}_{st}$  is the share of public sector jobs reserved (employment quota variable) for individual  $i$ 's social group in state  $s$  at time  $t$  (Each model will be estimated separately for SCs and STs. When the SC sample is

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<sup>21</sup>I will use the term employment quota and share of jobs reserved interchangeably.



used,  $Jobs\ Reserved_{st}$  is the percent of jobs reserved for SCs and analogously when the ST sample is used.).  $J_{ist}$  is a set of individual-level controls (i.e., age, sex, educational attainment, rural/urban residence, marital status and religion). Finally  $e_{ist}$  is the error term.

The coefficient of primary interest in Equation 1 is  $\gamma$ , the effect of percent jobs reserved (or employment quota) on the labor market outcome. Given the presence of state fixed effects and time fixed effects in the model,  $\gamma$  is identified using within-state variation in jobs reserved over time where time effects have been partialled out.  $\gamma$  would not be consistently estimated by the ordinary least squares (OLS) if there were an omitted variable not included in this empirical model but correlated with  $Jobs\ Reserved_{st}$ . In the general case in which an area chooses its own share of jobs reserved, clearly there will be concerns about omitted variable bias. Areas that have more jobs reserved for minorities will likely systematically differ in ways that affect the outcome variables; area fixed effects mitigate this concern to somewhat however there might be time-varying area characteristics that matter, such as changing attitudes about minorities or other changes.

In the case of India, all the variation in the employment quota for SCs and STs in a state is attributable only to changes in their census population estimates. This is attractive for the purpose of identifying  $\gamma$  because a state's preferences regarding minorities—a key potential omitted variable—does not matter for  $Jobs\ Reserved_{st}$ . Despite this, estimating Equation 1 using Indian data may lead to a biased estimate of  $\gamma$  for the following reason. Minority population share from the census surely determines the share of jobs reserved, but it may affect labor market outcomes in other ways besides through the share of jobs reserved. For example, minority population shares may affect the probability that any one minority member gets a good job or may determine other welfare policies directed at minorities. In order to guard against this source of omitted bias, I expand the set of control variables to include minority population share both from the most recent census and the current year. First, I add  $Census\ Pop_{st}$ , which is individual  $i$ 's social group's share of the population in the most recent census in state  $s$  at time  $t$ . (When the SC sample is used,  $Census\ Pop_{st}$  is the census population share for SCs and analogously when the ST sample is used.) I am able to control for the SC and ST census population share because the percent of jobs reserved for SCs and STs is not revised immediately after a new census is taken. Instead, as explained in subsection 3.2, there are several administrative steps that must be taken before percent of jobs reserved are revised to

reflect the new SC and ST census population shares. This generates a time lag between when a census is taken and when the percent of jobs reserved is revised, enabling me to control for *Census Pop<sub>st</sub>* without losing all the variation in *Jobs Reserved<sub>st</sub>*. Second, I add *Current Pop<sub>st</sub>*, which is individual *i*'s social group's share of the population in the current year. I am able to control for SC and ST current population share because the percent jobs reserved for SCs and STs is driven by their census population count and not their current population count. A diagrammatic representation of the identification strategy is shown in Figure 1.

In my main empirical work below, I estimate the effect of reserving jobs on the employment status of the people in targeted groups. The specific measures of employment status I will use are the probability of being employed, probability of being paid employed<sup>22</sup>, and probability of being salaried conditional on being paid employed (the formation of variables are described in the next appendix A). For this analysis, the base specification will be Equation 1 with the addition of the controls for the targeted group's census population share and current population share:

$$y_{ist} = \alpha_s + \beta_t + \gamma \text{Jobs Reserved}_{st} + \varphi J_{ist} + \phi \text{Census Pop}_{st} + \delta \text{Current Pop}_{st} + e_{ist} \quad (2)$$

I also estimate a second specification which controls for two state-time-varying variables: state per capita income last year and population density, together denoted by  $X_{st}$ :

$$y_{ist} = \alpha_s + \beta_t + \gamma \text{Jobs Reserved}_{st} + \varphi J_{ist} + \phi \text{Census Pop}_{st} + \delta \text{Current Pop}_{st} + \eta X_{st} + e_{ist} \quad (3)$$

It may be useful to control for state per capita income. For example, states with higher income growth may experience differential changes in population growth rates and growth in employment opportunities; if this story is true, then the estimated  $\gamma$  in Equation 2 would be reflecting in part the effects of state per capita income.

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<sup>22</sup>Paid Employment is comprised of salaried, self-employed, and casual workers only.

### 5.3 Allowing Effects on Employment Status to Vary by Education

The  $\gamma$  in Equation 2 or 3 gives the average effect of employment quota for the targeted group on individuals belonging to that targeted group. Is the effect heterogeneous? In the Indian media, there are stories asserting that reservation policies benefit primarily the “creamy layer or the elite”—consisting of people who would be doing well even without the reservation policies—rather than the worst-off minorities. In the United States too, there is speculation that affirmative action in admission to educational institutions primarily helps the most able, who presumably would have done well even without the affirmative action. Therefore, it is of interest to test whether the effect of job reservations varies by some measure of individual’s human capital or ability. One such measure available in the National Sample Survey is educational attainment.

To proceed, we modify Equations 2 and 3 to include interactions between the treatment variable ( $JobsReserved_{st}$ ) with four dummy variables for educational attainment (primary school, middle school, secondary school, and upper secondary school or higher) that are already elements of  $J_{ist}$ . Equation 2 with this modification is given by:

$$\begin{aligned}
 y_{ist} = & \alpha_s + \beta_t + \gamma_0 JobsReserved_{st} + \gamma_1 JobsReserved_{st} * PrimarySchool_{ist} \\
 & + \gamma_2 JobsReserved_{st} * MiddleSchool_{ist} + \gamma_3 JobsReserved_{st} * SecondarySchool_{ist} \\
 & + \gamma_4 JobsReserved_{st} * HigherSecondary_{ist} + \varphi J_{ist} + \phi CensusPop_{st} \\
 & + \delta CurrentPop_{st} + e_{ist}
 \end{aligned} \tag{4}$$

where the omitted educational attainment category is “no schooling”. Thus,  $\gamma_0$  gives the effect of job reservation for people with no schooling. The other  $\gamma$ s give the effect relative to people with no schooling. Similarly, Equation 3 changed to allow effects to differ by education is:

$$\begin{aligned}
 y_{ist} = & \alpha_s + \beta_t + \gamma_0 JobsReserved_{st} + \gamma_1 JobsReserved_{st} * PrimarySchool_{ist} \\
 & + \gamma_2 JobsReserved_{st} * MiddleSchool_{ist} + \gamma_3 JobsReserved_{st} * SecondarySchool_{ist} \\
 & + \gamma_4 JobsReserved_{st} * HigherSecondary_{ist} + \varphi J_{ist} + \phi CensusPop_{st} \\
 & + \delta CurrentPop_{st} + \eta X_{st} + e_{ist}
 \end{aligned} \tag{5}$$

## 5.4 Allowing Effects on Employment Status to Vary by Sector and Gender

I will also test whether the effect of employment quota for minorities varies by the individual's sector (urban/rural) and gender. First, there are more public sector jobs in urban areas than rural areas. Thus, members of SCs and STs living in urban areas may be more likely to have a reserved job become available that suits them. Second, in India many characteristics differ between males and females (e.g., employment rate, educational attainment, social status) and it is quite possible that the responsiveness of labor market outcomes to job reservations also differ by sex. Even in the U.S., there is evidence that employment-related affirmative action may have different impacts by sex. For example, a number of studies including Ashenfelter and Heckman (1976) and Smith and Welch (1976) compare the shares of employment or employment growth accounted for by different demographic groups between establishments that practice affirmative action and those who do not. They all find a positive impact on black male's share of total employment, while there is no such consensus on effects for black females.

We can estimate Equation 3 separately for each of the four sector-gender combinations to assess whether the effects vary by sector and gender. It turns out the following specifications with additional constraints produce similar results, so I will use them below. The following specification modifies Equation 3 to allow the effects of percent jobs reserved to vary by sector and gender:

$$\begin{aligned}
 y_{ist} = & \alpha + \gamma_0 JobsReserved_{st} + \gamma_1 JobsReserved_{st} * Male_{ist} * Rural_{ist} \\
 & + \gamma_2 JobsReserved_{st} * Female_{ist} * Urban_{ist} \\
 & + \gamma_3 JobsReserved_{st} * Female_{ist} * Rural_{ist} + \tau Q + e_{ist}
 \end{aligned} \tag{6}$$

where Q includes state dummies, time dummies, age, age squared, married dummy, sector dummy, gender dummy, education dummies, religion dummies, ST (SC) census population share, ST (SC) current population share, state per capita income, and population density; all of which are allowed to vary by gender and sector.

## 5.5 The Impact of Job Reservation on Monthly Per Capita Expenditure

We may wish to get a summary outcome measure that encapsulates all the effects of employment quotas for minorities on minorities' well-being, including but not limited to changes in employment status and changes in wages conditional on having a salaried job. Unfortunately in the National Sample Survey, there is not a measure of income, and wages are reported only for a few employment categories. To estimate the impact of job reservation on the well-being of SCs and STs therefore, I use the individual's household's monthly per capita expenditure (MPCE) as an outcome variable.<sup>23</sup> Many SCs and STs are close to the poverty line and have no access to financial institutions, so MPCE is interesting not only as a measure of consumption but also as a proxy for income. The MPCE analysis include all people, not only salaried workers since MPCE is available for all households. The estimating equation is:

$$MPCE_{st} = \alpha_s + \beta_t + \gamma JobsReserved_{st} + \phi CensusPop_{st} + \delta CurrentPop_{st} + \eta X_{st} + e_{st} \quad (7)$$

where  $MPCE_{st}$  is in turn the log MPCE at the mean and at the following percentiles: 10<sup>th</sup>, 25<sup>th</sup>, 50<sup>th</sup>, 75<sup>th</sup>, 90<sup>th</sup>. All variables are at state-time level.

## 6 Main Results

First, I present the results of estimating Equations 2 and 3 using OLS for each of the three employment status outcomes. I focus my discussion on the coefficient for the job reservation variable, which gives the average effect of percent jobs reserved (or employment quota). Table 4 reports the results for the STs and Table 5 reports the results for the SCs. Columns (1)-(2) of Table 4 suggest that increases in percent jobs reserved for STs has no impact on the probability of being employed. Columns (3)-(4) examine the impact of ST job reservation policy on probability of being paid employed. ST job reservation does not

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<sup>23</sup>A similar empirical analysis is done for wage as the dependent variable. There are no significant effects of minority job reservation on wages at the mean and at all the different points of the wage distribution. I have repeated the analysis dividing the sample into two education groups—high (secondary and higher secondary or higher) and low (uneducated, primary and middle)—and still find no effects. Thus, there is no evidence of “job upgrading” within salaried jobs at least as measured by wages in the NSS (the NSS asks about wages earned in the last week). It remains possible, though, that the salaried job is better along non-monetary dimensions (e.g., prestige, perks, job security) and perhaps even monetary dimensions to the extent that the NSS wage measure is a poor measure of total compensation.

affect the probability of working for pay at conventional levels of significance (5 percent or better) but does have a positive impact that is significant at the 10 percent level in column (4). Finally, columns (5)-(6) suggest that there is no effect of ST job reservation on the probability of having a salaried job conditional on being in paid employment. The finding that ST job reservation had essentially no impact on ST employment status outcomes is not surprising due to the following reasons. First, the educational attainment among STs is much lower compared to other social groups, and many reserved jobs may not have qualified candidates. Second, STs primarily reside in rural areas while the majority of the salaried jobs are in urban areas.

Table 5 shows the average effect of percent jobs reserved for SCs on SC employment status outcomes. Columns (1)-(4) suggest that there is no significant effect on either the probability of working or the probability of working for pay. In columns (5)-(6) we observe that increases in percentage of jobs reserved for SC has a significant positive impact on the likelihood of getting a salaried job conditional on being in paid employment. The column (6) estimate suggests that a 1-percentage point increase in SC job reservation increases the probability of being in a salaried job conditional on being in paid employment by 0.6 percentage points. Taken together, Table 5 suggests that the job reservations are causing SCs who are already in paid employment shift to better (salaried) jobs; SCs who are not in paid employment do not appear to be affected.

Second, I present the results where I allow the effect of minority job reservation on employment status outcomes to vary by education, i.e., I estimate Equations 4 and 5. Table 6 reports the results for the STs and Table 7 reports the results for the SCs. In Table 6, none of the effects of ST job reservation are significant at the 5 percent level or better. It is interesting to note that in columns (1)-(2), for the most educated people, there is a negative impact on the probability of working that is significantly different from the effect on the uneducated at the 10 percent level. Perhaps not much should be made of this result, however this result is consistent with people who can potentially qualify for the best public sector jobs have other attractive options, for example higher studies, work for private sector.<sup>24</sup>

Table 7 reports the effect of SC job reservation on SC employment by education. From

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<sup>24</sup>Another potential explanation is such individuals withdraw themselves from the labor market to prepare for the civil service exams required for those jobs. That is, the long run prize of the best public service jobs is inducing unemployment in the short run. Obviously, most minorities cannot afford to do this, but it must be said that STs with higher secondary education or higher are rare (according to Table 2, they make up less than 3 percent of all STs in the sample).

columns (1)-(2) of Table 7, increases in SC job reservation has significant negative impact on probability of being employed for the uneducated, with the negative effect diminishing as education increases. Similar comments can be made about the effects on being in paid employment reported in columns (3)-(4). Columns (5)-(6) examine the impact of SC job reservation on probability of getting a salaried job conditional on being paid employed. Increases in SC job reservation has significant positive impact on this outcome for the uneducated, with the positive impact diminishing as education increases. The column (6) estimate suggests that a 1-percentage point increase in SC job reservation increases the likelihood that an uneducated SC get a salaried job conditional on being in paid employment by 0.9 percentage points. In light of the positive effects for the less educated in columns (5)-(6), it is possible to build an intuition for the negative effects in columns (1)-(4). In particular, getting a salaried job is a lucrative prize, but it is not easy for minorities to get one. Increases in jobs reserved for SCs increase the chance of obtaining that prize, and may induce SCs outside of paid employment to take a longer time to prepare or search for a good job. Additionally, it makes sense that we detect positive effects on  $\Pr(\text{Salaried}|\text{Paid Emp})$  for the less educated but not for the more educated. This outcome is only a blunt measure of job quality. Educated individuals can get a salaried job relatively easily, and failing to detect impacts on the employment status outcomes on educated people does not necessarily mean they did not benefit. Instead, we will have to look at MPCE for everyone.

Before moving to the MPCE analysis, I consider whether the effects of job reservation are heterogeneous by sector and gender, i.e., I estimate Equation 6.<sup>25</sup> Table 8 reports the estimated effects of ST job reservation on ST employment status outcomes. The effect on  $\Pr(\text{Employed})$  and  $\Pr(\text{Salaried}|\text{Paid Emp})$  is not significant for any of the four sector-gender categories. The effect on  $\Pr(\text{Paid Emp})$  is not significant for men, but is positive and significant for women. Thus, ST job reservations appear to be benefiting working women: they are more likely to be in paid employment, with the composition of paid employment unchanged.

Table 9 reports the effect of minority job reservation on employment outcomes for the SCs. Columns (1)-(2) show that effects on employment and paid employment are negative except for rural males. Column (3) shows that it is SCs in urban areas are experiencing

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<sup>25</sup>The results from estimating Equation 6 are similar from the results from estimating Equation 3 for each of the four sector-gender categories.

the positive effect of job reservation on the probability of getting a salaried job conditional on being in paid employment. Effects on  $\Pr(\text{Salaried}|\text{Paid Emp})$  are similar for male SCs and female SCs: in rural areas, there are no effects for both, and in urban areas, there are positive effects for both.

Finally, I estimate the effect of job reservations on the monthly per capita expenditure. This can be viewed as a summary measure of well-being, capturing any changes in employment status and any changes in wages conditional on employment status. MPCE is available for all households, so all employment categories can be included for analysis. The methodology is described in subsection 5.5, with the specification given by Equation 7. The unit of observation is again the state-time cell. Again, I use urban males but results are similar for urban females. I do not find any effect of ST job reservation on ST MPCE, either for the full sample or after dividing the sample by education (Table 10 reports the estimated results for high and low educated STs). I do not find an effect of SC job reservation on SC MPCE when the full sample is used, however when I perform the analysis separately for the high educated and low educated, significant positive effects on MPCE are detected for the low educated. This is shown in Table 11. Given that there was no effect of SC job reservation on wages<sup>26</sup>, then these effects on MPCE must be the consequence of the effect of SC job reservation on the probability of having a salaried job (Table 5). It makes sense that the less educated experience the gains in MPCE since it was the less educated who experienced the gains in the probability of having a salaried job (Table 7).

The main findings from Tables 4-11 may be summarized as follows. First, SC benefitted from SC job reservation policy while ST did not benefit at the conventional level of significance at least using the labor market outcome measures available in the NSS. Specifically for SC, I do not find an overall change in employment, but find changes in the composition of employment—more SCs are getting salaried jobs. Second, the benefits of SC job reservation were more pronounced for SCs in urban areas and for the less educated.

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<sup>26</sup>Results available upon request



## 7 Robustness Checks and Credibility of Results

### 7.1 Control Experiment using Non-Minorities

In this section of robustness check, I use a control experiment to test for state-specific time effects. We might be concerned that the estimated coefficients for the job reservation variable does not reflect the true causal effect of job reservation but instead includes the effects of omitted state-time variables. We might test for state-specific time effects by using a group of people that experience the same state-time conditions but are not eligible for reserved jobs: the non-minorities. In particular, I estimate the effect of ST job reservation on the employment status outcomes of non-SC/ST (see Appendix Table C-1); these specifications are the same as the Table 4 ones except in Appendix Table C-1, the individuals in the sample have not received a real treatment (non-SC/ST are not impacted by ST job reservations). Similarly, I estimate the effect of SC job reservation on the employment status outcomes of non-SC/ST (see Appendix Table C-2); these specifications are the same as the Table 5 ones. I do not find any significant effect of ST job reservation on probability of being employed and probability to being paid employed for non SC/ST [columns (1)-(4)]. However, I do find significant negative effect of ST job reservation on probability of being salaried conditional on being in paid employment for the non SC/ST. So increases in percent jobs reserved for ST is associated with decreases in  $\Pr(\text{Salaried}|\text{Paid Emp})$  for reasons having nothing to do with the employment quota policy itself. Thus, if we imagine removing this secular state-time effect (taking the Table 4 estimate and subtracting out the corresponding Appendix Table C-1 estimate), then the effect on STs would be positive. In Table C-2, I do not find any significant effect of SC job reservation on the three employment status outcomes for the non-SC/ST. This supports the interpretation of the coefficients for SC job reservation in the rest of the paper as due to SC job reservation rather than omitted state-time variables.

### 7.2 Credibility of Results

In this subsection, I consider two other hypotheses that would confound a causal interpretation.<sup>27</sup> So far I have been interpreting the estimated coefficient for the share

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<sup>27</sup>It should be noted that conversations I had with bureaucrats during my data collection trip to India and the various Ministries does not suggest that the timing was endogenous; administrative lags appeared to be the sole determinant of the timing.

of jobs reserved for minorities (or employment quota policy) in Equation 3 as the causal effect of the minority employment quota policy. I only use the variation in employment quota arising from the administrative lag between when a new census count is available and when the revised employment quotas on the new census count are implemented. The results are shown in Appendix Table C-3.

**Quadratic control for minority population share:** The identification strategy is similar to a regression-discontinuity-type approach as the minority employment quota in the state is a discontinuous function of their population share in that state. Thus it is essential to control for nonlinear effects of minority population share. In Equation 3, I add ST (SC) quadratic population controls. The estimated effects of ST Job Reserved and SC Job Reserved are shown in Appendix Table C-3, Column 1. The effects are same as before for all the three employment outcomes for both STs and SCs.

**Control for minority political reservation:** Pande (2003) showed that minority political reservation lead to an increase in targeted benefits for the two minority groups. The effects were stronger for ST but not for SC. To be certain that the results I present is driven solely from the discontinuities, I control for minority political reservation (ST political reservation and SC political reservation) in my Equation 3. The estimated effects of ST job Reserved and SC Job reserved are shown in Appendix Table C-3, Column 2. The effects are same as before for all the three employment outcomes for both minority groups.<sup>28</sup>

## 8 Discussion

Using an identification strategy based on jumps and administrative lags in the response of minority job reservation to population changes in India, I find that minority job

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<sup>28</sup>In the earlier version of this paper I use minority political reservation as an instrument for minority job reservation. In order for minority political reservation to be a valid instrument, it should be correlated with the endogenous variable and uncorrelated with the error term. Pande (2003) provides evidence that the minority political reservation to be correlated with the job reservation variable. It might be a valid exclusion restriction because it is based on a strict policy rule (in a state, percent of legislative seats reserved for minorities is equal to the minority population share according to the most recent census) that is implemented with a lag not subject to any discretion (after new census estimates arrive, new political reservations become effective with the next election year). See Pande (2003) and Prakash (2007) for more information on India's political reservation policy. For both STs and SCs, in the first stage, minority political representation is a strong predictor of minority job reservation so weak instruments is not a concern here. None of the 2SLS effects are significant since the standard errors are considerably larger (since so much of the variation in percent jobs reserved is no longer used). However, the point estimates are consistent with our earlier results: a positive effect on the probability of being in a salaried job conditional on being in paid employment that is larger for SCs than STs. This result also suggests that there is little bias from omitted variables in the ordinary least squares estimate of the effect of minority job reservation on employment outcomes; suggesting omitted variables in the structural equation are weakly correlated or uncorrelated with minority job reservation.

reservations have varied effects on minority labor market outcomes. First, employment quotas significantly improve job outcomes for scheduled castes but not scheduled tribes. Second, among the scheduled castes, benefits accrue primarily to members who reside in urban areas and are less educated. These benefits appear to be in the form of moving up the job ladder to salaried positions from other types of paid employment. Indeed, it does not appear that there are increases in the probability of being employed or being in paid employment; if anything, these probabilities tend to be negative, suggesting that the employment quotas may be inducing minorities to invest in longer job searches. Nor does it appear that among salaried workers, job reservations raise the wages. Given the positive effect on the propensity of urban and less-educated SCs to get a salaried position, not surprisingly SC job reservation has a positive effect on the monthly per capita expenditures of urban and less-educated especially at the lower half of the distribution. Thus, my analysis suggests that India's employment quota policy benefited SCs overall, but not STs overall. Although scheduled tribes and scheduled castes both have much worse socioeconomic outcomes than non-minorities in India, the findings suggest that distinct policies for each minority group may be needed to narrow the gaps.

That members of scheduled tribes do not benefit overall may be due to their concentration in remote rural areas; according to the 2001 Census, over 90 percent of the ST population lives in rural areas. Yet, most new vacancies in public sector employment jobs are in urban areas. Thus, there is a spatial mismatch between where STs live and where reserved jobs are. This spatial mismatch problem appears to be present for the SCs living in rural areas as well, which is probably they did not benefit from the job reservations either. Considering that rural areas contain 72 percent of the population in the 2001 Census and an even larger share of the country's poor, it seems clear that employment quotas for minorities cannot be a policy that can promote economic progress for most of the country's neediest.

It is interesting that SCs with secondary and higher education do not seem to be affected by the employment quotas. Employment quotas cover a full range of public sector jobs—from less skilled to very skilled—so some reserved jobs should be attractive to the more educated. One interpretation of the insignificant effect for more educated SCs on the probability of being in a salaried position conditional on being in paid employment, wages for male urban salaried workers, and MPCE for urban residents is that there truly is no effect. Perhaps reserved jobs at the highest skill level go unfilled because applicants are

not deemed qualified, or because the few SCs who would be qualified for them have even better employment opportunities in the private sector. Even though there may not be legal mandates for private firms to hire minorities, they are encouraged to do so, and it is possible that they compete for the few highly qualified minorities. Another interpretation is that the educated SCs are benefiting, but such benefits are not captured by the outcomes I have used; for example, perhaps employment quotas improve non-financial aspects of the job.

Other countries have used or are considering using mandated employment quotas, so the results here for India's employment quota policy may be applicable. But even in a single country, there are heterogeneous effects of this policy. In the short run, for employment quotas to have a beneficial effect, it seems important to match the location and skill requirement of the reserved jobs to attributes of the targeted population. In the longer run, perhaps there will be changes in investments in human capital and mobility in response to the job opportunities created by the employment quotas. Along these lines, it would be interesting to estimate the effect of employment quotas on minorities' mobility; in India, there is very little geographic mobility especially across states, but perhaps there is an impact on rural-urban migration. Another interesting extension is the impact of employment quotas on human capital investments. Employment quotas raise the expected benefits from human capital investments (because there is an increased chance of getting a good job). First, do adults invest more in adult education and useful work experience? In this paper, we find that job reservations sometimes reduce the probability of being employed, which is consistent with adults investing in their human capital (perhaps preparing for exams to enable a better job match later, or searching for a job that is either in the public sector or provides a better stepping stone for a public sector job) but more direct evidence would be useful. Second, do parents invest more in the schooling of their children because of the larger expected returns to children's schooling due to the job reservations? If there are indeed such intergenerational effects, then the benefits of reserving jobs for minorities would be greater than what has been reported in this paper.<sup>29</sup>

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<sup>29</sup>Preliminary results from Prakash and Rahman (2009) finds evidence of a strong intergenerational effects among SCs, specifically increase in educational attainment and fall in incidence of child labor among the SCs children. A copy of this working paper is available upon request.

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Figure 1: Diagrammatic Representation of Identification Strategy

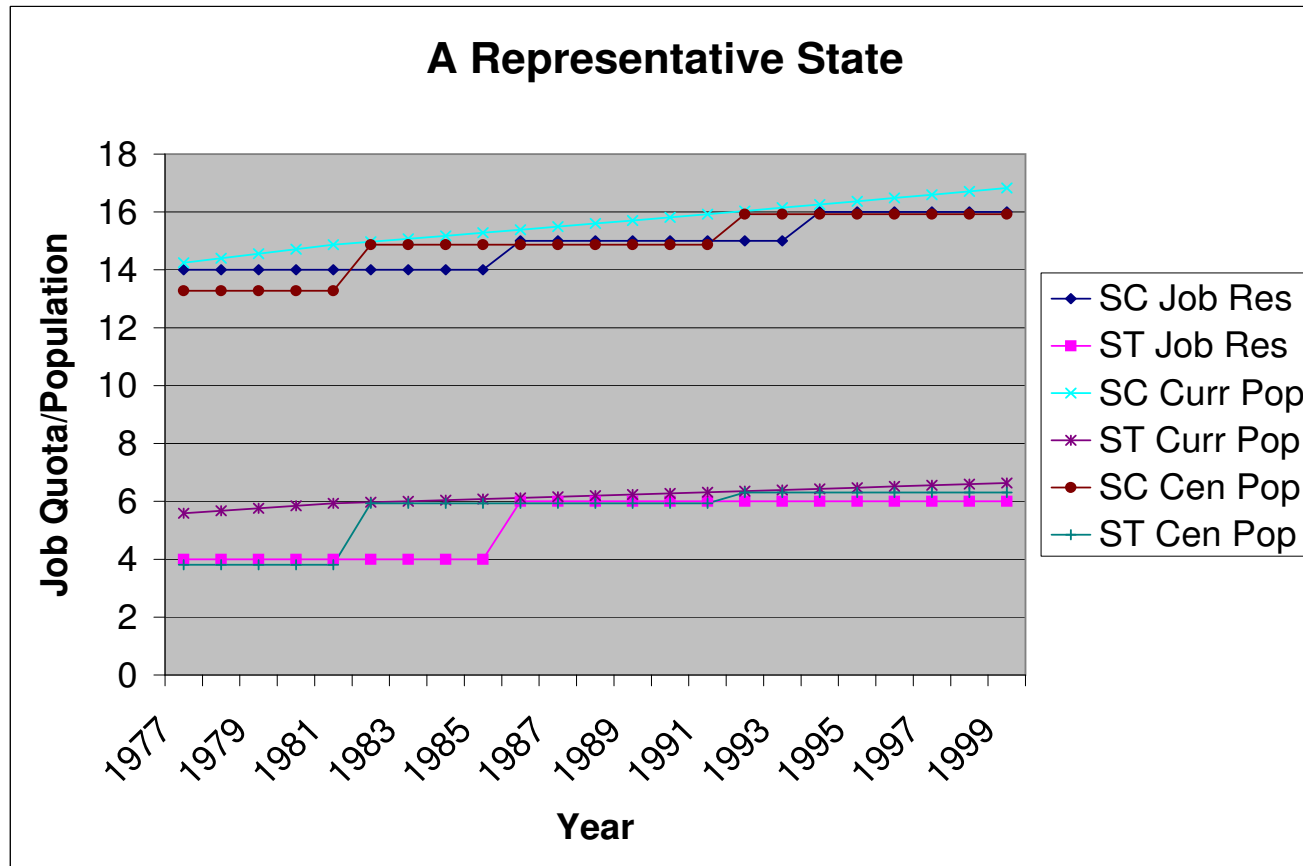


Table 1: Economic Characteristics of Scheduled Castes and Scheduled Tribes

Variable	Scheduled Tribes	Scheduled Castes	Non-SC/ST
All India Population Share	7.9	16.4	75.4
<i>Within-group characteristics:</i>			
Infant Mortality Rate* (age 0-5 yrs)	121	118	80
Literacy Rate (Rural)	45	51	63
Literacy Rate (Urban)	69	68	82
School Enrollment (age 7-17 yrs)	56.3	65.7	81.3
Rural Poverty Headcount Ratio	46	36	21
Urban Poverty Headcount Ratio	35	38	21

The sources for this data (1990's) are NSSO, Census of India, Thorat (2005) and SC and ST Commissioner's Report.

\* Per 1000 children under age 5.

Table 2: Descriptive Statistics- All India

Variable Name	Scheduled Tribes	Scheduled Castes	Non SC/ST
<i>Dependent Variables:</i>			
Pr(Employed)	76.77 (0.42)	66.84 (0.47)	60.60 (0.48)
Pr(Paid Employment)	59.63 (0.49)	60.42 (0.49)	48.49 (0.49)
Pr(Salaried Paid Employment)	12.11 (0.33)	16.31 (0.37)	26.98 (0.44)
Pr(Salaried)	7.21 (0.25)	9.85 (0.29)	13.08 (0.33)
<i>Policy Variable:</i>			
Percent Jobs Reserved	13.02 (6.77)	17.07 (5.23)	None (-)
<i>Educational Attainment Control Variables:</i>			
High Secondary	2.77 (0.16)	3.34 (0.18)	10.66 (0.31)
Secondary	2.53 (0.16)	3.31 (0.18)	6.73 (0.25)
Middle	4.99 (0.22)	6.80 (0.25)	8.85 (0.28)
Primary	11.50 (0.32)	13.25 (0.34)	17.64 (0.38)
No Education	78.20 (0.41)	73.29 (0.44)	56.11 (0.49)

Table continues on next page.

Table 2: Descriptive Statistics- All India (Continued)

Variable Name	Scheduled Tribes	Scheduled Castes	Non SC/ST
<i>Religion Control Variables:</i>			
Hinduism	91.90 (0.27)	92.64 (0.26)	76.46 (0.42)
Islam	1.39 (0.12)	0.91 (0.09)	17.30 (0.38)
Christianity	4.38 (0.20)	1.32 (0.11)	2.22 (0.15)
Sikhism	0.33 (0.06)	3.74 (0.19)	2.74 (0.16)
Jainism	0.07 (0.03)	0.00 (0.01)	0.58 (0.08)
Buddhism	0.15 (0.04)	1.07 (0.10)	0.42 (0.07)
Zoroastrianism	0.00 (0.00)	0.00 (0.00)	0.00 (0.01)
<i>Other Control Variables:</i>			
Marital Status	85.85 (0.35)	84.87 (0.36)	79.81 (0.40)
Male	49.56 (0.50)	50.25 (0.50)	50.44 (0.49)
Urban Sector	14.13 (0.35)	27.12 (0.44)	39.82 (0.49)
Age	28.55 (6.68)	28.46 (6.74)	28.61 (6.67)
Census population share	13.55 (7.53)	16.56 (5.29)	74.21 (7.28)
Current population share	13.80 (7.40)	17.73 (5.36)	75.46 (7.34)
Census population density	206.33 (124.00)	291.45 (149.21)	272.68 (150.48)
Lag(1) SDP	8.88 (1.94)	9.08 (1.98)	8.95 (1.99)

Data consists of men and women aged 18-40 living in India from the 1983, 1987, 1994 and 1999 rounds of the National Sample Survey who are not currently attending school. SDP indicates state domestic product.

Table 3: Average Monthly Wage and Consumption by Employment Category, Urban Men

	<u>ScheduledTribe</u>		<u>ScheduledCaste</u>		<u>NonSC/ST</u>	
	Wage	MPCE	Wage	MPCE	Wage	MPCE
Employment Category:						
Employed	NA (-)	710 (529)	NA (-)	637 (394)	NA (-)	866 (613)
Salaried	4077 (3464)	956 (638)	3023 (2791)	797 (498)	3446 (3611)	1004 (735)
Public	4907 (3353)	1044 (769)	4204 (3274)	864 (547)	5453 (4046)	1175 (754)
Private	3734 (4123)	794 (571)	2406 (2018)	726 (547)	3820 (3954)	1128 (1032)
Self Employed	NA (-)	693 (444)	NA (-)	620 (335)	NA (-)	863 (563)
Casual	1441 (759)	470 (226)	1646 (897)	515 (273)	1963 (7885)	592 (309)
Unpaid Family Worker	NA (-)	853 (767)	NA (-)	579 (270)	NA (-)	806 (462)
Not Employed	NA (-)	632 (378)	NA (-)	704 (362)	NA (-)	844 (493)

*Notes:* Standard deviation are in parentheses.

1. Data consists of men aged 18-40 living in urban India in the 1999 round of the National Sample Survey. MPCE is Monthly per capita expenditure. Wage and MPCE are expressed in Rupees. Wage and MPCE are deflated by Consumer Price Index-Industrial Worker (base 2001) to obtain real values. Weekly wage from NSS is multiplied by 4.33 to arrive at monthly wage. Wage data is not available (NA) for self-employed workers, and unemployed individuals, hence no average wage is reported for employment categories including them.

2. Paid Employment is comprised of salaried, self-employed and casual workers only.

3. Public sector employment consists of government jobs and semi-government jobs. Private sector employment consists of co-operative society, private limited company, and other units covered under Annual Survey of Industries, India.

Table 4: Effect of ST Job Reservation on ST Employment Outcomes- All India

	$Pr(Employed)$		$Pr(PaidEmp)$		$Pr(Salaried PaidEmp)$	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>ST Job Reservation</b>	<b>-0.003</b> <b>(0.003)</b>	<b>-0.002</b> <b>(0.003)</b>	<b>0.010</b> <b>(0.007)</b>	<b>0.013*</b> <b>(0.006)</b>	<b>-0.002</b> <b>(0.003)</b>	<b>-0.003</b> <b>(0.003)</b>
High Secondary	-0.079*** (0.016)	-0.078*** (0.016)	-0.066*** (0.018)	-0.064*** (0.018)	0.532*** (0.023)	0.531*** (0.023)
Secondary	-0.101*** (0.015)	-0.100*** (0.015)	-0.115*** (0.016)	-0.113*** (0.016)	0.319*** (0.026)	0.318*** (0.026)
Middle	-0.087*** (0.016)	-0.086*** (0.016)	-0.106*** (0.019)	-0.106*** (0.019)	0.128*** (0.015)	0.128*** (0.015)
Primary	-0.051*** (0.008)	-0.052*** (0.009)	-0.055*** (0.010)	-0.056*** (0.009)	0.096*** (0.021)	0.096*** (0.021)
ST census population	-0.012 (0.008)	-0.008 (0.009)	-0.007 (0.008)	0.001 (0.012)	-0.001 (0.010)	-0.008 (0.011)
ST current population	0.022*** (0.008)	0.015* (0.009)	0.008 (0.007)	-0.005 (0.013)	-0.002 (0.011)	0.004 (0.009)
Lag(1) SDP		-0.027** (0.013)		-0.051* (0.028)		0.029** (0.013)
Population density		0.000** (0.000)		0.001*** (0.000)		-0.000 (0.000)
Other Controls	YES	YES	YES	YES	YES	YES
$R^2$	0.30	0.31	0.28	0.28	0.22	0.22
Number of observations	62511	62511	62511	62511	37277	37277

*Notes:* Clustered standard errors by state and time are in parentheses. All the specifications also include state fixed effects, time fixed effects, and religion dummies. ST census population share is population shares measured by the most recent census, and ST current population share is the population share measured in current year.

Other controls include age, age square, urban sector dummy, male dummy and marital status dummy.

\* Significant at 10-percent level, \*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

Table 5: Effect of SC Job Reservation on SC Employment Outcomes- All India

	$Pr(Employed)$		$Pr(PaidEmp)$		$Pr(Salaried PaidEmp)$	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>SC Job Reservation</b>	<b>-0.004</b> <b>(0.003)</b>	<b>-0.004</b> <b>(0.003)</b>	<b>-0.005</b> <b>(0.003)</b>	<b>-0.004</b> <b>(0.003)</b>	<b>0.007**</b> <b>(0.004)</b>	<b>0.006**</b> <b>(0.003)</b>
High Secondary	-0.117*** (0.018)	-0.117*** (0.018)	-0.121*** (0.016)	-0.121*** (0.016)	0.462*** (0.023)	0.462*** (0.023)
Secondary	-0.091*** (0.018)	-0.091*** (0.018)	-0.116*** (0.017)	-0.117*** (0.017)	0.244*** (0.021)	0.245*** (0.021)
Middle	-0.065*** (0.017)	-0.065*** (0.017)	-0.089*** (0.015)	-0.089*** (0.015)	0.128*** (0.012)	0.128*** (0.012)
Primary	-0.044*** (0.009)	-0.044*** (0.009)	-0.052*** (0.009)	-0.053*** (0.009)	0.111*** (0.014)	0.112*** (0.014)
SC census population	-0.008** (0.004)	0.001 (0.006)	-0.008* (0.004)	-0.000 (0.005)	-0.013** (0.006)	-0.014** (0.007)
SC current population	0.001 (0.003)	0.001 (0.003)	0.002 (0.003)	0.003 (0.003)	0.010** (0.004)	0.009** (0.004)
Lag(1) SDP		-0.006 (0.008)		-0.018** (0.008)		0.019* (0.010)
Population density		0.000*** (0.000)		0.000*** (0.000)		-0.000** (0.000)
Other Controls	YES	YES	YES	YES	YES	YES
$R^2$	0.41	0.41	0.38	0.38	0.20	0.20
Number of observations	126189	126189	126189	126189	76241	76241

*Notes:* Clustered standard errors by state and time are in parentheses. All the specifications also include state fixed effects, time fixed effects, and religion dummies. SC census population share is population shares measured by the most recent census, and SC current population share is the population share measured in current year.

Other controls include age, age square, urban sector dummy, male dummy and marital status dummy.

\* Significant at 10-percent level, \*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

Table 6: Effect of ST Job Reservation on ST Employment by Education- All India

	$Pr(Employed)$		$Pr(PaidEmp)$		$Pr(Salaried PaidEmp)$	
	(1)	(2)	(3)	(4)	(5)	(6)
ST Job Reservation	-0.002 (0.003)	-0.000 (0.004)	0.011 (0.007)	0.015* (0.008)	-0.001 (0.004)	-0.002 (0.004)
High Sec*ST Job Res	-0.003* (0.002)	-0.003* (0.002)	-0.001 (0.002)	-0.001 (0.002)	0.003 (0.002)	0.003 (0.002)
Secondary*ST Job Res	0.000 (0.002)	-0.000 (0.002)	-0.002 (0.002)	-0.003 (0.002)	-0.004 (0.004)	-0.003 (0.004)
Middle*ST Job Res	0.000 (0.002)	-0.000 (0.002)	-0.001 (0.003)	-0.002 (0.003)	0.001 (0.002)	0.002 (0.002)
Primary*ST Job Res	-0.001 (0.001)	-0.002 (0.001)	-0.001 (0.001)	-0.002 (0.001)	-0.002 (0.003)	-0.002 (0.003)
High Secondary	-0.042 (0.029)	-0.036 (0.029)	-0.057** (0.027)	-0.046* (0.027)	0.497*** (0.039)	0.492*** (0.041)
Secondary	-0.105*** (0.029)	-0.097*** (0.030)	-0.088*** (0.032)	-0.075** (0.032)	0.362*** (0.050)	0.355*** (0.052)
Middle	-0.090*** (0.034)	-0.083** (0.035)	-0.097** (0.040)	-0.084** (0.039)	0.116*** (0.027)	0.109*** (0.028)
Primary	-0.032* (0.019)	-0.028 (0.019)	-0.040** (0.018)	-0.033* (0.018)	0.125*** (0.042)	0.120*** (0.043)
ST census population	-0.013 (0.008)	-0.008 (0.009)	-0.007 (0.008)	0.001 (0.013)	-0.001 (0.010)	-0.007 (0.011)
ST current population	0.022*** (0.008)	0.014 (0.009)	0.007 (0.007)	-0.007 (0.014)	-0.003 (0.011)	0.004 (0.010)
Other controls	NO	YES	NO	YES	NO	YES
$R^2$	0.30	0.30	0.28	0.28	0.22	0.22
Number of observations	62511	62511	62511	62511	37277	37277

*Notes:* Clustered standard errors by state and time are in parentheses. All the specifications also include state fixed effects, time-fixed effects, age, age square, married dummy, and religion dummies. Other controls consists of lag(1) SDP, and population density. ST census population share is population shares measured by the most recent census, and ST current population share is the - population share measured in current year.

\* Significant at 10-percent level,\*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

Table 7: Effect of SC Job Reservation on SC Employment by Education - All India

	$Pr(Employed)$		$Pr(PaidEmp)$		$Pr(Salaried PaidEmp)$	
	(1)	(2)	(3)	(4)	(5)	(6)
SC Job Reservation	-0.007** (0.003)	-0.007** (0.003)	-0.007* (0.004)	-0.006* (0.004)	0.010** (0.004)	0.009** (0.004)
High Sec*SC Job Res	0.007** (0.003)	0.007** (0.003)	0.004 (0.003)	0.004 (0.003)	-0.008*** (0.003)	-0.008*** (0.003)
Secondary*SC Job Res	0.005** (0.002)	0.005** (0.002)	0.004 (0.003)	0.003 (0.002)	-0.007** (0.003)	-0.007** (0.003)
Middle*SC Job Res	0.004** (0.002)	0.004** (0.002)	0.002 (0.002)	0.002 (0.002)	-0.003 (0.002)	-0.003 (0.002)
Primary*SC Job Res	0.003** (0.002)	0.003** (0.002)	0.002 (0.002)	0.002 (0.001)	-0.003 (0.002)	-0.003 (0.002)
High Secondary	-0.230*** (0.052)	-0.230*** (0.052)	-0.190*** (0.048)	-0.190*** (0.046)	0.603*** (0.044)	0.603*** (0.044)
Secondary	-0.178*** (0.046)	-0.178*** (0.045)	-0.177*** (0.044)	-0.177*** (0.042)	0.358*** (0.041)	0.357*** (0.042)
Middle	-0.134*** (0.035)	-0.135*** (0.034)	-0.115*** (0.035)	-0.120*** (0.033)	0.175*** (0.038)	0.179*** (0.038)
Primary	-0.100*** (0.029)	-0.100*** (0.028)	-0.082*** (0.028)	-0.084*** (0.027)	0.167*** (0.037)	0.169*** (0.037)
SC census population	-0.007 (0.004)	0.003 (0.006)	-0.007 (0.004)	0.001 (0.006)	-0.014*** (0.005)	-0.016** (0.006)
SC current population	-0.000 (0.003)	-0.000 (0.003)	0.002 (0.003)	0.002 (0.003)	0.011*** (0.004)	0.010*** (0.004)
Other controls	NO	YES	NO	YES	NO	YES
$R^2$	0.41	0.41	0.38	0.38	0.20	0.20
Number of observations	126189	126189	126189	126189	76241	76241

*Notes:* Clustered standard errors by state and time are in parentheses. All the specifications also include state fixed effects, time-fixed effects, age, age square, married dummy, and religion dummies. Other controls consists of lag(1) SDP, and population density. SC census population share is population shares measured by the most recent census, and SC current population share is the - population share measured in current year.

\* Significant at 10-percent level, \*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.



Table 8: Effect of ST Job Reservation on ST Employment by Sector and Gender

	<u><math>Pr(Employed)</math></u>	<u><math>Pr(PaidEmp)</math></u>	<u><math>Pr(Salaried PaidEmp)</math></u>
	(1)	(2)	(3)
<u><i>Estimated effect of ST Job Reservation</i></u>			
ST Job Reservation	-0.004 (0.005)	-0.007 (0.006)	0.006 (0.008)
ST Job Res*Male*Rural	0.005 (0.005)	0.013 (0.009)	-0.012 (0.009)
ST Job Res*Female*Urban	-0.004 (0.007)	0.017** (0.007)	0.004 (0.004)
ST Job Res*Female*Rural	0.004 (0.009)	0.031** (0.015)	-0.006 (0.008)
<u><i>Hypothesis Tests</i></u>			
$H_0$ :Male Urban Effect=Female Urban Effect	[0.596]	[0.024]	[0.343]
$H_0$ :Male Urban Effect=Male Rural Effect	[0.365]	[0.186]	[0.200]
$H_0$ :Male Rural Effect=Female Rural Effect	[0.885]	[0.019]	[0.044]
$H_0$ :Female Urban Effect=Female Rural Effect	[0.226]	[0.169]	[0.317]

*Notes:* Each row-column reports the coefficient and associated standard error from a separate regression. Clustered standard errors by state and time are in parentheses and p-values are in brackets. All the specifications also include state fixed effects, time fixed effects, age, age square, married dummy, sector dummy, gender dummy, education dummies, religion dummies, ST census population share, ST current population share, lag(1) SDP, and population density, all of which are allowed to vary by gender dummy and sector dummy.

ST census population share is population shares measured by the most recent census.

ST current population share is the population share measured in current year.

\* Significant at 10-percent level,\*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

Table 9: Effect of SC Job Reservation on SC Employment by Sector and Gender

	<u><math>Pr(Employed)</math></u>	<u><math>Pr(PaidEmp)</math></u>	<u><math>Pr(Salaried PaidEmp)</math></u>
	(1)	(2)	(3)
<u><i>Estimated effect of SC Job Reservation</i></u>			
SC Job Reservation	-0.007*** (0.002)	-0.006** (0.003)	0.028*** (0.006)
SC Job Res*Male*Rural	0.008*** (0.003)	0.008*** (0.003)	-0.029*** (0.006)
SC Job Res*Female*Urban	0.001 (0.005)	0.001 (0.004)	0.006 (0.004)
SC Job Res*Female*Rural	-0.004 (0.006)	-0.003 (0.005)	-0.030*** (0.006)
<u><i>Hypothesis Tests</i></u>			
$H_0$ :Male Urban Effect=Female Urban Effect	[0.825]	[0.846]	[0.117]
$H_0$ :Male Urban Effect=Male Rural Effect	[0.006]	[0.009]	[0.000]
$H_0$ :Male Rural Effect=Female Rural Effect	[0.026]	[0.007]	[0.765]
$H_0$ :Female Urban Effect=Female Rural Effect	[0.090]	[0.246]	[0.000]

*Notes:* Each row-column reports the coefficient and associated standard error from a separate regression. Clustered standard errors by state and time are in parentheses and p-values are in brackets. All the specifications also include state fixed effects, time fixed effects, age, age square, married dummy, sector dummy, gender dummy, education dummies, religion dummies, SC census population share, SC current population share, lag(1) SDP, and population density, all of which are allowed to vary by gender dummy and sector dummy.

SC census population share is population shares measured by the most recent census.

SC current population share is the population share measured in current year.

\* Significant at 10-percent level,\*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

Table 10: Effect of ST Job Reservation on MPCE for Men Urban Sector, State-Year-Level Data

<i>Dependent Variable:</i>	Mean of dependent variable		Coefficient for ST Job Reservation	
	Men (High Educated)	Men (Low Educated)	Men (High Educated)	Men (Low Educated)
<i>Log(Average)</i>	6.97 (0.33)	6.43 (0.23)	-0.044 (0.046)	0.024 (0.020)
<i>Log(90<sup>th</sup> Percentile)</i>	7.48 (0.48)	6.93 (0.28)	-0.138 (0.082)	0.036 (0.030)
<i>Log(75<sup>th</sup> Percentile)</i>	7.17 (0.41)	6.58 (0.26)	0.009 (0.057)	0.026 (0.028)
<i>Log(Median)</i>	6.76 (0.38)	6.27 (0.28)	0.044 (0.046)	0.006 (0.033)
<i>Log(25<sup>th</sup> Percentile)</i>	6.44 (0.39)	5.99 (0.28)	-0.012 (0.048)	0.011 (0.028)
<i>Log(10<sup>th</sup> Percentile)</i>	6.27 (0.45)	5.73 (0.33)	0.039 (0.057)	-0.014 (0.032)
Number of observations	59	63	59	63

*Notes:* Monthly per capita expenditure (MPCE) at the state-year level computed using men age 18-40 living in urban India are used.

Each row-column reports the coefficient and associated standard error from a separate regression. Robust standard errors are in parentheses.

All the specifications also include state fixed effects, time fixed effects, ST census population share, ST current population share, lag(1) SDP, and population density. High Educated implies an individuals with secondary and above education while Low Educated implies individuals with middle and below education.

\* Significant at 10-percent level,\*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

Table 11: Effect of SC Job Reservation on MPCE for Men Urban Sector, State-Year-Level Data

<i>Dependent Variable:</i>	Mean of dependent variable		Coefficient for SC Job Reservation	
	Men (High Educated)	Men (Low Educated)	Men (High Educated)	Men (Low Educated)
<i>Log(Average)</i>	6.83 (0.59)	6.50 (0.59)	-0.039 (0.098)	0.007 (0.071)
<i>Log(90<sup>th</sup> Percentile)</i>	7.38 (0.76)	6.84 (0.16)	-0.051 (0.130)	-0.004 (0.018)
<i>Log(75<sup>th</sup> Percentile)</i>	6.98 (0.32)	6.49 (0.14)	-0.000 (0.048)	0.027** (0.013)
<i>Log(Median)</i>	6.59 (0.26)	6.18 (0.14)	0.009 (0.036)	0.033*** (0.010)
<i>Log(25<sup>th</sup> Percentile)</i>	6.28 (0.26)	5.91 (0.15)	0.029 (0.029)	0.036*** (0.012)
<i>Log(10<sup>th</sup> Percentile)</i>	5.99 (0.34)	5.67 (0.16)	0.098* (0.049)	0.026** (0.013)
Number of observations	63	64	63	64

*Notes:* Monthly per capita expenditure (MPCE) at the state-year level computed using men age 18-40 living in urban India are used.

Each row-column reports the coefficient and associated standard error from a separate regression. Robust standard errors are in parentheses.

All the specifications also include state fixed effects, time fixed effects, SC census population share, SC current population share, lag(1) SDP, and population density. High Educated implies an individuals with secondary and above education while Low Educated implies individuals with middle and below education.

\* Significant at 10-percent level,\*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

# Appendix A

## Data Sources and Construction of Variables

This paper builds on a wide variety of data sources. The data source used in this paper covers sixteen main Indian states from the period 1983-1999 unless mentioned otherwise. These states are Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Jammu-Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. The outcome variables and individual level control variables comes from the National Sample Survey (NSS) rounds conducted in 1983, 1987, 1993 and 1999. These are large quinquennial surveys that covered the Employment and Unemployment rounds. The Employment and Unemployment round of NSS is the only survey that collects information on individual's earning and labor market characteristics for the entire India. Each survey collects information on approximately 120,000 households and over half a million individuals. The policy variables comes from the Annual Scheduled Caste and Scheduled Tribe Commissioner's Report (1955-2000). NSS is an individual-level data while my policy variables are at state-time level. These policy variables are merged into the NSS individual-level data by state and year.

## Outcome Variables

### *Employment*

The employment outcomes are constructed using NSS Employment and Unemployment rounds. From the NSS, I extract the following sample: individuals who are currently aged 18-40, living in one of the 16 major Indian states, and not currently attending school. The first data restriction is because only SCs and STs in this age range are eligible to apply for the reserved public sector jobs. The second restriction is because the job reservation variables I have cover these states over the 1983-1999 time period consistently; at any rate, it should have minimal impact since these 16 states account for over 95 percent of the Indian population. This paper uses three employment outcomes for SCs and STs, defined as follows:

(a) *Probability of being employed*: The NSS counts an individual as employed if he/she reports to be self-employed, unpaid family worker, worked as regular salaried/wage employee or worked as casual wage labor. The outcome variable denoted as  $\text{Pr}(\text{Employed})$

takes the value 1 if employed, 0 otherwise.

(b) *Probability of being in Paid Employment*: Formal definition of labor market considers self-employed, salaried and casual workers as the paid employment category. The outcome variable denoted as  $\text{Pr}(\text{Paid Employed})$  takes the value 1 if paid employed, 0 otherwise.

(c) *Probability of being a salaried worker conditional on being in paid employment*: The outcome variable denoted as  $\text{Pr}(\text{Salaried}|\text{Paid Employed})$  takes the value 1 if an individual reports to have worked as regular salaried/wage employee conditional on being in paid employment category, 0 otherwise.

(d) *Probability of being a salaried worker*: The outcome variable denoted as  $\text{Pr}(\text{Salaried})$  takes the value 1 if an individual reports to have worked as regular salaried/wage employee, 0 otherwise.

### ***Average Monthly Per Capita Expenditure (MPCE)***

This paper looks at the distribution of household monthly per capita consumption expenditure for SCs and STs as an outcome at the state level. The outcome variable denoted as  $MPCE_{st}$  stands for log MPCE at the mean and the following percentiles :  $10^{th}$ ,  $25^{th}$ ,  $50^{th}$ ,  $75^{th}$ ,  $90^{th}$ . MPCE is expressed in real terms and deflated using Consumer Price Index for Industrial Workers (CPI-IW) with 2001 as the base year. CPI-IW are drawn from the Indian Labor Handbook, the Indian Labor Journal and the Reserve Bank of India Report on Currency and Finance. The sample is restricted to households with non-negative monthly per capita expenditure. The unit of analysis is the state-time cell.

## **Policy and Control Variables**

### ***Employment quota***

This paper uses the Scheduled Caste and Scheduled Tribe Annual Commissioner's Report (1955-2000) for the employment quota variables for SCs and STs. The institutional details for the Employment Quota policy also comes from this report. This is a state level data available for the period 1955-1999. The employment quota variables are "Percentage of Jobs reserved for SC" and "Percentage of Jobs reserved for ST" and is denoted as "SC Job Reservation" and "ST Job Reservation".

-*Percentage of Jobs reserved for SC(ST)*: defined as total number of jobs reserved for SC(ST) in public sector divided by total number of new jobs advertised in the state in a

specific year.

### ***Population data***

This paper uses Census of India, Registrar General data from 1981-2001. In case of India, the government follows the linear interpolation to estimate annual population figures as used in this paper. I use two main control variables. First, “SC (ST) census population share” which is defined as the percentage of SC (ST) population share reported by the Census of India . This variable is updated each time a new census estimate arrives for a state. The second control variable is, “SC (ST) current population share” which is the interpolated SC (ST) population share from the census as measured in the current year. Population density is computed as the ratio of interpolated total population data from the census as measured when reservation was determined in the state divided by total land area of the state, as reported in the Census Atlas, India. This variable is also updated according to the two conditions described above.

-*SC (or ST) Census population share*: defined as population count of SC (or ST) in a state divided by total population count in that state at the time of census.

-*SC (or ST) Current population share*: defined as population count of SC (or ST) in a state divided by total population count in that state in the current year.

-*Census population density*: defined as interpolated total population count from the census as measured when reservation was determined divided by total land area in a state.

### ***Individual Characteristics from the NSS***

The individual level controls for this paper is extracted from the NSS. They are an individual’s age, gender, marital status, religion and education. This paper constructs four dummy variables for educational attainment (primary school, middle school, secondary school, and upper secondary school or higher; the omitted group is uneducated). I construct seven religion dummies based on the NSS (Islam, Christianity, Sikhism, Jainism, Buddhism, and Zoroastrianism; the omitted group is Hinduism).

### ***State Domestic Product***

State domestic product is the log of real per capita state income. The data source is: Domestic Product of States of India from 1983 to 2000 prepared by Economic and Political Weekly Research Foundation.

### ***Minority political Reservation***

The measure of minority political reservation is as follows: (1) percentage of seats in state assembly reserved for SC (“SC Share Reserved”); and (2) percentage of seats in

state assembly reserved for ST (“ST Share Reserved”). We obtained information on the share of seats reserved for SCs and STs from the Election Commission of India reports on state elections. The Election Commission is an independent agency set up in the Indian Constitution to conduct elections, and is the authoritative source on data related to elections. These reports contain constituency-level data for each state election, including information about which seats are reserved for SCs and STs.



## Appendix B

Table B-1: Additional Descriptive Statistics- All India

Variable Name	<u>Scheduled Tribes</u>				<u>Scheduled Castes</u>				<u>Non SC/ST</u>			
	Male		Female		Male		Female		Male		Female	
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
<i>PANEL A</i>												
Pr(Employed)	92.87	97.47	32.72	60.94	91.37	95.92	27.29	42.81	91.48	94.59	18.49	32.76
Pr(Paid Employment)	88.08	82.49	28.07	37.68	87.13	88.03	24.54	35.69	82.04	75.11	15.37	20.41
Pr(Salaried Paid Employment)	43.30	9.05	28.14	4.57	38.86	10.34	33.69	5.43	46.82	13.69	49.52	9.36
<i>PANEL B</i>												
Salaried	38.82	7.55	23.24	2.79	34.62	9.25	28.20	4.41	39.20	10.46	35.98	5.63
Self-Employed	21.05	34.41	12.64	12.66	22.69	23.49	14.87	12.09	31.39	41.75	18.65	21.15
Casual	29.78	41.47	46.68	45.76	31.79	56.67	40.65	64.69	13.12	24.21	18.02	33.38
Unpaid Family Worker	4.86	15.16	13.67	37.82	4.33	8.01	9.37	16.19	9.64	19.83	14.76	36.40
Not Employed	5.47	1.40	3.76	0.94	6.56	2.57	6.89	2.61	6.64	3.74	12.57	3.42
Total	100	100	100	100	100	100	100	100	100	100	100	100

*Notes:* Data consists of men and women aged 18-40 living in India from the 1983, 1987, 1994 and 1999 rounds of the National Sample Survey who are not currently attending school.

## Appendix C

Table C-1: Effect of ST Job Reservation on Non SC/ST Employment Outcomes- All India

	<u>Pr(Employed)</u>		<u>Pr(PaidEmp)</u>		<u>Pr(Salaried PaidEmp)</u>	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>ST Job Reservation</b>	<b>-0.001</b>	<b>-0.001</b>	<b>0.005</b>	<b>0.004</b>	<b>-0.008**</b>	<b>-0.008**</b>
	<b>(0.003)</b>	<b>(0.003)</b>	<b>(0.003)</b>	<b>(0.003)</b>	<b>(0.004)</b>	<b>(0.003)</b>
High Secondary	-0.064***	-0.064***	-0.039***	-0.039***	0.419***	0.419***
	(0.011)	(0.011)	(0.011)	(0.010)	(0.017)	(0.017)
Secondary	-0.092***	-0.092***	-0.099***	-0.100***	0.271***	0.272***
	(0.014)	(0.014)	(0.011)	(0.011)	(0.016)	(0.016)
Middle	-0.081***	-0.081***	-0.093***	-0.093***	0.163***	0.164***
	(0.013)	(0.013)	(0.011)	(0.011)	(0.011)	(0.012)
Primary	-0.060***	-0.059***	-0.054***	-0.054***	0.158***	0.158***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.016)	(0.016)
ST census population	-0.002	0.004	-0.009	-0.008	-0.003	-0.007
	(0.004)	(0.004)	(0.005)	(0.006)	(0.005)	(0.006)
ST current population	0.002	0.002	0.006	0.004	0.009	0.012*
	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Lag(1) SDP		-0.001		-0.011		0.014*
		(0.007)		(0.010)		(0.007)
Population density		-0.000		0.000***		-0.000
		(0.000)		(0.000)		(0.000)
$R^2$	0.50	0.50	0.40	0.40	0.25	0.25
Number of observations	613699	613699	613699	613699	297597	297597

*Notes:* Clustered standard errors by state and time are in parentheses. All the specifications also include state fixed effects, time fixed effects, sector dummy, gender dummy, age, age square, married dummy, and religion dummies.

SC/ST census population share is population shares measured by the most recent census.

SC/ST current population share is the population share measured in current year.

\* Significant at 10-percent level, \*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

Table C-2: Effect of SC Job Reservation on Non SC/ST Employment Outcomes- All India

	<u>Pr(Employed)</u>		<u>Pr(PaidEmp)</u>		<u>Pr(Salaried PaidEmp)</u>	
	(1)	(2)	(3)	(4)	(5)	(6)
<b>SC Job Reservation</b>	<b>-0.001</b>	<b>-0.001</b>	<b>-0.003</b>	<b>-0.002</b>	<b>0.005</b>	<b>0.005</b>
	<b>(0.002)</b>	<b>(0.002)</b>	<b>(0.004)</b>	<b>(0.004)</b>	<b>(0.004)</b>	<b>(0.004)</b>
High Secondary	-0.064***	-0.064***	-0.039***	-0.039***	0.419***	0.419***
	(0.011)	(0.011)	(0.010)	(0.010)	(0.017)	(0.017)
Secondary	-0.092***	-0.092***	-0.099***	-0.100***	0.271***	0.271***
	(0.014)	(0.015)	(0.011)	(0.011)	(0.016)	(0.017)
Middle	-0.081***	-0.081***	-0.093***	-0.094***	0.164***	0.164***
	(0.013)	(0.013)	(0.011)	(0.010)	(0.012)	(0.012)
Primary	-0.060***	-0.060***	-0.054***	-0.054***	0.158***	0.158***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.016)	(0.016)
SC census population	-0.006***	0.002	-0.003	0.001	-0.012***	-0.013**
	(0.002)	(0.003)	(0.004)	(0.006)	(0.003)	(0.005)
SC current population	-0.001	-0.001	-0.000	-0.001	0.008***	0.007***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)
Lag(1) SDP		-0.000		-0.012		0.004
		(0.007)		(0.010)		(0.008)
Population density		0.000		0.000***		-0.000***
		(0.000)		(0.000)		(0.000)
$R^2$	0.50	0.50	0.40	0.40	0.25	0.25
Number of observations	613699	613699	613699	613699	297597	297597

*Notes:* Clustered standard errors by state and time are in parentheses. All the specifications also include state fixed effects, time fixed effects, sector dummy, gender dummy, age, age square, married dummy, and religion dummies.

SC/ST census population share is population shares measured by the most recent census.

SC/ST current population share is the population share measured in current year.

\* Significant at 10-percent level, \*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.

Table C-3: Credibility of Results

	(1)	(2)
PANEL A: <i>Pr(Employed)</i>		
ST Job reservation	-0.002 (0.003)	-0.005** (0.003)
SC Job Reservation	-0.004 (0.003)	-0.004 (0.003)
PANEL B: <i>Pr(Paid Employment)</i>		
ST Job Reservation	0.013* (0.007)	0.005 (0.005)
SC Job Reservation	-0.004 (0.003)	-0.004 (0.003)
PANEL C: <i>Pr(Salaried Paid employment)</i>		
ST Job Reservation	-0.002 (0.002)	-0.002 (0.003)
SC Job Reservation	0.006** (0.003)	0.006* (0.003)

*Notes:* Clustered standard errors by state and time are in parentheses. All the specifications also include state fixed effects, time-fixed effects, age, age square, married dummy, and religion dummies. Other controls consists of lag(1) SDP, and population density. SC census population share is population shares measured by the most recent census, and SC current population share is the - population share measured in current year.

Column (1) adds as controls the square of SC and ST population shares in the last preceding census.

Column (2) adds as controls the share political reservation for STs and SCs.

\* Significant at 10-percent level,\*\* Significant at 5-percent level, and \*\*\* Significant at 1-percent level.