Heterogeneous effect of the Indian affirmative action: The role of caste certificates

Sugata Bag
Email: sugata@econdse.org
Department of Economics,
University of Delhi

Suman Seth
Email: S.Seth@leeds.ac.uk
Department of Economics,
University of Leeds

Barnali Basak
Email: B.Basak@leeds.ac.uk
Department of Economics,
University of Leeds

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Heterogeneous effect of the Indian affirmative action:
The role of caste certificates[*]

Sugata Bag[†]   Suman Seth[‡]   Barnali Basak[§]

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Abstract

Affirmative action policies, common to many countries, aim to provide preferential treatment to those belonging to disadvantaged communities. Contemporary studies that examine the effect of India's affirmative action policies implicitly assume that intended beneficiaries are eligible for targeted benefits. However, an intended beneficiary is unable to acquire benefits without possessing a valid *caste certificate* issued by an *appropriate authority*. The 2011-12 Indian Human Development Survey, the only nationally representative survey collecting information on caste certificate possession among households, reveals that nearly half of the Scheduled Caste and Scheduled Tribe households do not possess caste certificates and thus cannot be considered eligible for benefits. Through a novel attempt, in this paper, we first explore the factors that are associated with a household's likelihood of caste certificate possession. We then show that caste certificate possessions increase the likelihood of securing better jobs as well as enhance monetary and non-monetary well-being among scheduled households. Our findings establish another form of heterogeneous effect of Indian affirmative action.

Keywords: Affirmative action, caste certificate, India, scheduled caste, scheduled tribe

JEL Codes: O12, H4, I3

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1. Introduction

Social discrimination continues to exist across social groups (e.g., castes, ethnicities, races, genders, religious affiliations etc.) in different parts of the world and so do 'affirmative action' policies—seeking to provide preferential treatment to disadvantaged or underprivileged communities.[1] Indian affirmation action has been a subject of significant academic and policy interest and has been widely studied. Affirmative action in India is primarily implemented through reservations of slots in public services and educational institutions for key socially disadvantaged communities: scheduled castes (SCs), scheduled tribes (STs) and other backward classes (OBCs). SCs, being subjected to *untouchability* practices, and STs, comprising of geographically isolated tribal communities, have both hereditarily faced stringent social exclusions and have experienced restricted access to various opportunities, which justify the need for affirmative action.[2] Unlike SCs and STs, OBCs form a heterogenous collection of socially and culturally backward' castes within the Hindu society, some socially backward communities of non-Hindu religions and some tribal communities that are not classified as STs (Deshpande, 2013). In this paper, we chiefly focus on the two most disadvantaged communities comprising of SCs and STs.

The effect of India's affirmative action policies have been examined by a significant number of contemporary studies on various outcomes of these disadvantaged communities, such as welfare (Pande, 2003), poverty (Chin and Prakash, 2011), education (Bertrand et al., 2010; Bagde et al., 2016; Cassan, 2019), occupation and productivity (Deshpande and Weisskopf, 2014; Kaletski and Prakash, 2016; Deshpande and Ramachandran, 2019; Kumar et al., 2020; Prakash, 2020; Lee, 2021) and public goods allocation (Banerjee and Somanathan, 2007). While the findings vary, with some observing positive effects and others observing none, they all implicitly presume that all members of disadvantaged communities are automatically *eligible* for the intended benefits of affirmative action policies. However, in order to access the targeted benefits—offered separately by the state (i.e., provincial) governments and the Union (i.e., national) government—a beneficiary must satisfy certain essential requirements in addition to belonging to the scheduled lists of castes and tribes. The beneficiary must possess a documentary evidence of caste identity, known as a *caste certificate* (alternatively called, *Community Certificate* or *Jati Shansapatra*), issued by the competent authority of the beneficiary's native domicile state government. It is also vital to note

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[1]Affirmative action—variously known as positive-, protective- or compensatory discrimination—or its variants have been pursued in India, South Africa, Brazil, Northern Ireland, Malaysia and the United States (see Darity et al., 2011).
[2]Evidence abounds that these communities often trail behind in various social indicators and in political representation and experience more substantial deprivations (see Zacharias and Vakulabharanam, 2011; Howard and Prakash, 2012; Alkire and Seth, 2015; Chatterjee et al., 2016; Government of India, 2016; Girard, 2018; Deshpande and Ramachandran, 2019; Alkire et al., 2021).

that a certificate given by a state government is only *valid* for accessing benefits from the issuing state and assessing Union government benefits anywhere in the country, but it is *not valid* for accessing benefits offered in another state. In practice, an intended beneficiary may be denied the statutory benefits if *either* the beneficiary lacks a caste certificate *or* the beneficiary possesses a caste certificate but does not reside in the beneficiary's domicile state.

The contemporary literature studying the effect of affirmative action has not investigated this important aspect at the national scale. This lack of investigation is unsurprising, since widely recognised household surveys, such as the National Sample Surveys and the National Family Health Surveys, do not readily collect information on caste certificate possession. To the best of our knowledge, the only nationally representative survey containing any information on caste certificate possession is the second round (2011-12) of the Indian Human Development Survey (IHDS-II hereafter). Upon initial examination, the survey reveals that in nearly half of the SC and ST households no member possesses any caste certificate. Furthermore, Figure 1 demonstrates that the SC/ST households with at least one member possessing a caste certificate is systematically better off in key social indicators than the SC/ST households with no one possessing a caste certificate. The differences are common both within urban and within rural areas. Not only the SC and ST households with caste certificates appear to be more likely to have at least one member with a public sector job than even non-SC/ST Hindu and non-ST Muslim households, but their well-being in monetary and non-monetary indicators also appear to be much closer, albeit lower except for urban STs, to the well-being of the non-SC/ST Hindu households.

The comparable performance of SC/ST households with caste certificates and non-SC/ST households on selected social indicators demonstrates the partial success of the Indian affirmative action. Nonetheless, the presence of noticeable heterogeneity by caste certificate possession among the scheduled households gives rise to inquiries concerning the role of caste certificates on effective executions of affirmative action policies, specifically in terms of their reach or distribution. Potential heterogeneous effect of affirmative action policies have been debated and examined previously in the literature. Some past studies, for example, have claimed that the benefits of these policies are disproportionately concentrated among the socio-economic elites of the disadvantaged communities (Galanter, 1984; Sowell, 2004; Massey et al., 2007). Recent studies have refuted the claim though and instead have posed a contrary view (Cassan, 2019; Prakash, 2020; Lee, 2021). Albeit, Cassan (2019) observes a heterogeneous effect across gender, where the affirmative action policies may have failed to reach the women of the low caste communities. Our findings in this paper, through a novel attempt, contribute to this debate establishing the existence of a different form of heterogeneity that arise through caste certificate possession (or its lack of).

If caste certificate possessions appear to be linked to better performance in different social indi-

Figure 1: Social indicators across rural and urban areas by caste certificate possession
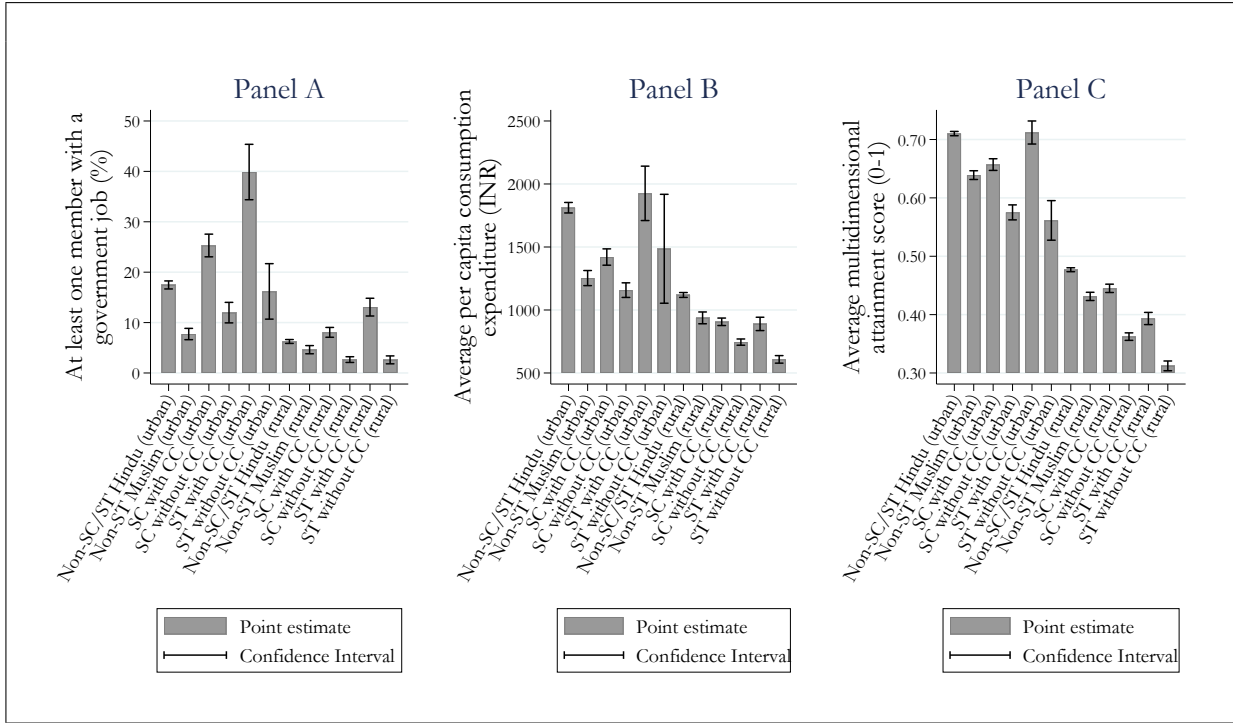
Abbreviations: CC: Caste Certificate; SC: Scheduled Caste; ST: Scheduled Tribe; INR: India Rupees.
Notes: Panel A presents the percentage of households with at least one member with a public sector job, Panel B presents the average per capita consumption expenditure and Panel C presents a multidimensional measure of non-monetary standard of living across different population subgroups. The methodology for constructing multidimensional attainment scores is discussed in Appendix A1. Confidence intervals are reported at 5% critical value. The SC sample households include those who identify themselves as Hindus, Buddhists and Sikhs. Total sample size for Panels A and B is 40,379 households and the sample size for Panel C is 39,622 households.

cators, then why do nearly half of the SC and ST households not possess any caste certificate? Given that a significant number of SC and ST households do not possess caste certificates, its acquisition can be seen as an informed choice and might be influenced by several factors. We first argumentatively explore different factors that may influence a scheduled household's likelihood of caste certificate possession, by classifying them into demand-side, supply-side, procedural and community-level factors. Our corresponding empirical analysis reveals that the demand-side factors, such as aspirations, knowledge and strong social ties within and outside communities, are expectedly associated with increased likelihood of a household's caste certificate possession. Similarly, the supply-side factors, such as the existence of public schools and colleges in a village and the availability of public sector jobs, are also associated with greater likelihood. Procedural factors—such as difficulties encountered during caste certificate applications—may reduce the likelihood of caste certificate acquirement, but are difficult to validate empirically owing to data limitations. However, we observe that SC households residing in constituencies, where the seat for the Member of Parliament (MP) is reserved for an SC candidate, are more likely to possess caste

certificates. We do not observe similar results for STs. Finally, among community-level factors, we observe that the possibility violence and discrimination towards SC households as well as social stigma deters SC households from possessing caste certificates. Among ST households, those residing in less developed villages are less likely to possess caste certificates.

We further examine whether there is a causal link between caste certificate possession and higher performance in different social indicators. The affirmative action policies for SCs and STs were implemented across the nation in 1950 with a few subsequent amendments. A lack of usable exogenous variation makes the impact evaluation of caste certificate possession using a cross-sectional and observational data challenging. Another key challenge is that caste certificate possession is not a random decision but rather an informed choice based on a number of factors, leading to an endogenous self-selection issue. We devise a setting, where the SC/ST households possessing caste certificates are considered as *treated* and tho SC/ST households without caste certificate constitute the *control* group. To deal with self-selection, we adopt two different approaches. We first attempt to disentangle the treatment effect by employing certain matching procedures where the treatment depends on observable covariates. Next, we deploy a two-stage residual inclusion approach (Terza et al., 2008; Wooldridge, 2014) to resolve the endogeneity of the treatment (i.e., caste certificate possession). Both approaches robustly indicate that caste certificate possession enhances monetary and multidimensional well-being among SC and ST households and improves their prospects for not only public sector jobs but also for professional jobs and formal-sector jobs in general. Our findings thus confirms the existence of the heterogeneous effect of affirmative action by caste certificate possession.

The subsequent sections of the paper are structured as follows. Section 2 briefly presents the goal and scopes for Indian affirmative action towards the SC and ST communities. Section 3 elaborates the intricacies of the benefit procurement process and the role that caste certificates play and argumentatively discusses the factors that may influence the likelihood of caste certificate possession. Section 4 elaborates the data and our empirical strategy and sample selection process. Section 5 empirically examines the factors that are associated with the likelihood of caste certificate possession. Section 6 investigates the effect of caste certificate possession on selected social indicators among SC and ST households. Finally, Section 7 provides concluding remarks.

2. Affirmation Action in India: The goal and scopes

Since its adoption in 1950, the Indian Constitution has enshrined a commitment to *equality* in Article 14 under the fundamental rights and in Article 46 under the directive principles (GoI, 2020b, p.25 and p.35, respectively), recognising the historical social injustices and exploitations that have

caused extreme backwardness in certain groups of population.[3] Special protections and benefits (i.e., affirmative action) have been pledged by Presidential Orders in 1950 to two distinct *schedules* (i.e. lists) of castes (i.e., SCs) and tribes (i.e., STs).[4] Special provisions have been assured in the form of reservation of seats in public-sector (not private-sector) jobs and educational institutions to prevent the *social exclusion* of these communities from the mainstream developmental process, to mitigate their *under-representation* in the upper socio-economic strata and to bring them at par with other social classes.[5] In addition to reservation in public sector jobs and quotas in educational institutions, various other forms of public benefits that these communities may access include scholarships, concession in education fees, relaxation of upper age limits and educational criteria for applying to certain jobs and college seats, technological upgradation and capacity building, and medical aid grants from both the union and state governments.[6] Targeted benefits and welfare schemes may differ between the Union and the state governments, as well as may vary across different state governments. Reservation quotas for public sector employment also vary from one state to another and are proportional to the percentages of SC and ST populations in respective states (Prakash, 2020).

The statutory state-specific lists of SCs and STs were notified for the first time in 1950 by the Union government, as per the provisions contained in Articles 341(1) and 342(1) of the Constitution respectively.[7] Since then, the SC lists have been subsequently amended four times—in 1951, 1956,

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[3]Provisions for reservation exist in Article 14 to ensure the right to equality and Articles 15.4 and 16.4 are intended to ensure the implementation of Article 14. Article 46 of the constitution commits: "the State shall promote with special care the educational and economic interests of the weaker sections of the people, and, in particular, of the Scheduled Castes and the Scheduled Tribes, and shall protect them from social injustice and all forms of exploitation."

[4]Orders are retrievable from government websites: Constitution (SCs) Order 1950 and Constitution (STs) Order 1950.

[5]Indian affirmative action policies could be a subject of debate based on Articles 15 and 16 of the constitution that direct "prohibition of discrimination on grounds of religion, race, caste, sex or place of birth" and so these policies can be considered discriminatory to other poorer sections who are ineligible for these benefits (Weisskopf, 2004).

[6]To name some additional benefits, the Department of Social Justice and Empowerment lists a number of benefits, such as provisions of scholarships to SC students for secondary and higher secondary education; the Dr Ambedkar Foundation under the same department provides medical treatment facilities to those from SC and ST communities under a certain income threshold; the Department of Education of Chandigarh provides fee concessions for SC students in public sector schools; the Ministry of Tribal Affairs set up Eklavya Model schools in remote areas to impart quality education to ST children; and the SC/ST Hub of the Ministry of Micro, Small and Medium Enterprises provide support to existing SC/ST entrepreneurs and enterprises in technological upgradation and capacity building.

[7]The 1950 SC list simply mirrored the list produced by the British colonial authorities in 1936, where the definition of *untouchability*—an inclusion criterion for being SC—lacked clarity and only reflected "an admixture of economic and educational tests and considerations of local politics" (Galanter, 1984; Cassan, 2019). Similarly, only the tribes that reflected indications of primitive traits, distinctive culture, geographical isolation, shyness of contact with general communities and backwardness were included in the list of STs, but the tribes that did not reflect any of these traits were not included (Lokur et al., 1965).

1976 and 1990—to deal with some inconsistencies in these lists, both across and within states (Cassan, 2019), as well as to include some castes who had converted to certain other religions. The inconsistencies in the initial SC lists take two forms: (1) some castes are considered 'scheduled' only in certain areas within a state but not in other areas within the same state; and (2) some castes are considered 'scheduled' in a particular state but not in another state.[8] The amendment in 1976 removed erstwhile inconsistencies in the SC list within each state (the first form of inconsistency). The amendment in 1956, for the first time, brought the religious dimension by additionally including the ex-untouchable castes that converted to Sikhism, and the amendment of 1990 did the same for Buddhism.[9] However, the ex-untouchable castes that converted from Hinduism to other religions (e.g., Christianity and Islam) are still kept out of the reservation under scheduled caste.[10] It is to be noted that the restrictions on reservations based on state domicile and residence status remained unchanged, and the SC lists are not harmonised across states (i.e., the second form of inconsistency). Unlike SCs, the inclusion of tribes in the ST list did not depend on their religious leanings (Thorat and Joshi, 2020), but like SCs, the ST lists are also not harmonised across states.[11]

3. Intricacies in benefit procurement process for SCs and STs: The role of caste certificate

When a person is born into a caste or a tribe (ancestry typically runs through father's side) that is on the state-specific scheduled list, the person is considered *entitled* to public reservations and targeted benefits. A mere claim of entitlement, however, does not automatically make someone *eligible* for these benefits. In order to be considered *eligible*, an entitled beneficiary must satisfy two additional criteria. First, a beneficiary must either possess or acquire through application a *valid* caste certificate in support of their eligibility claims.[12] A caste certificate is a documentary evidence confirming a beneficiary's belonging to a scheduled community within a 'state' and enables the beneficiary to access or to be eligible for any targeted public scheme or benefit. Second, these certificates are issued by the respective 'state' governments for their *native residents* through designated offices after due diligence. Different states have their own modus operandi for facilitat-

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[8]For example, the Namasudra caste and the Bagdi caste are considered SCs in the state of West Bengal but are considered OBCs in the neighbouring state of Bihar.

[9]Amendment acts are retrievable from various ministerial websites: SC/ST Act 1956; SC/ST Act 1976; SC Act 1990.

[10]However, some states have started extending reservation for the converted groups under the OBC scheme (e.g., West Bengal Commission's list of OBCs entry number 29 include Christians converted from Scheduled Castes).

[11]For example, the Santal tribe is included in the ST lists for the states of Bihar, Jharkhand, Odisha, and West Bengal but is considered OBC in the state of Assam.

[12]Application forms are available from the concerned local government bodies or municipal authorities in the applicant's usual residence region. Local authorities are located at the offices of District Magistrate/Additional District Magistrate/City Magistrate/Sub-Divisional Magistrate/Tehsildar (i.e. local revenue officer). Of late, applications can also be submitted online.

ing the acquisition procedures, which are often amended from time to time within states, but there are some commonalities over time as well as across states. A caste certificate issued by a particular state government is however considered *valid* for availing reservations and benefits provided only by that state government. A certificate issued by a state government may be binding for the Union government undertakings anywhere within the country, but a certificate issued by one state government is certainly not considered valid for availing of reservations and benefits offered by another state government. If a person, belonging to the 'scheduled' groups of a state, migrates from the state of origin to another state, then the person remains eligible for public reservations and benefits from the state of origin provided the person possesses a valid caste certificate issued by the state of origin, but the person does not become eligible for availing benefits in the migrated state.[13]

Even though caste certificates are imperative for receiving targeted benefits for both SCs and STs, yet we observe that nearly half of the SC and ST households do not possess a valid caste certificate according to IHDS-II. What factors could potentially restrict the households that are entitled for benefits from possessing caste certificates? Alternatively, what factors could potentially increase the likelihood of caste certificate possession? The governments, under constitutional mandate, have certainly identified and notified the list of scheduled castes and tribes but unfortunately they do not proactively issue these certificates. It is rather the responsibility of the households and their members to be informed about whether their respective castes or tribes belong to the 'scheduled' list and then acquire the certificates accordingly. Therefore, the acquisition of a caste certificate is an informed choice by a scheduled household and the members therein, and it can be influenced by certain factors. We classify these factors into demand-side, supply-side, procedural and community-level factors.

Two prominent demand-side factors that may influence the likelihood of caste certificate possession are households' and their members' aspiration and their knowledge or information base. Ambitious SC/ST household members are more likely to aspire for better socio-economic statuses, which are typically manifested through acquiring higher education degrees from public institutions (due to both lower costs vis-à-vis private institutions and preferential admissions through affirmative action) and/or obtaining public-sector jobs that are more secure and yield higher remunerations (especially less-skilled jobs). Although it may be feasible for a capable member of the scheduled community to acquire an education degree or secure a public sector job without reservation, yet most scheduled members would consider taking advantage of the available reservation

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[13]The Indian Ministry of Home Affairs letter Number 35/1/72-R.U. (SCT.V) dated 2nd May 1975 to all state governments and union territories iterates, "where a person migrates from one State to another, he can claim to belong to a Scheduled Caste or a Scheduled Tribe only in relation to the State to which he originally belonged and not in respect of the State to which he has migrated." The Indian Ministry of Home Affairs letter Number 12017/2/2018-SCD to all state governments and union territories dated 22nd February 2018 reiterates the same.

facilities. It is to be noted that caste certificate possession may neither be necessary (since a candidate can secure a position on the General Category merit list, which is possible but less likely) nor sufficient (as competition exists among qualified candidates from these communities) for securing a seat. Furthermore, a household's ability to acquire a caste certificate may be facilitated by its knowledge of the process, which may in turn be facilitated by the strength of its social ties within and outside the community, by its members' levels of education (i.e. their attendance at schools and colleges), by government outreach programmes or by a combination of all these factors.

Two important supply-side factors that may positively influence the prevalence of caste certificate possession are the availabilities of public sector educational institutions and public sector jobs. Caste certificates are likely to be most frequently used for accessing reservation benefits in higher education institutions for obtaining admissions, in schools/colleges for obtaining scholarships and other benefits, and for securing reservation benefits in public sector jobs. With economic growth and development, India has witnessed a surge in the number of educational institutions and in public sector employment. For example, along with economic growth, the total public expenditure on education as a percentage of GDP (at factor cost) increased from 0.64% in 1951-52 to 4.18% in 2011-12 (GoI, 2014, Table 25). During the same period, the number of educational institutions have increased several folds, especially the number of higher educational institutions (i.e., colleges and universities) increased by nearly 60 times (GoI, 2014, Table 16). As of 2019-20, 21.4% of the educational institutions in India providing undergraduate degrees and diplomas were public colleges, but they accounted for admitting almost one-third of all enrolled students (GoI, 2020a, Tables 5 and 5a). Public educational institutions are however not uniformly distributed across all regions and so their existence may have a more localised effect on the aspirations of students from scheduled groups and thereby on caste certificate possession. In other words, local regions with more and qualitatively better public educational institutions may have a larger influence.

Similarly, the abundance or scarcity of public sector employment opportunities at a given time may influence the decision to obtain caste certificates by the job-seekers of that generation. In Figure 2, we present the growth of total employment nationally in the public sector and in the organised private sector from 1970-71 to 2011-12, going as far back as possible subject to data availability. Panel A presents the annual growth of total employment in both sectors, and Panel B presents the ratio of total public sector employment to total private sector employment. Clearly, public sector employment growth had been significantly higher than private sector employment growth until around mid-1980. Since mid-1990 though, public sector employment growth had been close to zero or even negative—incidentally, owing to mass retrenchment of public-sector labour force in 1993 through voluntary retirement scheme following the well-known 1991 economic reforms (Ahluwalia, 2002), and those jobs were never restored, but the private sector employment growth

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Figure 2: Growth in public sector and private sector employment in India,1970-71–2010-11

Panel A   Panel B
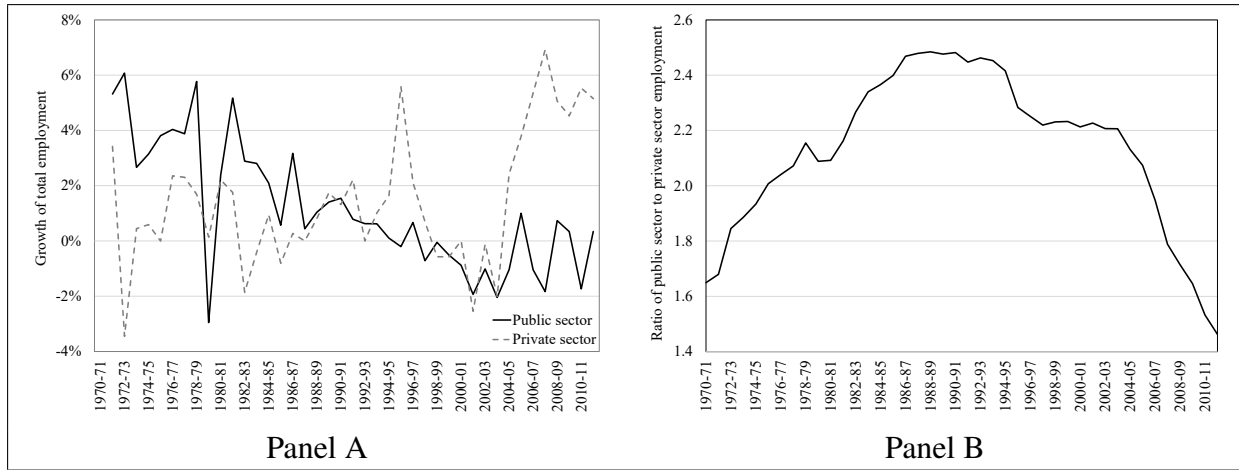
Source: Authors' computations from Reserve Bank of India (2000, Table 10) and Reserve Bank of India (2013, Table 14).

had been high since 2004-05. Evidently, total public sector employment rose faster than total private sector employment until early 1990s, which should have increased the need for acquiring caste certificates among the scheduled communities. From 2004-05 onwards, however, there had been a sharp drop in the ratio (Panel B) due to a much faster growth in private sector employment, which may lower the need for caste certificate acquirement.

Two procedural (or system-related) factors that may influence caste certificate possession are the rigour of the application process for acquiring the caste certificate itself and local political reservations. Stringent rules and verification processes are often placed by the issuing authorities in order to mitigate possible forgeries or false acquisitions. To meet application requirements, the applicants must prove their (or their forefathers') domicile or residency status within the state prior to the 1950 presidential order and provide testimonials from (a) two referees from the place of permanent residence (i.e. state domicile) of the applicant (someone in paternal blood relations of the concerned scheduled community is preferred), and (b) the head of the elected local governing body.[14] Upon receiving a satisfactory inquiry report from the concerned local authority (e.g. Tehsildar/ Revenue Office), a caste certificate can be issued. The application procedure for obtaining a caste certificate might be smooth and forthright when any family member (from the paternal side) of the applicant is already in possession of a caste certificate, provided the applicant can furnish other required documents. However, an applicant may encounter difficulties when no family member from the paternal side possesses a caste certificate (and/or the family has migrated from native/permanent place). In that case, the burden of proving residency status of the applicant or

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[14]An application form for a caste certification, available from the West Bengal (a state in India) government's Backward Classes Welfare Department, shows that the head of the elected local governing body may be the head of village (i.e. gram panchayat pradhan), municipality chairman, municipal corporation councilor etc.

that of his/her forefathers at a location (especially prior to the 1950 presidential order) and obtaining aforementioned testimonials can be onerous. Moreover, the lack of adequate representation or poor network of the scheduled communities, coupled with a considerable amount of discretionary power of the officials, within the offices where the applications are processed can potentially lead to bureaucratic apathy as well as abuse if not properly monitored.[15]

While talking about representation, it is worth considering the potential influence that political reservations for Members of Parliament (MPs) and Members of Legislative Assembly (MLAs)—who are elected representative at the lower house (Lok Sabha) of the parliament and at the legislature of state governments, respectively—may have on caste certificate possession. As part of Political/Electoral reservation, certain constituencies of the parliament's lower house and those of state legislative assemblies are reserved for SCs and STs depending on where their population share is higher than a certain threshold. While caste certificates are mandatory for accessing political reservations, it is improbable that such mandatory requirements would directly influence the prevalence of caste certificate possession owing to the limited number of individuals that can benefit from such reservations. However, political reservations of MPs and MLAs may affect caste certificate possession through indirect pathways (institutional channel). First, these elected representatives' offices could serve as a deterrent to discretionary practices at the local level and could facilitate fairness in the caste certificate application process. Second, their presence may have a *role-model-effect* and affect the aspirations of their community members, which may in turn affect the prevalence of caste certificate possession. Third, there is evidence indicating that political reservation has a discernible impact on the policy goals of local governments. Specifically, elected members from reserved constituencies demonstrate a heightened dedication towards the goals of their respective interest groups, leading to improved provision of targeted public goods (may include public educational institutions) and services (may create public jobs) (see, Chattopadhyay and Duflo, 2004; Besley et al., 2004; Pande, 2003).

There may be certain community-level factors inversely influencing a scheduled household's likelihood of caste certificate possession. The practice of untouchability is unfortunately still common in different segments of the Indian society and wide economic gaps exist between scheduled communities and upper caste communities. Engaging into the process of acquiring a caste certificate may be seen as a sign of assertiveness to reducing the existing economic gaps, which may not augur well with the community members from upper castes and may lead to violence and further discrimination towards the scheduled community members. The study by Sharma (2015) corroborates that a reduction in economic gaps between scheduled communities (both SCs and STs) and the upper

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[15]For anecdotal instances of various difficulties that scheduled members face during the caste certificate application process, see Deeksha (2022).

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caste communities was associated with an increase in crime against these scheduled communities by the upper caste communities between 2001 and 2010. These types of behaviours may be more pervasive in places where scheduled community members resides with other caste members rather than places where scheduled community members reside separately. It is common, for example, in rural India, for scheduled members—normally those from the scheduled caste communities due to their untouchability status—to reside is separate hamlets (Moffatt, 1975), and there is anecdotal evidence that the scheduled community members residing with other community members are less likely to receive benefits of public services compared to the scheduled community members residing in separate hamlets (Yadav, 2014). In order to avoid violence and further discrimination and to avoid the possible social stigma of being identified as a scheduled community member, a scheduled household member residing with the community members from other castes may be more likely to be dissuaded from possessing a caste certificate. Finally, the remoteness of residence and the level of underdevelopment, especially in rural areas, could prove to be a barrier and discourage households from going through the stringent application process.

4. Data, empirical strategy and sample selection

For our analysis in this paper, we use the IHDS-II dataset which is the only nationally representative survey, to the best of our knowledge, that contains information on the possession of caste certificates.[16] The IHDS is a panel household survey conducted over two periods—2004-05 and 2011-12—covering around 42,000 households, but the information on caste certificate possession is collected only in the second round (i.e., IHDS-II). Different modules of the IHDS-II collect information at the household-level, at the household-member-level as well as at the community-level that we will be using for our analysis.

The key variable of our interest is related to caste certificate possession and relevant information were collected at the household level by asking: *Does anyone in the household have ... Jati certificate*? Whenever a household acknowledges the possession of a caste certificate, no supplementary information is gathered about the certificate. In other words, there is no further details available in the survey on which member(s) in the household possess(es) the certificate, how long it has been possessed by a member, which generation in the household had possessed it for the first time, whether the certificate has been employed to access any intended benefits or whether any difficulties were encountered during its application process. It has neither been clearly recognised whether a possessed certificate within a household has been issued by the current domicile state govern-

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[16]The IHDS-II was jointly carried out by the University of Maryland and the National Council of Applied Economic Research (Desai et al., 2018).

ment or another state government. As a result, it cannot be established whether a possessed caste certificate within a household is valid for benefits in case the household or any of its predecessors have migrated from another state or from another country to the current place of residence.

Owing to the aforementioned data limitations, along with certain other limitations that we discuss subsequently, we adapt our empirical strategy and conduct our analysis on a restricted sample of households. We impose the following set of restrictions. First, in this paper we restrict our analysis to *household level* because individual-level information on caste certificate possession and its utilisation is unavailable. Second, following on our discussions in Section 3, several factors that may influence caste certificate possession are required to be observed at the community level. Such factors require information on the availability of public schools or colleges in local communities (i.e, supply-side factors), information on local political reservations (i.e., procedural factors), and information on various characteristics of the scheduled households' places of residence (i.e., community-level factors). Given that such crucial set of information is only available for villages in IHDS-II, our second restriction limits our sample to rural households only.

Third, based on our discussion in section 3, a possessed caste certificate may not be valid if it is not issued by the domicile state government. However, a lack of any additional information about the caste certificate in IHDS-II prevents us from confirming its validity at the current place of residence, especially for migrated households. A migrated household may possess a caste certificate issued from elsewhere or a migrated household may not even possess a certificate simply because of its migration status. For the sanctity of our analysis in this paper, we restrict the sample households to those that either have never migrated from its current place of residence or have only migrated from another district but within the same state of current residence. Our fourth restriction is distinct but partially related to our third restriction. The IHDS-II collects information on how many years ago a household *first* moved to its current place of residence, but no further information is collected about their residence location before this first move. A household could possibly had moved from a different state before their first move to their current place of residence. Since we cannot confirm whether they are native to the state of current residence from the IHDS-II, we adopt to a different strategy. The IHDS-II collects information on households' caste and tribe names by asking: *Which caste/jati and sub caste/sub jati do you belong to?* We verify whether these caste and tribe names, as relevant, are enlisted in the respective SC and ST lists for every state.[17] Our fourth restriction then further limits the sample to *only* those households for whom we could verify that they are enlisted in the respective states' scheduled lists of castes and tribes.

Finally, we restrict the sample of SC households to those that report their religion to be Hindu, Sikh

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[17]State-wise lists of SCs are available from the Ministry of Social Justice and Empowerment; whereas the state-wise lists of STs are available from the Ministry of Tribal Affairs.

or Buddhist following our discussions in Section 2 based on the Constitution (SCs) order 1950 and the amendments in SC/ST Act 1956 and in SC Act 1990. No such religious restriction is imposed on ST households as the ST lists did not depend on religious leanings (Thorat and Joshi, 2020). These five restrictions limit the SC sample size for our analysis to 5,719 households and the ST sample size to 2,859 households. Further information on sample sizes by variables and descriptive statistics are available in Table A3.

5. Likelihood of caste certificate possession by SC/ST households: Empirical investigation

We now take the opportunity to empirically investigate the association between the factors (that we have discussed in section 3) and the likelihood of caste certificate possession among SC and ST households. The dependent variable of our interest, for this section, is whether a household possesses caste certificate ($T = 1$) or the household does not ($T = 0$). We use the following binary response model: $P(T = 1 \mid \mathbf{x}_1, \mathbf{x}_2) = G(\mathbf{x}_1 \boldsymbol{\alpha}_1 + \mathbf{x}_2 \boldsymbol{\alpha}_2)$, where $\mathbf{x}_1$ is the set of variables capturing the factors that may influence the likelihood of caste certificate possession and $\mathbf{x}_2$ is the set of additional control variables. Whenever $G(x) = x$, the binary model takes the form of a linear probability model; while a probit model requires $G(x) = \Phi(x)$, where Φ is a standard normal distribution ensuring $0 < G < 1$. We report the linear probability model estimates (SCL1 and SCL2 for SCs and STL1 and STL2 for STs) in Table 1; and we report the probit model marginal effect estimates in Tables A5 in the appendix, ensuring the robustness of the estimated coefficients. We use separate models for SC and ST households because these two communities are characteristically quite different from each other (Kijima, 2006) and experience different forms of social discrimination and apathy.

We now attempt to examine all the potential factors that we have discussed in Section 3.[18] We first look to examine the demand-side factors. It is hard to directly capture aspiration, but we make an attempt to capture aspiration and knowledge through the following three variables: household head's father's completed year of schooling, average year of schooling completed by all adult members in a household and the main source of a household's income (i.e., profession). Further, to capture the knowledge transpiring mechanism, we use the strength of a household's social ties/network. Following Thorat and Joshi (2020), we construct two separate network variables for within- and outside- community networks based on a household's community acquaintances with doctors and other health workers, teachers and other school workers, public employees, elected

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[18]We present detailed descriptions of all variables that we use for the models in Table A2, the sample sizes and descriptive statistics for these variables in Table A3 and the descriptive statistics for the SC and the ST sample households by caste certificate possessions in Table A4.

politicians and other party officials, police and military personnels (in 11 cases). Given that we do not have any additional information, such as frequency or depth or duration of acquaintances, we simply count the number of acquaintances a household has. Both within and outside community network counts lie between 0 and 11, where a score of zero signifies a complete lack of community network and a score of 11 implies highest level of community network within the framework.

Note that the average years of schooling completed by household heads' fathers is only around 1.1 years for both SCs and STs and the average of the average years of schooling completed by the adult household members are 4.5 years for SCs and 4.1 years for STs. The marginal effect estimates show that an additional year of head's father's schooling is associated with less than one percentage point higher likelihood of a household's caste certificate possession for both SCs and STs. An additional year of average adult schooling is associated with an increased likelihood, as one may expect, of caste certificate possession by around three percentage points for both SCs and STs. We further observe that an SC household with the main profession being salaried, professional or reliant on retirement-pension is 7.6 percentage points more likely to possess a caste certificate (compared to 'wage labourer' as the base category).

The marginal effect for an ST household is nearly 10 percentage points. On social ties, we observe that an increase in the community network count (both within and outside) by one unit is associated with 1.2-1.4 percentage points more likelihood of caste certificate possession for an SC household. A slightly different pattern is observed for the ST households, where a one unit increase in within-community network count is associated with 2.5 percentage points higher likelihood of caste certificate possession but we do not observe any association with outside-community network. We should point out that both the average within and outside community network counts are higher for ST households than for SC households—implying that SC households are, on average, less well-connected than even the ST households who are, by definition, expected to be living in more geographically isolated and often in entirely tribal inhabited villages.

We next look at the role that supply-side factors may play in influencing the prevalence of caste certificate possession. First, we observe that, among SCs, the existence of public schools (both secondary and higher secondary schools) in a village appear to be associated with an increased likelihood of caste certificate possession by more than 4 percentage points, and the existence of a public college in the village increases the likelihood by a staggering 13 percentage points. Among STs, the presence of public schools in a village is associated with an even increased likelihood of caste certificate possession by nearly 10 percentage points but we do not observe any statistically significant association with the existence of a public college in a village, which may be due to the very small sample size, as only 0.7% of sample ST households (Table A3) are from villages with a public college. Second, like public institutions, we do not have any relevant village level

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Table 1: Likelihood of caste certificate possession by rural SC and ST households (LPM estimates)

	Model SCL1	Model SCL2	Model STL1	Model STL2
Head's father's schooling	0.007***	0.007***	0.004	0.003
Average adult schooling	0.032***	0.032***	0.033***	0.033***
Profession (*base*: Wage labourer)				
Salaried/Professional/Pension	0.076***	0.077***	0.093***	0.092***
Farm/Cultivation	0.028	0.031*	0.037*	0.038*
Artisan/Petty shop	0.013	0.014	0.037	0.039
Community network				
Within	0.013***	0.012***	0.025***	0.025***
Outside	0.014***	0.014***	0.002	0.002
Public school	0.045**	0.042**	0.096***	0.098***
Public college	0.131**	0.130**	−0.039	−0.036
Household head's age	0.018***	0.018***	0.015***	0.015***
Age square[a]	−0.000***	−0.000***	−0.000***	−0.000***
SC MP	0.089***			
ST MP			−0.008	
SC MLA		−0.012		
ST MLA				−0.023
SC Hamlet (*base*: Mixed)				
Seperate/Mono SC (Hindu)	0.034**	0.033**		
ST Hamlet (*base*: Mixed)				
Seperate			−0.076***	−0.076***
Mono			0.053	0.052
Household size	0.010***	0.011***	0.018***	0.018***
Remoteness	−0.001	−0.002	−0.000	−0.000
Less developed village	−0.008	−0.009	−0.074***	−0.075***
Female head	−0.026	−0.023	−0.040	−0.041
Constant	−0.286***	−0.283***	−0.345***	−0.340***
Number of observations	5,446	5,446	2,686	2,686
R-Squared	0.177	0.173	0.208	0.208

Source: Authors' computations based on IHDS-II dataset.

Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Notes: Standard errors are robust. We control for state fixed effects. Given that some states have too few SC and ST samples in rural areas, we club some of the states as follows. For the SC sample, the state categories are (1) Jammu and Kashmir and Himachal Pradesh; (2) Punjab; (3) Uttarakhand; (4) Haryana; (5) Rajasthan; (6) Uttar Pradesh; (7) Bihar; (8) Eastern States (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura); (9) West Bengal; (10) Jharkhand and Chhattisgarh; (11) Orissa; (12) Madhya Pradesh; (13) Gujarat, Daman & Diu, Dadra & Nagar Haveli; (14) Maharashtra; (15) Andhra Pradesh; (16) Karnataka; (17) Kerala and Goa; (18) Tamil Nadu and Pondicherry. For the ST sample, the state categories are (1) Jammu and Kashmir, Himachal Pradesh and Uttarakhand; (2) Punjab, Haryana and Delhi; (3) Rajasthan; (4) Uttar Pradesh and Bihar; (5) Eastern States 1 (Assam, Arunachal Pradesh, Sikkim); (6) Eastern States 2 (Manipur, Meghalaya, Mizoram, Nagaland, Tripura); (7) West Bengal; (8) Jharkhand; (9) Orissa; (10) Chhattisgarh; (11) Madhya Pradesh; (12) Gujarat, Daman & Diu, Dadra & Nagar Haveli; (13) Maharashtra; (14) Andhra Pradesh; (15) Karnataka; (16) Kerala, Goa, Tamil Nadu, Pondicherry.

[a]The coefficients of age square are 0.00017 for Models SCL1 and SCL2 and 0.00015 for Models STL1 and STL2.

variables for capturing the existence of public sector jobs in a village. In the absence of a directly relevant variable, we pursue an indirect approach by examining whether household head's age has any association with increased likelihood of caste certificate possession. We, in fact, observe an inverted-U shaped relationship. For both SCs and STs, the likelihoods of caste certificate possession are maximised around the household head age of 52 years. Given that the survey was conducted in 2010-11, a 52 year old household head should remain eligible for public sector job applications during 1980's and early 1990's as most of these job applications require the minimum age to be somewhere between 18 and 21 and the maximum age to be around early 30's for SC/ST job applicants.[19] Thus, the likelihoods of household caste certificate possession for both SCs and STs increase until around 1990 and then gradually fall, supporting our narrative in Section 3.

We next attempt to examine how procedural factors may influence caste certificate possession. As we have discussed in Section 4, we do not have any way of knowing whether the households have faced any form of bureaucratic apathy or any other difficulties during the application process while acquiring caste certificates. However, the survey has information on whether the residence village of a household falls within the region where the parliamentary seat for MP and/or the state legislative assembly seat for MLA is reserved for SCs or STs. We thus attempt to look at whether political reservations, at the state-level as well as at the national-level, have any effect on the likelihood of caste certificate possession among SCs and STs. We observe from Model SCL1 that an SC household from a village within a region where the seat for the MP is reserved for the SC candidate is 9.2 percentage points more likely than an SC household elsewhere to possess a caste certificate. We however do not observe any effect of seat reservations for MLAs (Model SCL2), which is a surprising finding. Furthermore, we do not observe any effect of political reservations (MPs or MLAs) on the likelihood of caste certificate possessions for ST households.

Finally, we examine whether community-level factors play any role in affecting the likelihood of caste certificate possession. Based on our elaboration in Section 3, we divide the sample of Hindu SC households based on whether they reside in either a separate hamlet within a village or in a village entirely comprised of SC families and whether they reside in a village with households from other Hindu castes (i.e., a *mixed* community). In support of our hypothesis in Section 3, we observe that a household residing in a separate hamlet is around 3.6 percentage points more likely to possess a caste certificate than a household living in a mixed community. We run a similar exercise for STs by dividing the ST sample into the following three categories: those that reside in separate hamlets, those that reside mixed with households from other communities, and those

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[19]Instead of only the household head's age, we have also used the average age of at most two adult household members and we observe that the likelihoods of caste certificate possessions are maximised around the average age of 50 for both SC and ST samples.

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that reside in villages consisting of only ST households. We observe, contrary to our findings for SCs, that the households residing in mixed villages appear to be more likely to possess caste certificates than those residing in separate hamlets. Two observations can be made related to our findings about STs here. One is that, unlike SCs due to their untouchability status, STs may not face discriminations to the same extent in mixed villages. The other is that STs appear to have better within community network on average than SCs.

Before closing this section, we should highlight an essential aspect of the analysis that we have conducted in this section, which has important bearing for our analysis in the next section. Some of the factors and associated variables that we have considered for examining the association with caste certificate possession are genuinely exogenous in nature. The potential supply-side factors, such as the presence of public sector educational institutions and the availability of public sector employment, are beyond the control of the households. Similarly, the community-level factors, such as the residing location (i.e., separate hamlet or mixed community village) and whether that location falls under any reserved constituency, can be argued to be exogenous to households because such long-term residency status is historically determined within a rural setting.

6. Does caste certificate possession causally affect job prospects and well-being?

We started this paper with an initial examination, observing differences in certain social indicators by caste certificate possession within both SC and ST communities. In our penultimate section, we now aim to examine whether caste certificate possession has any causal effect on these social indicators. We specifically look at three employment indicators—namely, at least one member in a household having a *public sector job*, a *professional job* and a *formal sector job*, a monetary indicator of well-being and a non-monetary indicator of well-being. The first of these five indicators—having a public sector job—can be seen as a measure of representation.

Although it is not clear from the IHDS-II whether a public sector job has been procured using caste certificate, yet there are natural justifications for a strong relationship between caste certificate possession and procurement of public sector jobs. Caste certificate possession can also be argued to increase the likelihood of procuring professional jobs and formal sector jobs in general. Public sector jobs, albeit scarcer in number, can be considered more secure than other jobs and even when job-seekers are unable to procure public sector jobs, their aspirations and preparations for these jobs should enhance their competitiveness and procurement chances of professional and formal jobs in other sectors (see Prakash, 2020, p. 504). Although the key objective of the reservation policies is to ensure representation and not to directly enhance well-being, yet caste certificate possession, through better employment opportunities and access to various targeted benefits and

welfare schemes that we have discussed in Section 2, is expected to enhance scheduled households' well-being. We further examine the influence of caste certificate possession on two indicators of household well-being: monetary well-being through the lens of per-capita consumption expenditure and non-monetary well-being by deploying a multidimensional counting framework (Alkire and Foster, 2011; Bag and Seth, 2017).[20]

Our exercise of studying the effect of caste certificate is slightly different from the traditional exercise of studying the impact of affirmative action policies where those belonging to the scheduled category (i.e., entitled for benefits) are considered as forming a treated group while those *not* belonging to the scheduled category (e.g., the Hindu general category) are often considered as forming a comparison/control group (see, for example, Prakash, 2009, 2020; Hnatkovska et al., 2012, 2013; Khanna, 2020; Lee, 2021). We are particularly interested in evaluating whether caste certificate possession improves the selected indicators for those who possess it (i.e., eligible) compared to those that do not (i.e., entitled but not eligible). We thus focus only on the respective groups that are entitled for benefits (i.e., SCs and STs). Our distinction of those that are *entitled* for benefit from those that are *eligible* for benefits, elaborated in Section 3, is important here. For our evaluation exercise, we consider the entitled households that possess caste certificates as forming the *treated* group while the entitled households that do not possess caste certificates as forming the *comparison* or the *control* group.[21]

Borrowing the same notation used in Section 3, let us denote the binary treatment by T, where $T = 1$ indicates a possession of caste certificate and $T = 0$ indicates a lack of its possession.[22] The well-being outcome is denoted by y, where y_1 denotes the outcome with treatment and y_0 denotes the outcome without treatment. Given that each household can only be in one state, both y_1 and y_0 cannot be simultaneously observed. For household i, thus, $y_i = T y_{1i} + (1 - T) y_{0i}$, which mean that $y_i = y_{1i}$ whenever $T = 1$ and $y_i = y_{0i}$ whenever $T = 0$. A successful experimental process for impact evaluation relies on appropriate randomisation of the intervention or the treatment being randomised across households. If the treatment is independent of outcomes, then the *average treatment effect* (ATE) and the *average treatment effect among the treated* (ATT) may be estimated using simple mean difference of outcomes, i.e., $E(y_1 - y_0) = E(y \mid T = 1) - E(y \mid T = 0)$. In our context, however, caste certificate possession (*treatment*) is not a randomised intervention. Rather, as we have discussed in Section 3 and empirically examined in Section 5, it is due to a household's (or its members') informed choice of self-selecting itself to be an eligible beneficiary, influenced

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[20]Appendix A1 demonstrates how the multidimensional well-being measure is constructed.

[21]Unlike traditional studies, Cassan (2019) also adopted an innovative identifying strategy, where those that were classified SC during the time of India's independence (early SCs) formed the control group, and those that became SC after 1976 (late SCs) formed the treated group.

[22]We draw the notational and conceptual framework from Wooldridge (2010, Chapter 21).

by a number of factors.

Selection on observables

We first attempt to select observable covariates on which the treatment depends. While selecting the observable covariates, we had to ensure that they are neither influenced by the treatment itself nor by the outcomes. For example, given that we have no information about the duration of caste certification possession by a household, we could not select several internal household characteristics (e.g., indicators of aspirations and social networks) as they may have been affected by the treatment itself. Let us denote the set of selected observable covariates by $\mathbf{x}$. Then, under the reasonable and verifiable assumption of *overlap* requiring every household in the sample to have a positive probability of receiving treatment and no household being certain to be treated or to be not treated (i.e., $0 < \text{Prob}(T = 1 \mid \mathbf{x}) < 1$), and the conservative assumption of *ignorabiltiy* requiring outcomes and treatment to be independent conditional on $\mathbf{x}$, we can estimate the *average treatment effect on the treated conditional on* $\mathbf{x}$, i.e., $\text{E}(y_1 - y_0 \mid \mathbf{x}, T = 1)$.[23]

For computing the treatment effect, we use a set of *matching estimators*, which are unlikely to be affected by the treatment itself as we have argued at the end of Section 5. We use the following observable covariates for matching across treatment and control groups for the SC households: (1) a binary category of whether a household resides in a village where the MP seat is reserved for SC; (2) three categories on whether the household resides in a separate hamlet of a village, in a mixed hamlet or in another hamlet; (3) six categories of household head's age: 18–25, 26–35, 36–45, 46–55, 56–65 and 66 and over; (4) a binary category on whether the village has both public secondary school and public higher secondary school; (5) a binary indicator on whether the village has a public college; and (6) eighteen categories of subnational regions.

A slightly different set of observable covariates have been used for matching the treatment and control groups for the ST households: (1) four categories on whether the household resides in a separate hamlet of a village, in a mixed hamlet, in a village entirely consisting of ST households or in another hamlet; (2) six categories of household head's age: 18–25, 26–35, 36–45, 46–55, 56–65 and 66 and over; (3) a binary category on whether the village has both public secondary school and public higher secondary school; (4) a binary indicator on whether the village is under-developed; and (5) fifteen categories of subnational regions.

We report the treatment effects on five selected indicators based on matching estimators for SCs

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[23]A further assumption of *stable unit treatment value assumption* (SUTVA) requires that a household's treatment status affects only that household's outcome and is unaffected by treatments given to others Wooldridge (see, 2010, p. 905).

Table 2: Treatment effect with different matching methods for SCs

	One-to-one matching	NN(2) matching	Radius matching	Mahalanobis matching
Government job	0.043***	0.044***	0.050***	0.034**
	(0.007)	(0.007)	(0.006)	(0.016)
	[0.036]	[0.035]	[0.029]	[0.047]
	{5,611}	{5,611}	{5,611}	{5,359}
Professional job	0.068***	0.065***	0.068***	0.073***
	(0.009)	(0.009)	(0.008)	(0.018)
	[0.053]	[0.056]	[0.053]	[0.049]
	{5,611}	{5,611}	{5,611}	{5,359}
Formal sector job	0.067***	0.072***	0.078***	0.080***
	(0.012)	(0.012)	(0.010)	(0.027)
	[0.127]	[0.122]	[0.116]	[0.115]
	{5,611}	{5,611}	{5,611}	{5,359}
Per capita expenditure (log)	0.121***	0.112***	0.125***	0.159***
	(0.019)	(0.019)	(0.016)	(0.046)
	[6.489]	[6.497]	[6.485]	[6.453]
	{5,611}	{5,611}	{5,611}	{5,359}
Attainment score	0.062***	0.060***	0.063***	0.044***
	(0.006)	(0.006)	(0.006)	(0.017)
	[0.378]	[0.379]	[0.376]	[0.395]
	{5,514}	{5,514}	{5,514}	{5,272}

Source: Authors' computations based on IHDS-II dataset.

Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Abbreviations: NN(2): two nearest neighbour matching.

Notes: Each set of results has four rows. The first row presents the average treatment effect on the treated (ATT), the second row in parentheses presents the standard errors, the third row in square brackets presents the control mean, and the fourth row in curly brackets presents the number of observations on common support. The variables used for matching are SC MP, SC hamlet, household head's age category, public school, public college, and eighteen subnational regions. Due to small sample size, some subnational regions were merged. Estimates are computed using Stata's *psmatch2* command and those in the first three columns use a caliper of 0.01.

Subnational regions: Jammu & Kashmir and Himachal Pradesh (*merged*), Punjab, Uttarakhand, Haryana, Rajasthan, Uttar Pradesh, Uttar Pradesh, Bihar, North-Eastern States (include Sikkim, Tripura, Assam), West Bengal, Jharkhand and Chhattisgarh (*merged*), Orissa, Madhya Pradesh, Gujarat, Dadra & Nagar Haveli and Daman & Diu (*merged*), Maharashtra, Andhra Pradesh, Karnataka, Kerala and Goa (*merged*), Tamil Nadu and Pondichery (*merged*).

in Table 2 and for STs in Table 3.[24] The first three columns in each table report *propensity score* based estimates. The first column in each table reports estimates with *one-to-one* or *single near-*

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[24]We have reported the covariate imbalance tests in Table A6 and the evidence of common support in Figure A3.

Table 3: Treatment effect with different matching methods for STs

	One-to-one matching	NN(2) matching	Radius matching	Mahalanobis matching
Government job	0.077***	0.082***	0.088***	0.067***
	(0.012)	(0.012)	(0.011)	(0.019)
	[0.051]	[0.046]	[0.039]	[0.054]
	{2,770}	{2,770}	{2,770}	{2,579}
Professional job	0.074***	0.070***	0.077***	0.060**
	(0.014)	(0.014)	(0.012)	(0.024)
	[0.070]	[0.075]	[0.067]	[0.080]
	{2,770}	{2,770}	{2,770}	{2,579}
Formal sector job	0.091***	0.096***	0.098***	0.106***
	(0.017)	(0.017)	(0.015)	(0.028)
	[0.113]	[0.108]	[0.106]	[0.093]
	{2,770}	{2,770}	{2,770}	{2,579}
Per capita expenditure (log)	0.090***	0.129***	0.177***	0.115*
	(0.034)	(0.033)	(0.028)	(0.063)
	[6.419]	[6.380]	[6.332]	[6.372]
	{2,770}	{2,770}	{2,770}	{2,579}
Attainment score	0.046***	0.052***	0.059***	0.046***
	(0.009)	(0.009)	(0.008)	(0.017)
	[0.343]	[0.337]	[0.330]	[0.333]
	{2,737}	{2,737}	{2,737}	{2,548}

Source: Authors' computations based on IHDS-II dataset.

Statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Abbreviations: NN(2): two nearest neighbour matching.

Notes: Each set of results has four rows. The first row presents the average treatment effect on the treated (ATT), the second row in parentheses presents the standard errors, the third row in square brackets presents the control mean, and the fourth row in curly brackets presents the number of observations on common support. The variables used for matching are ST hamlet, household head's age categories, public school, less developed village, and fifteen subnational regions. Due to small sample size, some regions were merged. Estimates are computed using Stata's *psmatch2* command and those in the first three columns use a caliper of 0.01.

Subnational regions: Jammu & Kashmir, Himachal Pradesh and Uttarakhand (*merged*), Rajasthan, Uttar Pradesh and Bihar (*merged*), North-Eastern States group-1 (include Sikkim, Arunachal Pradesh and Assam), North-Eastern States group-2 (include Nagaland, Mizoram, Meghalaya and Tripura), West Bengal, Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Gujarat, Dadra & Nagar Haveli and Daman & Diu (*merged*), Maharashtra, Andhra Pradesh, Karnataka, and Southern states group (include Kerala, Goa, Tamil Nadu and Pondichery).

est neighbourhood matching with replacement and the second column reports estimates with *two nearest neighbourhood matching with replacement* (Wooldridge, 2010), whereas the third column reports *radius matching* estimates (Dehejia and Wahba, 2002). The final column reports the *Ma-*

halanobis distance matching estimates. Although there is minor variation in the magnitudes of the effect, all four matching estimates show statistically significant positive effects of caste certificate possession among SCs as well as among STs.

Having at least one member with a caste certificate in an SC household increases the household's likelihood of having someone with a government job by 3.4–5.0 percentage points, having someone with a professional job by 6.5–7.3 percentage points and having someone with a formal sector job by 6.7–8.0 percentage points. For an ST household, having at least one member with a caste certificate increases the household's likelihood of having someone with a government job by 6.7–8.8 percentage points and having someone with a formal sector job by 9.1–10.6 percentage points. However, the increase in likelihood of having someone with a professional job is similar to that for an SC household, i.e., 6.0–7.7 percentage points. Both SC and ST households with caste certificates also appear to have 11.2–15.9% and 9–17.7% higher per capita expenditure, respectively, than the SC and ST households without caste certificates. Finally, in terms of multidimensional attainment scores, SC and ST households with caste certificates experience 0.044–0.063 points and 0.046–0.059 points higher well-being, respectively, on a 0-1 scale. Thus, the matching estimates, under the assumption of ignorability, reveal that SC and ST households with caste certificates experience higher well-being compared to their respective counterparts without caste certificates.[25]

Selection on unobservables

The assumption of ignorability can however be considered restrictive and one may argue in favour of the presence of unobservable factors influencing the treatment (i.e., the possession of caste certificate by a household). In other words, the treatment could be considered endogenous. Please note that our treatment assignment is binary and among the selected outcome measures, three selected job related measures are binary, the multidimensional attainment score measure is cardinal but bounded between zero and one, and the per capita consumption expenditure measure is continuous. We use a two-stage model to resolve the endogeneity problem. Given that both stages require non-linear model specifications (except for the expenditure measure), we use the *two-stage residual inclusion approach*, which is argued to be consistent rather than the *two-stage predictor substitution approach* (Terza et al., 2008), and is a type of a more general *control function approach*

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[25]Standard errors reported in Tables 2 and 3 do not take into account that the propensity score is estimated. Bootstrap is not feasible either. As robustness check, in Tables A7 and A8, we produce the robust standard errors using Stata's *teffects* command. We also compute the treatment effects using other methodologies assuming *ignorability*: regression adjustment, inverse probability weight and inverse probability regression adjustment (Wooldridge, 2010). The directions of the treatment effects are identical and their magnitudes are of comparable sizes to what we have reported in Tables 2 and 3.

(Wooldridge, 2014).

We specify the outcome equations for the treatment group ($T = 1$) and the control group ($T = 0$) as:

$$y_0 = \Gamma(\mathbf{x}\boldsymbol{\beta}_0) + u_0 \text{ and } y_1 = \Gamma(\mathbf{x}\boldsymbol{\beta}_1) + u_1, \tag{1}$$

and the treatment equation as:

$$T = \mathbf{1}[\mathbf{z}\boldsymbol{\gamma} + \mathbf{x}\boldsymbol{\lambda} + e \geq 0], \tag{2}$$

where Γ is a known function, $\mathbf{x}$ is the set of exogenous regressors in both equations and $\mathbf{z}$ is the set of exogenous regressors in the treatment equation. The error terms in both equations respect the following restrictions: $\mathrm{E}(u_0 \mid \mathbf{x}) = 0$, $\mathrm{E}(u_1 \mid \mathbf{x}) = 0$, $\mathrm{E}(u_0 \mid \mathbf{z}) = 0$, $\mathrm{E}(u_1 \mid \mathbf{z}) = 0$, $\mathrm{E}(u_0, e) \neq 0$ and $\mathrm{E}(u_1, e) \neq 0$. The two-stage residual inclusion approach first fits the treatment equation (i.e., Equation 2) with a probit estimator and then computes the residuals $\hat{e}$ as the difference between the treatment and the predicted values of the probit estimator. These residuals capture the unobservable factors and are then controlled in the outcome equations as follows:

$$y_0 = \Gamma(\mathbf{x}\boldsymbol{\beta}_0 + \delta_0\hat{e}) + u_0' \text{ and } y_1 = \Gamma(\mathbf{x}\boldsymbol{\beta}_1 + \delta_1\hat{e}) + u_1'. \tag{3}$$

The endogenous treatment effect on the treated can be estimated as $\mathrm{E}(y_1 - y_0 \mid \mathbf{x}, \hat{e}, T = 1)$. For the three job related indicators, we use a probit outcome model; for the multidimensional attainment score, we use a fractional outcome model; and for the per capita consumption expenditure measure, we use a linear outcome model.[26]

For our analysis, the set of exogenous variables in $\mathbf{z}$ include the following four variables: household head age categories (18–25, 26–35, 36–45, 46–55, 56–65 and 66 and over), whether the seat for the constituency is reserved for SC (for the SC sample) or for ST (for the ST sample), the hamlet categories and whether the village has both public secondary schools and public higher secondary schools. None of these four variables is likely to be affected by caste certificate possession or the outcomes, but they are likely to affect the outcomes through caste certificate possession. The set of exogenous variables in $\mathbf{x}$ include main income source categories, head's father's education categories, head's father's occupation categories, head of the household's gender, household size and subnational regional fixed effect. In Table 4, we present the estimated treatment effects on the five selected indicators for SCs and STs. The direction of the treatment effects are the same for all five indicators for both groups, but the magnitudes are larger than those obtained with matching methods presented in Tables 2 and 3. Especially the effect of caste certificate possession on the per capita consumption expenditure for the SC households is 77% and that for ST households is

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[26]We estimated these models in Stata applying the *eteffects* command.

Table 4: Endogenous treatment effect of caste certificates for SCs and STs

	Government job	Professional job	Formal sector job	Log per capita expenditure	Attainment score
ATT for SC	0.066***	0.107***	0.156***	0.772***	0.288***
	(0.010)	(0.017)	(0.032)	(0.189)	(0.039)
	[0.005]	[0.011]	[0.038]	[5.837]	[0.152]
	{5,580}	{5,580}	{5,580}	{5,559}	{5,483}
	⟨0.003⟩	⟨0.029⟩	⟨0.010⟩	⟨0.001⟩	⟨0.000⟩
ATT for ST	0.102***	0.141***	0.126**	0.583***	0.170***
	(0.014)	(0.012)	(0.057)	(0.212)	(0.059)
	[0.005]	[0.003]	[0.072]	[5.927]	[0.219]
	{2,757}	{2,757}	{2,757}	{2,749}	{2,723}
	⟨0.071⟩	⟨0.016⟩	⟨0.217⟩	⟨0.004⟩	⟨0.109⟩

Source: Authors' computations based on IHDS-II dataset.
Statistical significance: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.
Notes: The first five sets of results are for SCs and the next five sets of results are for STs. Each set of results has five rows. The first row presents the average treatment effect on the treated (ATT), the second row in parentheses presents the robust standard errors, the third row in square brackets presents the control mean, the fourth row in curly brackets presents the number of observations and the fifth row in the angular brackets presents the p-value for the Wald test test for endogeneity in order to determine whether the estimated correlations between the treatment and outcome models are different from zero (i.e., $E(u_0, e) \neq 0$ and $E(u_1, e) \neq 0$). The null hypothesis requires that simultaneously $E(u_0, e) = 0$ and $E(u_1, e) = 0$ and so its rejection suggests existence of endogeneity.

58%. Similarly, the multidimensional attainment score for SC household with caste certificates, on average, is 0.288 points higher and that for respective ST households is 0.17 points higher on a 0-1 scale. Hence, even after controlling for unobservable factors, caste certificate possession appear to show positive influence on household well-being.

7. Concluding remarks

The efficacy of affirmative action policies has been the subject of contemporary discourse in India, which has raised academic and policy interests alike. Many studies confirm favourable effect of the Indian affirmative action policies in reducing the gap, on average, between the disadvantaged communities and non-disadvantaged communities in various social indicators. Several studies have also engaged in the debate on whether the favourable effect of the affirmative action policies have benefited everyone uniformly or rather captured only by the elites within the disadvantages communities. A common presumption in all these studies is that those belonging to the scheduled lists are automatically eligible for the intended benefits of affirmative action policies. However, without valid caste certificates issued from appropriate authorities, the scheduled community members

cannot be considered eligible for their entitled benefits. Contemporary studies have not examined the role that caste certificates can play in effective implementation of affirmative action policies. Despite significant data limitations, our paper attempts to fill this particular void in the literature.

Even though caste certificates are mandatory for accessing benefits, we observe in IHDS-II that a significant proportion (i.e., roughly half) of the households belonging to the SC and ST communities lack caste certificate possession, circa 2011. In other words, half of these two disadvantaged communities are not formally eligible for well-intended affirmative action benefits and can be argued to have been left behind even after 60 years of constitutional commitment made in 1950. We empirically examine that the lack of caste certificate possession can be attributed to a number of factors, such as household's aspirations, social ties with communities, existence of public educational institutions, availability of public sector jobs, local political reservations and community-level social discrimination and apathy. We argue that many of these factors are actually exogenous to the households. Further, devising a quasi-experimental framework, we demonstrate that caste certificate possession, in fact, enhances household's monetary as well as non-monetary well-being and improves job opportunities in public sector and beyond.

The ownership of caste certificates has been found to have a positive impact on employment prospects and well-being, hence necessitating specific policy suggestions. The potential for more proactive role of government in facilitating the acquiring of caste certificates might be explored, particularly through the enhancement of certain elements that have been identified as external to a household's decision-making process regarding the acquisition of such certificates. Based on our findings on the ownership of caste certificates among those residing in reserved areas, it is reasonable to suggest that there may be an institutional element associated with enhanced accountability in public offices that has proper representation at the helm, leading to a favourable impact. Governments may implement strategies aimed at mitigating bureaucratic apathy by enhancing the representativeness and accountability of local offices in the context of processing applications for caste certificates. Furthermore, the gradual shrinkage of the public sector resulting from privatisation and the removal of government involvement in various economic domains, coupled with the increasing privatisation of higher education, has had a notable impact on the effectiveness of the social justice model implemented through reservation. Hence, it is imperative for governments to fulfil their obligation by creating employment opportunities within the public sector, carefully implementing reservation regulations, and devoting adequate resources to accomplish these objectives.

By showing that the scheduled households without caste certificates experience lesser well-being, we consequently establish the existence of a distinct form of heterogeneous effect of affirmative action in India, originating through caste certificate possession (or its absence thereof). A case

can safely be made in favour of the efficacy of the Indian affirmative action policies that they are functioning as intended on two counts. First, they have upheld the *equality of opportunity in matters of public employment* as proposed in Article 16.4 of Constitution of India (GoI, 2020b, p.26) by enhancing the underprivileged community's *representation* in the public offices. Second, they have upheld the basic tenet of *equality* among different social groups, enshrined in Article 15.4 (GoI, 2020b, p.25), at least in terms of economic status, by improving the underprivileged community's well-being. However, one should not overlook, based on our findings in this paper, that such improvements, on average, apply to those who possess caste certificates from appropriate authorities to support their eligibility claims. Whether a more egalitarian distribution of social status has been achieved or not along the same line as economic status is still a subject to further research.

Owing to various data limitations that we have acknowledged in details, our analysis is based on a limited sample size. The scope of our research is limited to rural areas due to the unavailability of community-level characteristics in IHDS-II for other locations. We also solely focus on households that have either never migrated from their place of residence or have only relocated within the same state of domicile. In future, we aim to examine the effects of affirmative action policies within the urban setting, which is particularly relevant due to the sizeable presence of scheduled communities in urban areas as well as due to a significant influx of population into cities, where a notable proportion of people with lower socio-economic status seek shelter in urban slums.

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Appendices

Appendix A1. Computation of multidimensional attainment score

Multidimensional attainment scores are based on the counting framework (Atkinson, 2003; Alkire and Foster, 2011). A household is considered to have achieved an attainment in an indicator if the household satisfies the attainment criterion for that indicator. The indicators and their attainment cut-offs are summarised in Table A1. The multidimensional attainment score for each household is obtained by counting the number of attainments and then dividing by the number of maximum feasible attainments, which is nine. Thus, the multidimensional attainment score for each household lies between zero and one, where a score of zero signifies the lowest possible living standard based on these indicators and a value of one signifies the highest possible living standard within the framework.

Table A1: Indicators and attainment criteria for constructing multidimensional attainment score

Indicator	Attainment criterion (household level)
Residence type	The floor, roof and wall materials of a house are of improved quality (pucca house)
Spaciousness	Three or less members are residing per room in a household
Electricity	A household has electricity access for at least twelve hours per day
Toilet facility	A household has traditional pit latrine, semi-flush (Septic tank) latrine or flush toilet
Drinking water	The main water source is piped (public supply) into the dwelling, tube well, hand pump, covered well, or rainwater and the walking time to external any water source is no more than minutes minutes away (one way)
Cooking fuel	The household uses liquefied petroleum gas (LPG) or kerosene as primary cooking fuel
Communication	A household has access to a landline phone or at least one member has access to a mobile phone
Asset ownership	A household owns a car or more that six of the following set of assets: television, fridge, fan, cooler, washing machine, computer, chair/table and cot
Domestic help	A household is privileged with domestic help from maids or servants for cleaning, cooking and childcare

Source: The indicators and their attainment criteria are adapted from Bag and Seth (2017).

Table A2: List of variables and their descriptions

Variable: Definition

Caste certificate: $= 1$ if any member in the household possesses caste certificate; $= 0$ otherwise

SC MP: $= 1$ if the household resides in a village that falls in a constituency whose member of parliament (MP) seat is reserved for SCs; $= 0$ otherwise

ST MP: $= 1$ if the household resides in a village that falls in a legislative constituency whose member of parliament (MP) seat is reserved for STs; $= 0$ otherwise

SC MLA: $= 1$ if the household resides in a village that falls in a legislative constituency whose member of legislative assembly (MLA) seat is reserved for SCs; $= 0$ otherwise

ST MLA: $= 1$ if the household resides in a village that falls in a legislative constituency whose member of legislative assembly (MLA) seat is reserved for STs; $= 0$ otherwise

SC hamlet: $= 1$ if Hindu SCs in a village reside in a *separate* hamlet or the village only has Hindu SCs; $= 2$ if Hindu SCs in a village reside *mixed* with other non-SC Hindu households; $= 3$ otherwise

ST hamlet: $= 1$ if STs in a village reside in a *separate* hamlet; $= 2$ if only STs reside in the village (*mono*); $= 3$ if STs in a village reside *mixed* with other households; $= 4$ otherwise;

Remoteness: Median distance (in Kilometres) from local amenities: pucca road, nearest police station, nearest public distribution system, nearest markets, nearest bank branch and post office, nearest agricultural commission agent, nearest Anganwadi and nearest district hospital.

Public school: $= 1$ if the village has both public secondary school and public higher secondary school; $= 0$ otherwise

Public college: $= 1$ if the village has public college; $= 0$ otherwise

Head's father's schooling: Years of schooling completed by the household head's father

Average adult schooling: Average years of schooling completed by adult members

Main income source: $= 1$ if the main sources are salaried/professional/pension; $= 2$ if the main sources are farm/cultivation; $= 3$ if the main sources is wage labourer; $= 4$ if the main sources are artisan/petty shop; $= 5$ otherwise

Female head: $= 1$ if the household head is a female; $= 0$ otherwise

Household head's age: Age of the household head in years

Household size: The number of related members in the households

Within community network: A count variable based on within community acquaintances with (i) doctors, (ii) health workers, (iii) teachers/principal, (iv) school workers, (v) officers and above, (vi) other government employees, (vii) elected politicians, (viii) political party official, (ix) police inspector and above, (x) other police officials, and (xi) military personnels

Outside community network: A count variable based on outside community acquaintances with (i) doctors, (ii) health workers, (iii) teachers/principal, (iv) school workers, (v) officers and above, (vi) other government employees, (vii) elected politicians, (viii) political party official, (ix) police inspector and above, (x) other police officials, and (xi) military personnels

Attainment score: Multidimensional attainment score based on Appendix A1

Per capita expenditure: Per capita monthly consumer price index (CPI) adjusted consumption expenditure

Public sector job: $= 1$ if someone in the household has a public sector job; $= 0$ otherwise

Formal sector job: $= 1$ if someone in the household has a formal sector job; $= 0$ otherwise

Professional job: $= 1$ if someone in the household has a professional job at either public or private sector; $= 0$ otherwise

Table A3: Sample size and descriptive statistics for SCs and STs in rural areas

Variables	Scheduled caste (SC)					Scheduled tribe (ST)				
	Obs	Mean	SD	Min	Max	Obs	Mean	SD	Min	Max
Caste certificate	5,719	0.492	0.500	0	1	2,859	0.481	0.500	0	1
SC MP	5,635	0.132	0.338	0	1					
SC MLA	5,635	0.198	0.399	0	1					
ST MP						2,803	0.273	0.446	0	1
ST MLA						2,803	0.330	0.470	0	1
SC hamlet	5,634	1.497	0.652	1	3					
ST hamlet						2,795	2.082	1.034	1	4
Remoteness	5,635	3.449	3.905	0	35	2,803	6.825	7.514	0	40
Less developed village	5,710	0.514	0.500	0	1	2,859	0.670	0.470	0	1
Public school	5,621	0.157	0.363	0	1	2,783	0.091	0.287	0	1
Public college	5,623	0.017	0.128	0	1	2,784	0.007	0.084	0	1
Head's father's schooling	5,688	1.137	2.648	0	16	2,846	1.131	2.519	0	16
Average adult schooling	5,594	4.542	3.320	0	16	2,804	4.190	3.317	0	16
Main income source	5,719	2.653	0.855	1	5	2,858	2.367	0.788	1	5
Female head	5,719	0.145	0.352	0	1	2,859	0.148	0.355	0	1
Household head's age	5,719	47.724	13.806	11	92	2,859	47.536	13.145	16	90
Household size	5,719	4.831	2.218	1	21	2,859	4.790	2.178	1	18
Within-community network	5,703	0.974	1.609	0	11	2,856	1.419	2.253	0	11
Outside-community network	5,695	1.819	2.254	0	11	2,836	2.183	2.643	0	11
Attainment score	5,615	0.400	0.193	0	1	2,821	0.349	0.186	0	1
Per capita expenditure	5,719	820.428	772.168	31	24897	2,859	743.580	844.181	78	23225
Per capita expenditure (log)	5,719	6.529	0.555	3.4	10	2,859	6.353	0.651	4.4	10
Public sector job	5,719	0.052	0.222	0	1	2,859	0.077	0.266	0	1
Formal Sector job	5,719	0.150	0.357	0	1	2,859	0.144	0.352	0	1
Professional job	5,719	0.085	0.278	0	1	2,859	0.093	0.291	0	1

Source: Authors' computations based on IHDS-II dataset.
Abbreviations: SC: Scheduled caste; ST: Scheduled Tribe; Obs: Number of observations; SD: Standard deviation.

Table A4: Descriptive statistics for rural SC and ST households by caste certificate possession

	Scheduled caste (SC)			Scheduled tribe (ST)		
	With CC (1)	No CC (2)	Δ (1−2)	With CC (3)	No CC (4)	Δ (3−4)
Political reservation (SC)						
For MPs (%)	15.5	11.0	4.5***			
For MLAs (%)	18.7	20.9	−2.3*			
Political reservation (ST)						
For MPs (%)				22.8	31.4	−8.6***
For MLAs (%)				28.1	37.6	−9.5***
SC hamlets						
Seperate/Mono (%)	66.8	60.7	6.1***			
Mixed (%)	31.0	37.3	−6.3***			
ST hamlets						
Seperate (%)				37.0	45.3	−8.2***
Mono (%)				21.4	13.8	7.6***
Mixed (%)				34.6	31.3	3.4
Remoteness	7.5	7.5	−0.0	10.5	10.7	−0.1
Less Developed village (%)	46.1	56.6	−10.5***	59.3	74.1	−14.9***
Public school (%)	17.8	13.7	4.1***	11.6	6.8	4.8***
Public college (%)	2.3	1.1	1.2***	1.0	0.5	0.5
Head's father's schooling	1.4	0.8	0.6***	1.5	0.8	0.6***
Average adult schooling	5.5	3.6	1.9***	5.3	3.2	2.1***
Main income source[a]						
Salaried (%)	16.5	9.1	7.4***	17.5	7.7	9.8***
Farm/Cultivation (%)	20.3	18.0	2.3*	45.3	43.3	2.0
Wage labourer (%)	56.1	65.0	−8.9***	32.1	44.7	−12.5***
Female head (%)	13.4	15.6	−2.2*	13.2	16.3	−3.1*
Head's age	47.9	47.5	0.4	48.0	47.1	1.0*
Household size	5.0	4.6	0.4***	5.0	4.6	0.5***
Community network						
Within	1.2	0.8	0.5***	2.0	0.9	1.0***
Outside	2.2	1.5	0.7***	2.6	1.8	0.8***

Source: Authors' computations based on IHDS-II dataset.

Statistical significance: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.

Abbreviations: CC: caste certificate; Δ: Difference between estimates of 'With CC' and 'No CC'; SC: Scheduled caste; ST: Scheduled tribe; MP: Member of parliament; MLA: Member of legislative assembly.

[a]The primary household occupation denotes the main source of income. The salaried occupation category include salaried, professional as well as pensioner.

Table A5: Likelihood of caste certificate possession by rural SC and ST households (Probit marginal effect estimates)

	Model SCP1	Model SCP2	Model STP1	Model STP2
Head's father's schooling	0.007***	0.007***	0.004	0.004
Average adult schooling	0.031***	0.031***	0.032***	0.032***
Profession (*base*: Wage labourer)				
Salaried/Professional/Pension	0.082***	0.084***	0.105***	0.104***
Farm/Cultivation	0.026	0.029*	0.034*	0.034*
Artisan/Petty shop	0.010	0.011	0.029	0.030
Community network				
Within	0.013***	0.013***	0.027***	0.027***
Outside	0.014***	0.014***	0.002	0.002
Public school	0.048**	0.045**	0.101***	0.103***
Public college	0.114**	0.114**	−0.038	−0.035
Household head's age	0.018***	0.018***	0.015***	0.014***
Age square[a]	−0.000***	−0.000***	−0.000***	−0.000***
SC MP	0.086***			
ST MP			−0.010	
SC MLA		−0.013		
ST MLA				−0.025
SC Hamlet (*base*: Mixed)				
Seperate/Mono SC (Hindu)	0.033**	0.033**		
ST Hamlet (*base*: Mixed)				
Seperate			−0.078***	−0.078***
Mono			0.051	0.049
Household size	0.011***	0.011***	0.018***	0.018***
Remoteness	−0.001	−0.001	−0.000	−0.000
Less developed village	−0.007	−0.008	−0.074***	−0.074***
Female head	−0.026	−0.023	−0.040	−0.041
Number of observations	5,446	5,446	2,686	2,686
Pseudo R-Squared	0.139	0.136	0.167	0.168

Source: Authors' computations based on IHDS-II dataset.

Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Notes: Standard errors are robust. We control for state fixed effects. Given that some states have too few SC and ST samples in rural areas, we club some of the states as follows. For the SC sample, the state categories are (1) Jammu and Kashmir and Himachal Pradesh; (2) Punjab; (3) Uttarakhand; (4) Haryana; (5) Rajasthan; (6) Uttar Pradesh; (7) Bihar; (8) Eastern States (Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura); (9) West Bengal; (10) Jharkhand and Chhattisgarh; (11) Orissa; (12) Madhya Pradesh; (13) Gujarat, Daman & Diu, Dadra & Nagar Haveli; (14) Maharashtra; (15) Andhra Pradesh; (16) Karnataka; (17) Kerala and Goa; (18) Tamil Nadu and Pondicherry. For the ST sample, the state categories are (1) Jammu and Kashmir, Himachal Pradesh and Uttarakhand; (2) Punjab, Haryana and Delhi; (3) Rajasthan; (4) Uttar Pradesh and Bihar; (5) Eastern States 1 (Assam, Arunachal Pradesh, Sikkim); (6) Eastern States 2 (Manipur, Meghalaya, Mizoram, Nagaland, Tripura); (7) West Bengal; (8) Jharkhand; (9) Orissa; (10) Chhattisgarh; (11) Madhya Pradesh; (12) Gujarat, Daman & Diu, Dadra & Nagar Haveli; (13) Maharashtra; (14) Andhra Pradesh; (15) Karnataka; (16) Kerala, Goa, Tamil Nadu, Pondicherry.

[a]The marginal effect of age square are 0.00017 for Models SCP1 and SCP2 and 0.00014 for Models SPL1 and SPL2.

Table A6: Balance test results for different matching methods for SCs and STs

	One-to-one matching	NN(2) matching	Radius matching	Mahalanobis matching
Attainment Score (SC)				
Rubin's B (before matching)	58.281	58.281	58.281	58.281
Rubin's B (after matching)	9.602	9.660	9.711	0.000
Rubin's R (before matching)	1.038	1.038	1.038	1.038
Rubin's R (after matching)	0.978	1.142	0.989	1.000
LR test (p-value)	0.993	0.992	0.992	1.000
Other four indicators (SC)				
Rubin's B (before matching)	58.281	58.281	58.281	58.281
Rubin's B (after matching)	7.530	10.865	8.103	0.000
Rubin's R (before matching)	1.038	1.038	1.038	1.038
Rubin's R (after matching)	1.106	1.082	0.956	1.000
LR test (p-value)	1.000	0.951	1.000	1.000
Attainment Score (ST)				
Rubin's B (before matching)	53.092	53.092	53.092	53.092
Rubin's B (after matching)	15.656	17.239	14.390	0.000
Rubin's R (before matching)	0.892	0.892	0.892	0.892
Rubin's R (after matching)	1.182	1.232	1.122	1.000
LR test (p-value)	0.897	0.750	0.962	1.000
Other four indicators (ST)				
Rubin's B (before matching)	53.092	53.092	53.092	53.092
Rubin's B (after matching)	20.360	21.809	14.225	0.000
Rubin's R (before matching)	0.892	0.892	0.892	0.892
Rubin's R (after matching)	1.261	1.326	1.139	1.000
LR test (p-value)	0.301	0.154	0.963	1.000

Source: Authors' computations based on IHDS-II dataset.

Notes: Rubin's B is the absolute standardized difference of the means of the linear index of the propensity score in the treated and non-treated group. Rubin's R is the ratio of treated to non-treated variances of the propensity score index. For samples to be considered sufficiently balanced, the acceptable level of Rubin's B should be less than 25 and that of Rubin's R should be between 0.5 and 2 (Rubin, 2001). We report the p-value of the Likelihood-Ratio (LR) test of the joint insignificance of all the observable covariates after matching.

Table A7: Treatment effect with additional matching methods for SCs

	Propensity score matching	Regression adjustment	Inverse probability weighting	Inverse probability regression adjustment
Government job	0.043***	0.051***	0.051***	0.049***
	(0.009)	(0.006)	(0.006)	(0.007)
	[5,615]	[5,615]	[5,615]	[5,580]
Professional job	0.068***	0.069***	0.070***	0.069***
	(0.009)	(0.008)	(0.008)	(0.008)
	[5,615]	[5,615]	[5,615]	[5,580]
Formal sector job	0.067***	0.078***	0.078***	0.078***
	(0.013)	(0.010)	(0.010)	(0.011)
	[5,615]	[5,615]	[5,615]	[5,580]
Per capita expenditure (log)	0.121***	0.125***	0.124***	0.106***
	(0.020)	(0.015)	(0.015)	(0.016)
	[5,615]	[5,615]	[5,615]	[5,559]
Attainment score	0.062***	0.064***	0.064***	0.056***
	(0.006)	(0.005)	(0.005)	(0.005)
	[5,518]	[5,518]	[5,518]	[5,483]

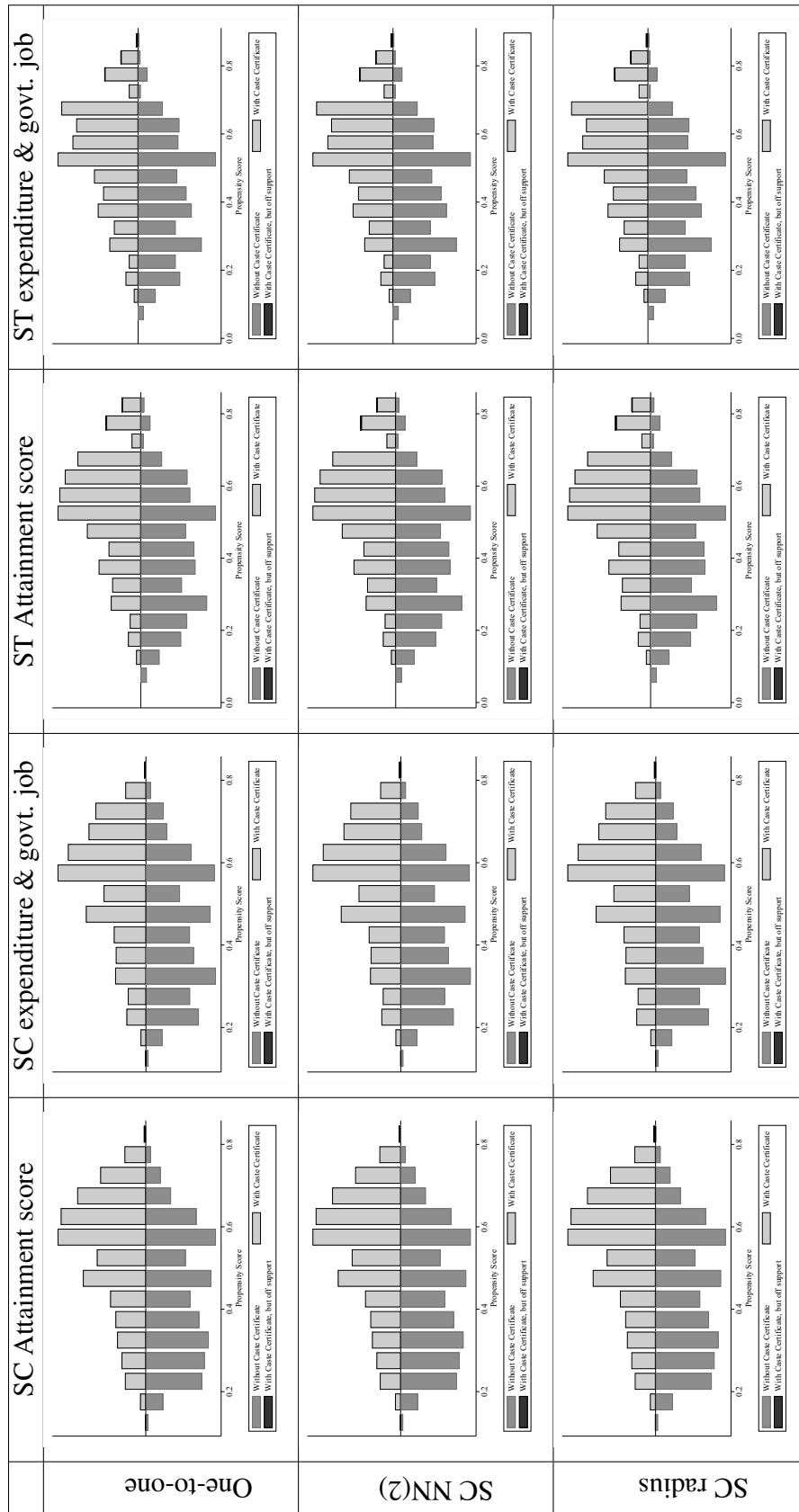*Source*: Authors' computations based on IHDS-II dataset.

Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Abbreviations: NN(2): two nearest neighbour matching.

Notes: Each set of results has three rows. The first row presents the average treatment effect on the treated (ATT), the second row in parentheses presents the robust standard errors, the third row in square brackets presents the number of observations. The variables used for matching are SC MP, SC hamlet, household head's age category, public school, public college, and eighteen subnational regions. Due to small sample size, some subnational regions were merged. Estimates are computed using Stata's *teffects* command. The outcome equations for the Inverse probability regression adjustment models use two additional variables: household head's father's years of schooling and household head's father's occupation.

Subnational regions: Jammu & Kashmir and Himachal Pradesh (*merged*), Punjab, Uttarakhand, Haryana, Rajasthan, Uttar Pradesh, Uttar Pradesh, Bihar, North-Eastern States (include Sikkim, Tripura, Assam), West Bengal, Jharkhand and Chhattisgarh (*merged*), Orissa, Madhya Pradesh, Gujarat, Dadra & Nagar Haveli and Daman & Diu (*merged*), Maharashtra, Andhra Pradesh, Karnataka, Kerala and Goa (*merged*), Tamil Nadu and Pondichery (*merged*).

Figure A3: Common support for different matching methods for SCs and STs

Notes: The light gray colour correspond to those with caste certificates, the dark gray colour corresponds to those without caste certificates and the black colour corresponse to those with caste certificate but off the support.

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Table A8: Treatment effect with additional matching methods for STs

	Propensity score matching	Regression adjustment	Inverse probability weighting	Inverse probability regression adjustment
Government job	0.078***	0.093***	0.093***	0.084***
	(0.016)	(0.011)	(0.011)	(0.012)
	[2,774]	[2,774]	[2,774]	[2,758]
Professional job	0.076***	0.084***	0.083***	0.083***
	(0.020)	(0.013)	(0.013)	(0.013)
	[2,774]	[2,774]	[2,774]	[2,774]
Formal sector job	0.092***	0.101***	0.101***	0.090***
	(0.020)	(0.015)	(0.015)	(0.016)
	[2,774]	[2,774]	[2,774]	[2,758]
Per capita expenditure (log)	0.091*	0.193***	0.193***	0.173***
	(0.036)	(0.025)	(0.025)	(0.026)
	[2,774]	[2,774]	[2,774]	[2,750]
Attainment score	0.046***	0.055***	0.057***	0.046***
	(0.009)	(0.007)	(0.007)	(0.007)
	[2,740]	[2,740]	[2,740]	[2,724]

Source: Authors' computations based on IHDS-II dataset.

Statistical significance: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

Abbreviations: NN(2): two nearest neighbour matching.

Notes: Each set of results has three rows. The first row presents the average treatment effect on the treated (ATT), the second row in parentheses presents the robust standard errors, the third row in square brackets presents the number of observations. The variables used for matching are ST hamlet, household head's age categories, public school, less developed village, and fifteen subnational regions. Due to small sample size, some regions were merged. Estimates are computed using Stata's *teffects* command. The outcome equations for the Inverse probability regression adjustment models use two additional variables: household head's father's years of schooling and household head's father's occupation.

Subnational regions: Jammu & Kashmir, Himachal Pradesh and Uttarakhand (*merged*), Rajasthan, Uttar Pradesh and Bihar (*merged*), North-Eastern States group-1 (include Sikkim, Arunachal Pradesh and Assam), North-Eastern States group-2 (include Nagaland, Mizoram, Meghalaya and Tripura), West Bengal, Jharkhand, Orissa, Chhattisgarh, Madhya Pradesh, Gujarat, Dadra & Nagar Haveli and Daman & Diu (*merged*), Maharashtra, Andhra Pradesh, Karnataka, and Southern states group (include Kerala, Goa, Tamil Nadu and Pondichery).