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

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Abstract

Affirmative action policies, around the world, aim to provide preferential treatment to those that belong to underprivileged communities and have experienced historical social injustices and exploitations. Contemporary studies that examine the effect of Indian affirmative action policies do not explicitly consider that all intended beneficiaries are not eligible for targeted benefits. An intended beneficiary is unable to acquire the targeted benefits without possessing a valid caste certificate issued by an appropriate authority. Yet, the 2011-12 IHDS, the only nationally representative survey collecting information on caste certificate possession among households, reveals that nearly half of the Scheduled Caste (SC) and Scheduled Tribe (ST) households do not possess caste certificates and thus cannot be considered eligible for benefits. In this paper, we first explore the factors that are associated with a household's likelihood of caste certificate possession, observing that some factors are associated with increased likelihood while others are associated with reduced likelihood. We then examine the causal link between caste certificate possession and SC/ST households' performance in three social indicators: government job procurement, monetary well-being and non-monetary multidimensional well-being. We observe that caste certificate possessions increase the likelihood of securing government jobs and enhance monetary and non-monetary well-being among SC/ST households.

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

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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 (variously known as positive-, protective- or compensatory discrimination)—seeking to provide preferential treatment to disadvantaged or underprivileged communities (Darity et al., 2011). In the Indian context, the constitution has enshrined a commitment since 1950 to *equality* (GoI, 2020), recognising the historical social injustices and exploitations that have caused extreme backwardness among certain groups of population, especially among scheduled castes (SCs) and scheduled tribes (STs). SCs have been historically subjected to *untouchability* practices and STs comprise of geographically isolated tribal communities (Deshpande, 2013).[1] Special provisions have been assured for these two communities in the form of reservation of seats in public-sector jobs and educational institutions to prevent their *exclusion* 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. Other public benefits include scholarships and concession in education fees in schools, relaxation of upper age limits and educational criteria for applying to certain public-sector jobs, and provision of medical aid grants.

Indian affirmation action has been a subject of significant academic and policy interest and has been widely studied. The effect of India's affirmative action policies have been examined by a number of contemporary studies on various outcomes of these disadvantaged communities (Pande, 2003; Bertrand et al., 2010; Chin and Prakash, 2011; Deshpande and Weisskopf, 2014; Bagde et al., 2016; Kaletski and Prakash, 2016; Cassan, 2019; Deshpande and Ramachandran, 2019; Kumar et al., 2020; Prakash, 2020; Lee, 2021). While their findings vary, these contemporary studies do not explicitly consider the fact that all members of disadvantaged communities may not be explicitly *eligible* for the benefits of intended affirmative action policies. When a person is born into a caste or a tribe that is on the state-specific scheduled list, the person should be considered *entitled* to public reservations and targeted benefits. A mere claim of entitlement, however, does not automatically make the person *eligible* for these benefits.

In order to be considered eligible, an entitled beneficiary must satisfy two additional criteria. First, a beneficiary must possess or acquire a *valid* caste certificate (CC, henceforth) in support of their eligibility claims. A CC is a documentary evidence confirming a beneficiary's belonging to a scheduled community within a 'state' (i.e., province) of India 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* and a CC issued by a particular state government is considered *valid* for availing reservations and benefits provided *only* by that state government. A CC issued by a state government may be binding for the Union government undertakings anywhere within the country, but a CC issued by one state government is certainly not considered valid for availing reservations and benefits offered by another state government. If a person, belonging to a 'scheduled' group of a state, migrates from the state of origin to another state, then the person does not become eligible for availing benefits from the state where the person has migrated.[2]

Even though CCs are imperative for receiving targeted benefits for both SCs and STs, yet according to the second round (2011-12) of the Indian Human Development Survey (IHDS-II hereafter),

nearly half of the SC and ST households do not possess a valid CC. The governments, under constitutional mandate since 1950, have certainly identified and notified the list of scheduled castes and tribes but unfortunately the governments do not proactively issue these certificates.[3] 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 to acquire the certificates.

A further descriptive examination of the IHDS-II reveals that the SC/ST households with at least one member possessing a CC is systematically better off in key social indicators than the SC/ST households with no one possessing a CC.[4] The presence of noticeable heterogeneity by CC possession among the scheduled households gives rise to inquiries concerning the role of CCs 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 in the literature. Some, for instance, have observed benefits to be disproportionately concentrated among the socio-economic elites within the disadvantaged communities (Galanter, 1984; Sowell, 2004; Massey et al., 2007), whereas others have posed a contrary view (Cassan, 2019; Prakash, 2020; Lee, 2021). Albeit, Cassan (2019) observes a heterogeneous effect across gender within the disadvantaged communities. Through a novel attempt in this paper, we contribute to this debate by establishing the existence of a different form of heterogeneity that arise through CC possession (or its lack of).

We first explore different factors that may be *associated* with a scheduled household's likelihood of CC possession. Our corresponding empirical analysis reveals that higher schooling, salaried profession, strong social ties within and outside communities, the availability of public schools and colleges in a village and the availability of public sector jobs are all associated with greater likelihood of CC possession. In contrast, the possibility of violence and discrimination towards SC households as well as social stigma deters SC households from possessing CCs. Among ST households, those residing in less developed villages are less likely to acquire possession.

We then examine whether there is a causal link between CC possession and scheduled households' performance in three social indicators: likelihood of government job procurement, monetary well-being in terms of per capita consumption expenditure and non-monetary well-being using a multidimensional measure. We devise a setting, where the SC/ST households possessing CCs are considered as *treated* and the SC/ST households without CCs constitute the *control* group. However, CC possession by a household is not a random decision. Rather, the decision is influenced by several observable and unobservable factors, leading the treatment to be endogenous. To resolve the endogeneity of the treatment (i.e., CC possession), we pursue an instrumental variable approach. We justify and use the total state government employment per million people across states for year 1992 as an instrument. We find that CC possession causally increases the prevalence of government job procurement and improves both monetary and non-monetary well-being among both SC and ST households.

Subsequent sections are structured as follows. Section 2 elaborates the data, empirical strategy and the sample selection process. Section 3 empirically examines the factors that are associated with the likelihood of CC possession. Section 4 investigates the causal effect of CC possession on selected social indicators among SC and ST households. Section 5 provides concluding remarks.

2. Data, empirical strategy and sample selection

For our analysis, we use the 2011 Indian Human Development Survey (IHDS-II) dataset, which is the only nationally representative survey, to the best of our knowledge, that contains information on CC possessions.[5] The IHDS is a panel household survey conducted over two periods, during 2004-05 and during 2011-12, covering around 42,000 households, but the information on CC possession is collected only in the second round (i.e., IHDS-II). The information on CC possession, the key variable of our interest, is collected at the household level by asking: *Does anyone in the household have ... Jati (i.e., caste) certificate*? However, the information on CC possession in IHDS-II is quite restrictive and no supplementary details has been gathered regarding which particular members in the household possess the certificate, how long the certificate has been possessed, which generation in the household had acquired the certificate for the first time, whether the certificate has been used to access any intended benefits or whether any difficulty was encountered during the application process of the certificate. These aforementioned constraints on our key variable of interest, along with certain additional constraints that we subsequently discuss, require us adapting our empirical strategy and conducting our analysis on a restricted sample.

First, we restrict our analysis to the *household level* since individual-level information on CC possessions and its utilisations are unavailable. Second, we restrict the sample of SC households to those that report practising Hinduism, Sikhism or Buddhism based on the Constitution (SCs) order 1950 and the amendments in SC/ST Act 1956 and in SC Act 1990, respectively.[6] The Constitution (SCs) order 1950 only allowed ex-untouchables practising Hinduism to be included in the scheduled SC list. The 1956 and the 1990 amendments later included the ex-untouchable castes practising Sikhism and Buddhism, respectively. However, the ex-untouchable castes that converted to any other religions (e.g., Christianity and Islam) are still kept out of the reservation under scheduled castes.[7] Unlike SCs, however, the inclusion of tribes in the ST lists did not depend on religious leanings (Thorat and Joshi, 2020) and so no such restrictions are required for the ST sample households.

Third, for this paper we restrict our attention to the households 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 for the following reason because a CC can only be issued by a household's domicile state or the state of origin, and the certificate issued by one state government is *not* valid for accessing benefits in another state. Unfortunately, the IHDS-II does not allow us to verify whether a CC possessed within a household has been issued by the domicile state government or by another state government. A household that has migrated from a different state may thus possess a valid CC issued from the state of origin and yet the household may be ineligible for availing benefits from the migrated state of residence. Among the IHDS-II SC sample, 95% of households (practising Hinduism, Sikhism or Buddhism) either have never migrated or have only migrated within the same state. The same share among the ST sample households is 99.4%.

Our fourth restriction is partly related to our third restriction. The IHDS-II contains information on how many years ago a household had *first* moved to its current place of residence, but no further information is available about their residence location before this first move. Among the households that migrated within state, a household could have possibly migrated from a different state before their first move to their current place of residence. In that case, the household may

either be ineligible to apply for a CC or a possessed certificate may not be valid in the current state of residence. Since the IHDS-II does not directly confirm whether their current state of residence is their state of origin or not, we adopt to an alternative strategy. We make use of the information that the IHDS-II collects on households' caste and tribe names by asking: *Which caste/jati and sub caste/sub jati do you belong to?* We cross-check and verify whether the caste/tribe name of each household, as relevant, is enlisted in the respective SC/ST list for every state.[8] The third restriction further limits the sample to the households for whom we could verify that they are enlisted in the respective states' scheduled lists of castes and tribes. We were able to verify the caste identity for 95.9% of the same SC households and 96.2% of the sample ST households, respectively.

The second, third and fourth restrictions collectively restrict the sample to households that are *entitled* as well as *eligible* for the intended benefits, and ensures that the CC possessed by every household in the restricted sample is valid for availing benefits. The share of SC households, practising Hinduism, Sikhism or Buddhism, in our sample that satisfy the third and the fourth restrictions is 91.2%, whereas 96.2% of ST households satisfy the third and the fourth restrictions.

Finally, we restrict our analysis in this paper to the sample of rural households only since community level information is only available for villages in IHDS-II. The likelihood of CC possession may be affected by household-level characteristics but also by community-level characteristics, such as the availability of public-sector institutions in local communities, information on local political reservations, and information on scheduled households' places of residence (e.g., remoteness of location, the extent of social segregation etc.) These five restrictions together limit the SC sample size for our analysis to 5,719 households and the ST sample size to 2,859 households. Of the SC sample, 2,813 (49.19%) households have at least one member possessing a CC and 2,906 (50.81%) have none. Likewise, of the 2,859 ST sample, 1,408 (47.22%) households have at least one member possessing a CC and 1,574 (52.78%) have none. More information on sample sizes by variables and relevant descriptive statistics are available in Appendix Table A2.

3. Correlates of caste certificate possession

We now examine the factors that are associated with the likelihood of CC possession among rural SC- and ST households within our sample, dividing them into village-level and household-level factors.[9] Among village-level factors, we examine the association with the existence of public educational institutions within the village, the existence of an SC/ST member of parliament (MP) or a member of legislative assembly (MLA) and certain other characteristics; whereas among household-level characteristics, we examine the association with head's father's schooling, average adult schooling, primary profession (income source), community network (social ties), household size and head's gender and age. The binary dependent variable captures whether a household possesses CC (= 1) or not (= 0). The linear probability model (LPM) estimates are reported in Table 1 (SCL1 and SCL2 for the SC sample and STL1 and STL2 for the ST sample).[10] We use separate models for SC and ST samples as these two communities are characteristically different (Kijima, 2006) and experience different forms of social discrimination and apathy.

To begin with the village-level factors, we observe that, among SC households, the existence of public schools (both secondary and higher secondary) in a village is associated with a 4 percentage

point (pp hereafter) higher likelihood of CC possession, and the existence of a public college in the village increases the likelihood by nearly 15pp. Among ST households, the presence of public schools in a village is associated with 10pp greater likelihood of CC possession, but we do not observe any association with the existence of a public college in a village (which may be due to small sample size as only 0.7% of ST sample households are from villages with a public college).

Anecdotal evidence suggests that scheduled members encounter various difficulties during their efforts to obtaining CCs (Deeksha, 2022). A lack of adequate representation of the SC/ST communities within the offices where the CC applications are processed can potentially lead to bureaucratic apathy and abuse if not properly monitored. The IHDS-II does not include any information on whether the households face any form of bureaucratic apathy or any other difficulties during the CC application process, but the survey has information on whether the residence village of a household falls within the region where the parliamentary seat or the state legislative assembly seat is reserved for SCs or STs. We examine whether political reservations at the state-level and at the national-level have any effect on the likelihood of CC possession among SCs and STs. SC households in MP-reserved constituencies are 9.2pp (Model SCL1) more likely to possess CCs, unlike in MLA-reserved areas (Model SCL2). No such association is found for STs (Models STL1 and STL2), possibly due to geographic dispersion or weaker institutional linkages.

Engaging into the CC acquirement process by scheduled members could be seen by the upper caste communities as a sign of assertiveness to reducing existing socio-economic gap, which may lead to violence and further discrimination towards the scheduled communities (Sharma, 2015). For the SC sample, we examine this aspect through two exercises. In our first exercise, we divide the SC sample into two groups: (i) those that reside in separate hamlets within villages (Moffatt, 1975) or in villages entirely comprised only of SC families (i.e. Mono-SC) and (ii) those that reside in villages with other castes (i.e., a *mixed* community). We observe that an SC household residing in a separate hamlet is around 3.3pp more likely to possess a CC than a household living in a mixed community. In our second exercise, we observe that an SC household, residing in a village where the share of the SC population is 25% or more, is 4–5pp more likely to possess a CC. It thus appears that SC households residing in mixed communities or in villages with smaller share of SC population are more likely to be dissuaded from CC possession to possibly avoid violence, further discrimination and possible social stigma from identification. In contrast, we observe that the ST households residing in mixed villages appear to be more likely to possess CCs than those residing in separate hamlets. There may be two possible reasons. One reason could be that STs in mixed villages do not encounter untouchability practices to the same extent as SCs. The other reason could be that STs show better within community network on average than SCs as we further show. Among the ST sample, the negative effect of separate hamlets and the positive effect of mono-ST villages suggest internal heterogeneity and may warrant further exploration.

We now turn our attention to household-level factors. An additional year of the head's father's schooling is associated with less than 1pp higher likelihood of an SC household's CC possession. It is worth noting that the average years of schooling completed by household heads' fathers is only around 1.1 years for both SC and ST samples. Similarly, an additional year of average adult schooling is associated with around 3pp increased likelihood of CC possession 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 around 7.7pp more likely to possess a CC (compared to 'wage

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

	Model SCL1	Model SCL2	Model STL1	Model STL2
Public school	0.041**	0.038*	0.097***	0.098***
Public college	0.148***	0.147***	–0.040	–0.036
SC MP	0.082***			
ST MP			–0.008	
SC MLA		–0.018		
ST MLA				–0.023
SC Hamlet (*base*: Mixed)				
Seperate/Mono SC (Hindu)	0.033**	0.033**		
Village SC Share ($\geq 25\%$)	0.044***	0.052***		
ST Hamlet (*base*: Mixed)				
Seperate			–0.076***	–0.077***
Mono			0.053*	0.051
Less developed village	–0.014	–0.016	–0.075***	–0.075***
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	0.077***	0.078***	0.094***	0.092***
Farm/Cultivation	0.033*	0.036**	0.037*	0.038*
Artisan/Petty shop	0.021	0.022	0.038	0.039
Community network				
Within	0.012***	0.012***	0.025***	0.025***
Outside	0.014***	0.014***	0.002	0.002
Household size	0.009***	0.010***	0.018***	0.018***
Female head	–0.024	–0.021	–0.040	–0.041
Head's age	0.018***	0.019***	0.015***	0.015***
Age square[a]	–0.000***	–0.000***	–0.000***	–0.000***
Constant	–0.338***	–0.339***	–0.345***	–0.340***
Number of observations	5,383	5,383	2,686	2,686
R-Squared	0.182	0.179	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.

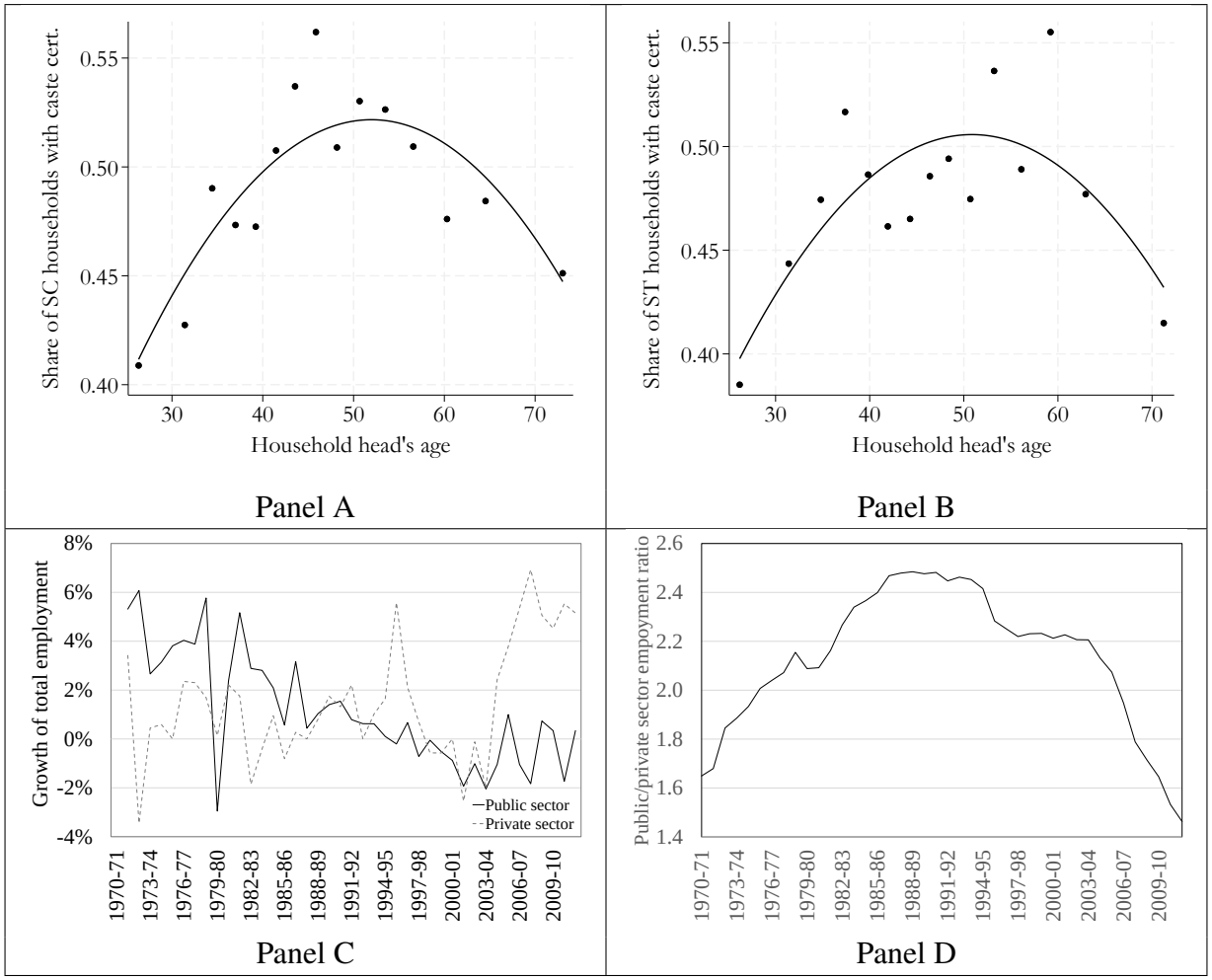
[a]The coefficients of age square are 0.00017 for Models SCL1 and SCL2 and 0.00015 for Models STL1 and STL2.

labourer' as the base category). The marginal effect for an ST household is more than 9pp. These associations are expected as ambitious SC/ST households (and members therein) are likely to aspire for better socio-economic statuses, which are typically manifested through acquiring higher education degrees from public institutions and/or obtaining public-sector jobs that are relatively safer, yet yielding higher remunerations. Although it is feasible to acquire a degree or secure a public-sector job without reservation, yet most SC/ST members would consider taking advantage of the available reservation facilities by CC possession.

A household's knowledge of the process of acquiring a CC may be facilitated by the strength of its social-ties. Following Thorat and Joshi (2020), we construct two variables capturing within-community networks and outside-community networks based on a household's community acquaintances. We simply count the number of acquaintances (e.g., with doctors, teachers, police, elected politicians etc.) a household has since we do not have any additional information (see Appendix Table A1). Both within- and outside-community network counts lie between 0 and 11, where a score of zero signifies a complete lack of social ties and a score of 11 implies highest level of community network. It is worth noting that both the average within- and outside-community network counts are higher for ST households than for SC households (see Appendix table A2)—implying that SC households are, on average, less socially-connected than even ST households who are more geographically isolated. For SC households, we observe that an increase in both community network counts by one unit is associated with 1.2-1.4pp more likelihood of CC possession. However, for ST households, a one unit increase in within-community network count is associated with 2.5pp higher likelihood of CC possession but we do not observe any association with outside-community network, potentially due to geographic isolation.

Finally and quite interestingly, our estimates reveal an inverted-U-shaped relationship between household head's age and the prevalence of CC possession among both SCs and STs. This relationship may be linked to the historical availability/scarcity of public sector employment opportunities, which may influence households' decisions to CC procurement. In order to examine this link, we divide heads' ages into fifteen quantiles or age-groups (i.e, bins) for both samples and compute the prevalence of CC possession within each of the fifteen age-groups (i.e., binned scatter-plot) presented in panels A and B of Figure 1. We then present the trend in public sector employment vis-à-vis private sector employment in panels C and D. In Panel C, we present the growth of total national employment in the public sector and in the organised private sector between 1970-71 and 2011-12; and in Panel D, we present the ratio of total public sector employment to total organised private sector employment. The total public sector employment rose relatively faster until early 1990s, which should have increased the need for acquiring CCs among the scheduled communities. From 2004-05 onwards, however, there had been a sharp drop in the ratio due to a much faster growth in private sector employment, which may have lessened the need for CC acquirement. Our estimates show that the likelihoods of CC possession are maximised for both SCs and STs in our sample around the head's age of 52 years. Given that the survey was conducted in 2010-11, a household head around that age 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 of 18–21 and the maximum age of around early 30's for SC/ST job applicants.[11] We use this particular link to motivate our instrumental variable framework in the next section.

Figure 1: Household head's age, public sector employment and caste certificate possession



Source: Panels A and B are based on authors' computations from the IHDS-II dataset and Panels C and D are based on author's computations from Reserve Bank of India (2000, Table 10) and Reserve Bank of India (2013, Table 14). *Notes*: The scatter plots in Panels A and B were computed using the *binscatter* command in Stata after controlling for the variables that have been used in Table 1. The household age variable were divided into fifteen quantiles.

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

Our primary objective in this penultimate section is to establish a causal link between CC possessions by households and their performance in three key social indicators. The first indicator is whether *at least one member in a household has a public sector job* (i.e., a government job). The IHDS-II does not contain information on whether a government job was procured using a CC, but there are natural justifications for a *direct* relationship between CC possession and government job procurements among SC and ST communities. Public sector jobs, albeit has become relatively scarcer in number since 1990s, can still be considered more secure and expected to yield higher remunerations (which is evident from the IHDS-II itself). We further examine indicators of household well-being that are expected to be *indirectly* affected by CC possession. Although the key purpose of the reservation policies is to ensure representation and not to directly enhance well-being, yet CC possession, through better employment opportunities, both in public and private sectors (Prakash, 2020), and access to various targeted benefits and welfare schemes, is expected to

enhance well-being of scheduled households. We specifically examine the causal effect on a *monetary indicator* and a *non-monetary* indicator. We capture monetary well-being through the lens of per-capita consumption expenditure and non-monetary well-being by deploying a multidimensional counting measure (Alkire and Foster, 2011; Bag and Seth, 2017). We have demonstrated how the multidimensional well-being measure is constructed in Appendix A1 and Table A3.

Our exercise of studying the effect of CC is not the same as the traditional exercise in the literature 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 CC possession improves the selected indicators for those who possess it (i.e., entitled and 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), where we consider the entitled households possessing CCs as forming the *treated* group while the entitled households not possessing CCs as forming the *comparison* or the *control* group.[12]

The standard for robust impact evaluation relies on the random assignment of an intervention or treatment across households. However, in the context of India's affirmative action policies, the possession of a CC—our treatment—is not a randomized intervention and is rather endogenous. The decision to possess a CC by a person from the SC/ST community may be influenced by a number of observable (Section 3) and unobservable factors (e.g., aspiration, empathy etc.), which may also affect job prospects and well-being. Given that traditional single-equation OLS/Probit model would likely produce biased estimates, we employ an instrumental variable (IV) approach—a method that is well-established in the economics literature for tackling this type of identification challenge. For IV estimation, we use a two-stage Conditional Mixed Process (CMP) framework (Roodman, 2011), which is suitable for modelling non-linear endogenous variable, such as binary CC possession. Unlike the common linear two-stage least squares (2SLS) method, our first stages for all models use Probit estimations. For the outcome variables in the second stages, we use Probit estimation for the government job indicator and linear estimations for the two well-being indicators.

Our identification strategy leverages an instrument that is correlated with households' likelihood of CC possession but is not directly related to the outcome variables except through the channel of CC possession. As an instrument for CC possession, we use the *state-wise total number of public sector employment per million people in year 1992*. It is to be noted that the total employment figures represent the total stock of employment accumulated till that date and not the new job postings by respective state governments. We construct the instrument in two steps. The source of public sector employment in India can be divided into the following four broad categories: central government, state government, quasi-state government and local government. We first construct the *total* state government employment by combining state, quasi-state and local government employments since they all require furnishing CCs from the scheduled communities. The total state government employment is more relevant, than the central government, in our context as a CC issued by a state government can be used only in that state and the same CC is invalid in another state. Moreover, we focus on the sample residing in rural areas who never migrated and so the state, quasi-state and

local government employment opportunities are more likely to be available to our sample households. In fact, according to the 1992 Employment Review (Government of India, 1992), more than 85% of all public sector employment in India was within state, quasi-state and local governments. We use the employment data for the year 1992 as this is the earliest period for which we were able to access the state-level employment data, but the state-wise variation in total state employment in 1992 is expected to represent the variation in India's pre-economic-reform period across states quite well.[13] We next normalise the total state government employment by dividing it by the state population to construct our instrument.

The validity of our IV estimates rests on satisfying three core assumptions of the IV-procedure: relevance, exogeneity and the exclusion restriction. The *relevance* assumption (first stage) requires that our instrument should be a strong predictor of the endogenous variable. Our instrument indeed serves as a powerful incentive for SC/ST households to obtain CCs as a greater number of state government jobs per capita directly increases the potential returns to holding a CC. We empirically confirm this through our first-stage estimations (Table 2) by showing that the marginal effect of the instrument on CC possession is statistically significantly positive, and thus demonstrating that our instrument is a strong predictor of the endogenous variable.[14]

The *exogeneity* assumption requires that the instrument must not be correlated with the unobserved determinants of the outcome variables. We argue that our instrument satisfies this condition for two main reasons. First, the total number of state government jobs is a macro-level variable determined by government policy and budgetary decisions, not by the unobserved characteristics or actions of a particular household. A household cannot influence the number of jobs availability in an entire state. Second, we empirically observe a lack of strong correlation between our instrument and overall economic well-being, measured by per capita State Domestic Product (SDP), across states. The correlation coefficient between our instrument and the per capita SDPs in 1991-92 is only 0.207, which is not even statistically significant.[15] Our second reasoning suggests that our instrument is not directly aligned with general economic prosperity—which could independently affect a household's well-being—across states.

The third assumption, the *exclusion restriction*, requires that the instrument should affect the outcome variables only through its effect on the endogenous variable (i.e., CC possession). Our instrument, the historical stock of government jobs, is a benefit-shifter that primarily influences the decision to obtain a certificate. While it is conceivable that states with a larger historical stock of jobs might also differ in other unobserved ways (e.g., in their institutional quality or public service delivery), we argue that these differences are unlikely to systematically confound our results. The historical stock of jobs in 1992 is a static, pre-determined variable, making it less likely to be correlated with the unobserved, contemporary factors that could influence our outcomes of interest. The causal pathway that we propose is as follows: the prevalence of state government jobs influences household decisions to acquire CCs, which, in turn, influences the outcome variables (i.e., job prospects and well-being). However, could the prevalence of state government job availability directly improved well-being or job prospects for SC/ST households without the need for acquiring CCs? We argue that such possibility is unlikely. In India, most government jobs, including those that are reserved for the SC/ST communities, are secured through a formal and highly competitive process. Someone from the the SC/ST community is far less likely to be successful in securing an unreserved public sector job and to be eligible to apply for a reserved job one must prove their

eligibility by CC possession (needless to say that even then they have to 'compete' with the other eligible candidates from the SC/ST communities). Hence, mere availability of jobs is not sufficient. Rather, the prevalence of state government jobs affects the likelihood of government jobs among SC/ST households almost exclusively through its effect on the likelihood of households possessing CCs. CC possessions further unlock other opportunities for SC/ST households, such as educational scholarships and other concessions, which play an active role in enhancing both monetary and non-monetary well-being—consistent with findings in the broader literature (Bagde et al., 2016; Deshpande and Ramachandran, 2019; Lee, 2021).

Table 2: OLS/Probit and IV regression estimates for CC effect on well-being

	Government job (ME)	Per capita expenditure (logarithm)	Attainment score (0–1)
Panel A: Scheduled caste (SC)			
OLS/probit estimate (CC)	0.035***	0.093***	0.019***
IV estimate			
Second stage (CC)	0.305***	0.548***	0.232***
First Stage (Instrument)	0.012***	0.007***	0.005***
Arc-hyperbolic tangent rho	–1.088***	–0.574***	–1.028***
Number of observations	5,299	5,383	5,383
Panel B: Scheduled tribe (ST)			
OLS/probit estimate (CC)	0.035***	0.131***	0.047***
IV estimate			
Second stage (CC)	0.254***	0.970***	0.270***
First Stage (Instrument)	0.012***	0.011***	0.004***
Arc-hyperbolic tangent rho	–0.941***	–0.951***	–0.978***
Number of observations	2,706	2,740	2,740

Source: Authors' computations based on IHDS-II dataset.
Statistical significance: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$.
Notes: Standard errors are robust. Common additional controls for both SC and ST regressions include the existence of public schools and colleges in the village, corresponding MP seat reservations, village hamlet residence, head's father's education, gender and age of household head, household size and within and outside community networks. We do not use state fixed effects, as our IV is constructed at the state level. For the OLS/Probit regressions, we additionally control for state fixed effects. For the SC sample, we additionally control for the share SC population in villages ($\geq 25\%$). We use Probit estimates for Government job (binary) where we use ordinary least squares (OLS) regression for Per capita expenditure and Attainment score. IV estimates are computed using Stata's *cmp* command. We use Probit models in the first stages of all three variables as the left hand side CC possession variable is binary. For the second stage, we use a Probit model for Government job (binary) but use linear models for the other two variables. The Arc-hyperbolic tangent rho values capture the correlation between the error terms of the two equations in the IV framework.

In Table 2, we present the OLS/Probit (non-IV) estimates as well as IV estimates for the three selected indicators. We present the estimates for SCs in Panel A and the estimates for STs in Panel

B. At the bottom of both panels, we report the statistical significance of the estimated ρ values from the IV models using the CMP procedure that confirms the presence of endogeneity by showing a correlation between the unobserved error terms of our first and second stages. This provides empirical validation that unobserved factors influencing CC possession are systematically linked to our outcome variables, thereby justifying the use of the IV framework. The first row within each panel reports the OLS/Probit (non-IV) estimates. The second row within each panel reports the IV estimates and the third row reports the first stage marginal effect estimate of the instrument on the prevalence of CC possession.

The OLS/Probit estimates show that for both among SCs and STs, CC possession is associated with 3.5pp higher prevalence of government jobs among scheduled households. CC possession is associated with a 9.3% and 13.1% higher per capita expenditure among SC and ST households, respectively. Similarly, CC possession is associated with a 1.9 points and 4.7 points higher attainment score among SC and ST households, respectively. Thus, CC possession is associated with better performance in all three indicators.

Our IV estimates show that the directions of the effects are the same for all three indicators for both groups, but the magnitudes are larger than the corresponding OLS/Probit estimates. Our IV estimates show a 30.5pp and a 25.4pp rise in the prevalence of government job within SC and ST households, respectively. The causal effect of CC possession on the per capita consumption expenditure for the SC households is 54.8% and that for ST households is 97%. Similarly, the multidimensional attainment score for SC households with CCs, on average, is 0.232 points higher and that for respective ST households is 0.270 points higher on a 0-1 scale. Hence, CC possessions appear to show positive influence on household well-being.

Our IV estimates reported in Table 2 are markedly larger than the corresponding OLS/Probit estimates. This is expected, as the OLS/Probit estimates are likely to reflect downward biased due to endogeneity as households that possess caste certificates may differ systematically in unobserved traits (e.g., aspiration, awareness, social capital) that also influence job prospects and well-being. Our IV strategy, using historical state-level public sector employment per million (1992) as an instrument, isolates the causal impact of CC possession by identifying marginal households whose decision to acquire a certificate is influenced by the instrument. These households are plausibly more responsive to the benefits unlocked by certificate possession, resulting in larger treatment effects. Thus, the IV estimates can be argued to reflect a more accurate and policy-relevant measure of the causal effect of CC possession.

5. 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. Contemporary studies do not explicitly consider that those belonging to the scheduled

lists are not automatically eligible for the intended benefits of affirmative action policies. Without valid CCs issued from appropriate authorities, the scheduled community members cannot be considered eligible for their entitled benefits. Contemporary studies have not investigated the role that CCs may 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 CCs are mandatory for accessing benefits, nearly half of the households belonging to the SC and ST communities lack CC possession according to IHDS-II. Thus, 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 CC possession can be attributed to a number of village-level and household-level factors. Further, devising an instrumental variable framework, we demonstrate that CC possession, in fact, improves job opportunities for SC/ST households in public sector as well as enhances their monetary and non-monetary well-being.

As the possession of CCs has been found to have a positive impact on employment prospects and well-being, it necessitates specific policy suggestions. The potential for more proactive role of government in facilitating the acquiring of CCs 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 possession of CCs among those residing in reserved constituencies, 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 CCs. 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 CCs experience lesser well-being, we consequently establish the existence of a distinct form of heterogeneous effect of affirmative action in India, originating through CC 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, 2020, 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, 2020, 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 CCs 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, which 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.

Notes

[1]Evidence abounds that these two communities trail behind in social indicators and political representation (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).

[2]See the Indian Ministry of Home Affairs letter numbers 35/1/72-R.U. (SCT.V) and 12017/2/2018-SCD dated 2nd May 1975 and 22nd February 2018, respectively, to all state governments and union territories.

[3]The IHDS-II dataset contains information on households' caste- and tribe names. We have cross-checked caste affiliations with the respective state and central lists of SCs and STs and have revised their caste/tribe status as required.

[4]Some key social indicators by CC possession are available in Supplementary Figure S1.

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

[6]The constitution order and the amendment acts are retrievable from the following ministerial websites: Constitution (SCs) Order 1950; SC/ST Act 1956; and SC Act 1990.

[7]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).

[8]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.

[9]We present detailed descriptions of all variables that we use for the models in Table A1 and the sample sizes and descriptive statistics for these variables in Table A2. Descriptive statistics for the SC and the ST sample households by CC possessions are available in Supplementary Table S1.

[10]We also estimate Probit models. The average marginal effects are reported in Supplementary Table S2, ensuring the consistency of the LPM estimates.

[11]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 CC possessions are maximised around the average age of 50 for both SC and ST samples.

[12]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.

[13]Please recall that we have already shown in Figure 1 how the total number of public sector employment grew faster than the total organised private sector employment until early 1990s and then the growth of total public sector employment slowed down.

[14]As our first stage is non-linear (Probit), we do not report the standard F-statistic for weak instruments.

[15]Although per-capita SDPs of different years are highly correlated across states, the correlations between our instrument and per capita SDPs of other years are also quite low (Supplementary Table S3). We also use a scatterplot for total state government employment per one million population for 1992 and the per capita SDP of 1991-92 in Supplementary Figure S2, which suggests a lack of monotonic relationship.

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Appendices

Table A1: List of variables and their descriptions

Variable: Definition
Caste certificate: = 1 if any member in the household possesses CC; = 0 otherwise
SC (ST) MP: = 1 if the household resides in a village within a reserved constituency for member of parliament (MP) for SCs (STs); = 0 otherwise
SC (ST) MLA: = 1 if the household resides in a village within a reserved legislative constituency for member of legislative assembly (MLA) for SCs (STs); = 0 otherwise
SC hamlet: = 1 if Hindu/Sikh/Buddhist SCs in a village reside in a *separate* hamlet or the village only has Hindu/Sikh/Buddhist SCs; = 2 if SCs in a village reside *mixed* with other non-SC households; = 3 otherwise
Village SC Share ($\geq$ 25%): = 1 if the share of the total SC population in a village is 25% or more
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;
Less developed village: = 1 if the village is identified as less developed in the IHDS-II
Public school: = 1 if the village has both public secondary and 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 for salaried/professional/pension; = 2 for farm/cultivation; = 3 for wage labourer; = 4 for artisan/petty shop; = 5 otherwise
Female head: = 1 if the household-head is a female; = 0 otherwise
Household-head's age: Household head age in years
Household size: 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 consumption expenditure adjusted for monthly consumer price index (CPI)
Public sector job: = 1 if someone in the household has a public-sector job; = 0 otherwise

Table A2: Sample size and descriptive statistics for SCs and STs in rural areas

	Scheduled caste (SC)			Scheduled tribe (ST)		
Variables	Obs	Mean	SD	Obs	Mean	SD
Caste certificate	5,719	0.492	0.500	2,859	0.481	0.500
SC MP	5,635	0.132	0.338			
SC MLA	5,635	0.198	0.399			
ST MP				2,803	0.273	0.446
ST MLA				2,803	0.330	0.470
SC hamlet	5,634	1.497	0.652			
ST hamlet				2,795	2.082	1.034
Village SC Share ($\geq 25\%$)	5,564	0.558	0.497			
Remoteness	5,635	3.449	3.905	2,803	6.825	7.514
Less developed village	5,710	0.514	0.500	2,859	0.670	0.470
Public school	5,621	0.157	0.363	2,783	0.091	0.287
Public college	5,623	0.017	0.128	2,784	0.007	0.084
Head's father's schooling	5,688	1.137	2.648	2,846	1.131	2.519
Average adult schooling	5,594	4.542	3.320	2,804	4.190	3.317
Main income source	5,719	2.653	0.855	2,858	2.367	0.788
Female head	5,719	0.145	0.352	2,859	0.148	0.355
Household head's age	5,719	47.724	13.806	2,859	47.536	13.145
Household size	5,719	4.831	2.218	2,859	4.790	2.178
Within-community network	5,703	0.974	1.609	2,856	1.419	2.253
Outside-community network	5,695	1.819	2.254	2,836	2.183	2.643
Attainment score	5,615	0.400	0.193	2,821	0.349	0.186
Per capita expenditure	5,719	820.428	772.168	2,859	743.580	844.181
Per capita expenditure (log)	5,719	6.529	0.555	2,859	6.353	0.651
Public sector job	5,719	0.052	0.222	2,859	0.077	0.266
Formal Sector job	5,719	0.150	0.357	2,859	0.144	0.352
Professional job	5,719	0.085	0.278	2,859	0.093	0.291

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

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 A3. 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 A3: 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).