

How Unequal Access to Public Goods Reinforces Horizontal Inequality in India

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ABSTRACT

This paper uses data from the National Sample Survey from 1993 to 2012 to measure inequality between caste and religion based groups in India. It measures inequality in consumption, living conditions, educational attainment, health, and occupational-status. It finds that group-based inequality is multidimensional and persistent. It then uses new survey data to measure inequality in access to following government provided goods and services: public schools, healthcare, utilities (water, electricity, gas), identity cards (voter ID, aadhaar), issuance of driving license, and registration of land or property. It shows that unequal access to government provided goods and services reinforces, reproduces, and exacerbates the unequal social and economic structure of India.

Keywords: Inequality, Horizontal Inequality, Inequality of Opportunity, Equity, Service Delivery, Public Goods and Services.

1 Introduction

In India, group wealth endowments vary substantially by caste and religion. Those belonging to deprived caste or religion groups are often trapped in a vicious cycle, wherein children born in disadvantaged groups do not have the tools and the opportunities to grow out of poverty; this is referred to as “inequality traps” by the *World Development Report: Equity and Development* 2006. Governments often attempt to break these inequality traps by providing universal goods and services that reduce inequality and promote social mobility (Barro, 1996; Owen and Weil, 1998; Ferreira, 2001; Alesina and La Ferrara, 2005.) But what if the tools that are meant to level the playing field, cause inequality

to persist? For example, investments in universal public education can help reduce inequality of opportunity and provide growth opportunities. However, weakness in service delivery may result in unequal access to public schools (Demirguc-Kunt *et al.*, 2017.) When children from deprived groups have lower access to public schools, or study in poorly managed public schools, any public spending on education will not only reinforce and reproduce group-based inequality, but also exacerbate it. In other words, unless any increase in public spending on education is specifically directed towards increasing access among deprived groups or improving the quality of schools catering to deprived groups, an ‘across-the-board’ increase in spending will merely reinforce an unequal socio-economic structure (Hero, 1998.)

This paper shows one way in which caste and religion based inequality in India is reinforced and reproduced by weaknesses in government service delivery. It does so in three parts. First, using National Sample Surveys between 1993 and 2012, it shows that inequality by caste and religion-based groups exists across multiple dimensions in India. More importantly, these inequalities have persisted over the last two decades. Second, the paper reports from a survey designed to measure inequality in access to government provided goods and services. It shows that members of disadvantaged caste and religion-based groups do not have equal access to important goods and services such as public education and universal healthcare. Third, it maps inequality in access to government provided goods and services to group-based inequality in consumption and educational attainment.

The rest of the paper proceeds as follows. Section 2 provides a brief discussion on measurement of group-based inequality. It also discusses relevant literature. Section 3 uses the National Sample Survey to measure inequality along the following dimensions: Consumption, Living Conditions, Educational Attainment, Job-Status, and Health. It shows that inequality by caste and religion-based groups is significant, multi-dimensional, and persistent. Section 4 uses the ‘India State Survey’ to measure inequality in access to government provided goods and services. It includes the following goods and services: public schools, universal healthcare, identity cards (voter ID and aadhaar), utilities (wa-

ter, gas, and electricity), issuance of driving license, and registration of land or property. Section 5 briefly discusses the interlinkages between inequality in access and horizontal inequality by caste and religion. Section 6 conclude by explaining how the findings contribute to the literature on horizontal inequality and inequality of opportunity.

2 Theoretical Motivation

A traditional view of equity, efficiency, and distributive justice does not always preclude economic inequality.¹ At best, there is a very fuzzy boundary between a level of inequality that is inevitable and a level that is undesirable, unjust, or unsustainable. This is because unequal circumstances and innate differences both contribute to economic inequality. Circumstances include one's access to material opportunities, skills training, healthcare, labor markets, schools; while innate differences include individual-level characteristics such as effort, ability, and choices. Broadly, inequality arising out of differences in circumstances, particularly those beyond one's control, is considered to be undesirable from the perspective of both equity and efficiency.² From the standpoint of equity: Dworkin (1981a,1981b) argues that individuals should be compensated for aspects of their circumstances over which they had no control, or for which they cannot be held responsible. Roemer (2000) suggests that equity demands an "equal opportunity policy."³ From the standpoint of efficiency: high inequality may lead to inefficient investment decisions, such as under-investment in education or skills, poor occupational choices, depressed wages for unskilled workers, and ultimately lower economic growth (Galor and Zeira, 1993; Banerjee and Newman, 1993; Ferreira *et al.*, 2017); or inefficient policies, such as under-investment in universal public goods and public infrastructure (Alesina and Rodrik, 1994; Esteban and Ray, 2000; Benabou, 2000; Ferreira, 2001; Boix,

¹Rawls, 1971; Dworkin, 1981a; Dworkin, 1981b; *World Development Report: Equity and Development* 2006; Paes de Barros *et al.*, 2009; Ferreira *et al.*, 2017; Huber, 2017

²For extensive literature review see Voitchovsky, 2005; Bertola, 2000

³The key difference between Dworkin and Roemer is that, while the former argues in favor of compensating for innate differences (such as, ability), the latter argues that public action should aim to equalize "advantages" among people from groups with different circumstances at every point along the distribution of efforts within the group. For more discussion on theories of distributive justice see *World Development Report: Equity and Development* 2006; Paes de Barros *et al.*, 2009; Huber, 2017.

2003; Campante and Ferreira, 2007; Ferreira and Gignoux, 2011.) Together, inefficient investment decisions and inefficient policies may further exacerbate inequalities arising from unequal circumstances.

In terms of measurement, inequality due to circumstances (also called ‘Inequality of Opportunity’) is separated from inequality due to innate differences in two ways. The first approach measures ‘Vertical Inequality’ using outcomes in early childhood.⁴ For example, Paes de Barros *et al.* (2009) estimate inequality of opportunity by measuring children’s access to basic goods and services. The underlying motivation is that for children, unlike adults, access implies opportunity. Children cannot be expected to make effort in order to gain access to basic goods and services.⁵ *World Development Report: Equity and Development* 2006 points out that “on the day of their birth, children cannot be held responsible for their family circumstances, despite the fact that these circumstances—such as race, gender, parent’s income and education, and urban or rural location—will make major differences in the lives they lead.” The second approach is to estimate inequality in outcomes by social groups, also known as ‘Horizontal Inequality.’⁶ If groups are selected so that 1) group membership is assigned at birth 2) and individuals cannot self-select into groups, then the allocation of group membership is *as-if* random. When allocation is random, innate or individual-level characteristics such as ability, intelligence, or industriousness will not vary by groups. For example, ordinarily one would not expect members of Race A to be innately more intelligent or industrious than members of Race B. When, individual-level attributes are randomized, then differences in outcomes can be largely attributed to group-level differences in circumstances. Recent literature on civilian conflict and ethnic mobilization reinforce horizontal inequality’s role as a measure of distributional justice. Stewart (2008) demonstrates that compared to groups close to the national average, both disadvantaged and advantaged groups, have a higher likelihood of mobilizing for conflict. Østby *et al.* (2009) show that both economic and social group-level differences are likely drivers of ethnic mobilization. Likewise, Cederman *et al.* (2011)

⁴Vertical Inequality measures differences in income or consumption by individual or households

⁵See Chapter 2: A Human Opportunity Index for Children in Paes de Barros *et al.*, 2009

⁶Horizontal Inequality measures differences in income or consumption by social groups, such as caste, ethnicity, religion, or race.

postulate that resentment or grievance based on intergroup inequality leads to ethnic mobilization.⁷ This paper uses the National Sample Survey in India to measure inequality by two groups assigned at-birth, Caste and Religion. The paper finds that caste and religion-based inequality is significant and persistent.

Persistence of horizontal inequality can be more damaging to individual well-being and have a high welfare cost than persistent vertical inequality (Stewart and Langer, 2008.) This is because people in deprived groups may feel trapped in their situation, particularly when persistence is inter-generational.⁸ This paper seeks to explain persistence of inequality between caste and religion-based groups in India. In the Indian context, inequalities may persist because: A) individual circumstances and access to material opportunities continue to be determined by one's caste or religion; B) discrimination prevents members of deprived caste and religion-based groups from benefiting from opportunities made available to them. (A) and (B) are two distinct mechanisms for inequality to persist. For example if applied to jobs and education: (A) implies that members of deprived caste groups do not have access to education; and (B) implies that in spite of being educated, discrimination in labor market prevents members of deprived caste-groups from finding appropriate jobs. Michelutti and Heath (2013) provides evidence for the latter (B): They show that over the last two decades, literacy rates of Dalits in Uttar Pradesh (UP) has increased substantially. However, due to discrimination in the labor market, this improvement in educational attainment has not resulted in jobs or improvement in the socio-economic status of Dalits. This paper tests the former(A). To do so, it uses a national survey to measure inequality in access to government provided goods and services. Access to the following government provided goods and services is analyzed: public schools, healthcare, biometric identity card (Aadhaar), voter-ID card,

⁷In contrast, Fearon and Laitin (2003) and Collier and Hoeffler (2004) use vertical inequality (Gini Coefficient) as a measure of grievance and find no statistical effect linking measures of inequality to ethnic mobilization. Cramer (2003), Sambanis (2005), Håvard Hegre and Nicholas Sambanis (2006), and Stewart and Langer (2008) point out that individual or interpersonal measures of inequality (such as Gini coefficient) are not appropriate measures of grievance. They recommend the use of group-based measures of inequality to proxy grievance.

⁸Vertical inequality, may persist without impacting efficiency, growth, or welfare. With adequate social mobility, vertical inequality may coexist with distributional justice too: For example, Duncan *et al.* (1993) find that in Western Europe, low inequality combined with extensive mobility among the poor enabled most of the population to avoid relative deprivation at least occasionally.

public utilities (such as gas, electricity, water), issuance of driving license, and registration of land or property. And access is measured by the following identity groups: caste, religion, and gender. The paper finds that inequality persists when deprived groups do not have equal access to government provided goods and services.

3 Horizontal Inequality (HI) in India

3.1 Data

The first step would be to identify relevant groups on the basis of which discrimination or favoritism occurs (Mancini *et al.*, 2008.) Often, identities that determine the ordering or ranking of groups in a society’s social or economic hierarchy are also politically salient. Thus, observing a country’s politically relevant identities may offer some clues as to which identities matter for the measurement of horizontal inequality (henceforth also referred to as HI.) (Wimmer *et al.*, 2009.) In India, political parties mobilize along religious, caste, or linguistic identities (Thachil and Teitelbaum, 2015.) Religion, caste, and language groups are assigned at-birth.⁹ This paper measures inequality by two types of social groups: religion and caste. Inequality is not measured by linguistic groups because states, the unit of analysis, are organized along linguistic groups. Since, states are linguistically homogeneous, and states are the unit of analysis, measurement of inequality by linguistic groups within a state will not yield any insights.

This paper uses data from the National Sample Survey (NSS) to measure HI. The NSS is a nationally representative annual household survey with a ‘thick’ round every five years, and ‘thin’ rounds between two successive thick rounds. While, thick rounds have a large sample size (between five to six million observations) and are representative at the district level, thin rounds have a smaller sample size and are representative only at the state level. The paper uses data from five thick rounds: 50th NSS conducted in 1993-1994, 55st NSS conducted in 1999-2000, 61st NSS conducted in 2004-2005, 66th NSS conducted in 2009-2010, and 68th NSS conducted in 2012. The 66th round was conducted after two successive years of drought, and hence the next thick round, 68th,

⁹Native languages only.

was conducted within two years of the preceding round. Additionally, the paper also uses data from two special rounds of NSS: 60th NSS conducted in 2003-2004, with a special emphasis on morbidity and healthcare; and 64th NSS conducted in 2006-2007, with a special emphasis on education. The NSS has data on each respondents caste category, religion, and gender. The paper estimates HIs by caste category (Scheduled Caste, Scheduled Tribe, Other Backward Caste, Upper Caste Hindu), religion (Hindu, Muslim, and Christian), and by gender.

3.2 Estimation Technique

HIs are measured using Odds Ratio and Theil Index. In general, Odds Ratio (OR) is a measure of association between an exposure and an outcome. For example, let exposure equal ‘membership in an ethnic group.’ Furthermore, let outcome equal ‘being poor.’ When OR equals 1, the exposure (membership in the ethnic group) does not affect the odds of outcome (being poor). In other words, members of the ethnic group are as likely as non-members to be poor. When $OR > 1$, the exposure (membership in the ethnic group) increases the odds of outcome (being poor.) Or otherwise, members of the ethnic group are more likely than non-members to be poor. When $OR < 1$, the exposure (membership in the ethnic group) decreases the odds of outcome (being Poor). Or alternately, members of the backward ethnic group are less likely than non-members to be poor. Mathematically:

$$\text{Odds Ratio}_i = \frac{a * d}{b * c} \quad (1)$$

where a equals the number of exposed cases, b equals the number of exposed non-cases, c equals the number of unexposed cases, d equals the number of unexposed non-cases, and i denotes the group, such as caste, religion, or gender.

The paper also uses the Theil to measure inequality. The Theil Index (GTheil) is a specialized case of the Generalized Entropy Index.¹⁰ The group Theil within any popu-

¹⁰Theil, 1967; Conceição and Ferreira, 2000

lation, is given by:

$$\text{GTheil} = \sum_r^R P_r \frac{\bar{y}_r}{\bar{y}} \log \frac{\bar{y}_r}{\bar{y}} \quad (2)$$

where $\bar{y}_r = \frac{1}{n_r} \sum_i^{n_r} y_{ir}$ is group r mean value, p_r is group r population share, R is group r population size, y_{ir} is the value of y for the i^{th} member of group r (Mancini *et al.*, 2008.) Using the Theil Index, Hero and Levy (2016) decompose income inequality from 1980 to 2010 in the U.S. They show that inequality between racial groups accounts for a rising share of total income inequality over this period nationally and in most states.

However, GTheil, is so conceptualized that it yields average inequality between groups. It does not, however, yield any information on the economic or social position of one group relative to the population, the relative performance of a group, the ordering or ranking of groups, or distribution of inequality between groups. For example, consider the hypothetical society in Table 1. In this society, there are two states, A and B, and in each state there are five groups: Scheduled Caste, Scheduled Tribe, Other Backward Caste, Upper Caste Hindu, and Muslim. Each group consists of 20 people. All individuals belonging to a group have the same income. Columns 3 and 4 show the mean income of each group in the two hypothetical states. Equation 2 will yield the inequality for State A and State B. However, the incomes of members of the Scheduled Caste are diametrically opposite in States A and B. Pertinent to this discussion is the relative performance of members of the Scheduled Caste (and not the average inequality between the five groups.) In this direction, the Group Theil is modified. The adjusted formula yields inequality by group. For example, Equation 3 will yield a different result for Scheduled Caste in State A and for Scheduled Caste in State B.

$$\text{Theil} = P_r \frac{\bar{y}_r}{\bar{y}} \log \frac{\bar{y}_r}{\bar{y}} + P_{r'} \frac{\bar{y}_{r'}}{\bar{y}} \log \frac{\bar{y}_{r'}}{\bar{y}} \quad (3)$$

where, r indicates members of Group r and r' indicates non-members of group r .

Table 1: Two Hypothetical States

	Group Population	State A Mean Income	State B Mean Income
Scheduled Caste Hindu	20	20	100
Scheduled Tribe Hindu	20	40	80
Other Backward Caste Hindu	20	60	60
Upper Caste Hindu	20	80	40
Muslim	20	100	20

3.3 Horizontal Inequality is Multi-Dimensional

This section uses data from one thick round and two thin rounds: 1) The 68th NSS conducted in 2011-2012. 2) The 60th NSS, with a special emphasis on morbidity and healthcare, from 2003-2004. 3) The 64th NSS, with a special emphasis on education, from 2006-2007. Table 2 presents Odds Ratios for various outcomes across multiple dimensions. Members of the Scheduled Caste and the Scheduled Tribe are less likely than the rest of the population (OR<1) to have: 1) High Consumption; 2) High status or skill job; 3) Good living conditions; 4) Good sanitation (public health); 5) Access to healthcare; 6) Access to education.

3.3.1 Inequality in Consumption

Inequality in consumption and occupational category are measured from NSS-68, This was a thick round with around 5.8 million observations. Inequality in consumption is estimated using the following method: First, the average household consumption expenditure for each state is estimated. Second, the average consumption in each state is normalized with a mean equal to 0 and a standard deviation equal to 1. Third, each household's consumption is expressed in terms of standard deviations from the mean consumption. Thus, for example, if a household's consumption expenditure is estimated to be 1, it implies that the household's consumption is 1 standard deviation (SD) greater than the mean household consumption in the state. A consumption greater than 1 standard deviation will place the household in the top one-sixth (approximately, top 17%) of the state in terms of consumption. The paper reports the odds that a household randomly selected from a caste or religion based group has a consumption expenditure greater than

1SD. Members of the groups *Upper Caste Hindus* are 1.34 times more likely than the rest of the population to have a consumption expenditure greater than 1SD (Figure 1a). In contrast, the odds of being in the top $1/6^{\text{th}}$ in terms of consumption is 0.70, 0.81, and 1.14 for members of the *Scheduled Tribe*, *Scheduled Caste*, and *Other Backward Caste*, respectively. The odds for *Christians* and *Muslims* are 1.04 and 0.72, respectively.

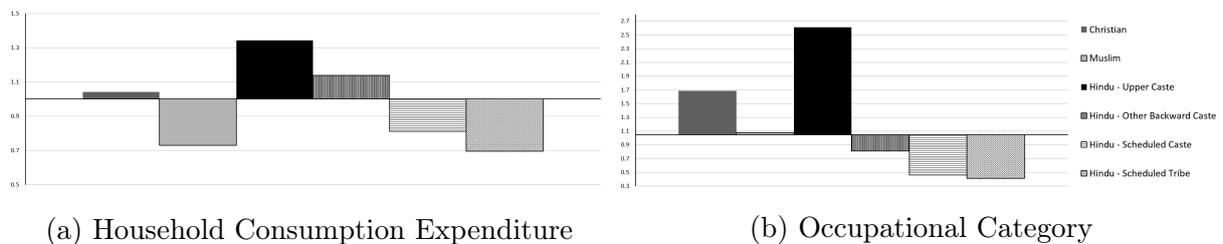


Figure 1: Horizontal Inequality

Notes: Household Consumption Expenditure (HCE) measures odds of having a consumption expenditure 1 standard deviation more than the state-level mean. For example, ‘Upper Caste Hindus’ are 1.34 times more likely than the rest of the population to have a housing consumption expenditure greater than 1 standard deviation more than the state-level mean. Occupational Category measures the odds of being in a high status or skill job (such as, Legislators, Senior Management, Professionals, Technical Professionals.)

3.3.2 Inequality in Occupation-Type

The National Sample Survey uses the National Classification of Occupation (NCO) to record the occupation of each respondent. Broadly, the NCO has nine divisions ranging from high status or high skill jobs (Division 1) to elementary jobs (Division 9).¹¹ This section reports the odds that a member of a given caste or religion based group has a high status or a high skill job. To be categorized as high skill or high status, they must belong to one of the following: Division 1 (Legislators, Senior Officials, and Managers), Division 2 (Professionals), or Division 3 (Technicians and Associate Professionals). Figure 1b shows that members of the group *Upper Caste Hindus* are 2.56 times more likely than the rest of the population to have a Division 1, 2, or 3 category job. In contrast, the odds of having a high status or high skill job is 0.37, 0.41, and 0.76 for members of the *Scheduled Tribe*, *Scheduled Caste*, and *Other Backward Caste*, respectively. The odds for

¹¹In order from Division 1 to 9: 1) Legislators, Senior Officials, and Managers; 2) Professionals; 3) Technicians and Associate Professionals; 4) Clerks; 5) Service Workers and Shop and Market Sales Workers; 6) Skilled Agricultures and Fisheries Workers; 7) Craft and Related Trade Workers; 8) Plant and Machine Operators and Assemblers; 9) Elementary Occupations.

Table 2: Inequality by Caste and Religion-Based Groups In India

Inequality Dimension	Measures Odds of	ST	SC	OBC	UC Hindu	Muslim	Christian
Consumption ¹	Being in the top 1\6 th in consumption	0.70	0.81	1.14	1.34	0.72	1.04
Occupation ¹	Being employed in a high skill or status job	0.37	0.41	0.76	2.56	1.03	1.64
Living Conditions ²	Living in a <i>pucca</i> ⁴ (permanent house)	0.18	0.60	1.03	2.76	0.90	1.33
	Using LPG as source of fuel for cooking ⁵	0.92	0.93	0.87	1.09	0.84	1.60
	Having access to electricity	0.72	0.54	0.88	2.91	0.76	2.39
Sanitation ²	Having underground or covered drainage ⁶	0.20	0.45	0.73	2.82	1.05	1.15
	Having a toilet with a flush and a septic tank ⁷	0.15	0.40	0.71	3.24	1.16	1.62
Education ³	Having English as a medium of instruction ⁸	0.18	0.39	0.70	2.37	0.97	4.01
	Not having to walk or cycle to school	0.37	0.59	0.88	1.98	0.73	2.00
	Professional or technical qualification	0.31	0.39	0.84	2.50	0.54	1.91
	Completed higher secondary school (12 th Grade)	1.05	0.70	1.80	1.02	0.59	0.42
Preventative Healthcare ²	Access to piped water	0.35	0.85	0.99	1.67	0.83	1.13
	Drinking water treated (UV, resin, reverse osmosis)	0.13	0.22	0.33	5.81	0.64	2.51
Healthcare ²	Health self-reported as ‘good’	0.89	0.66	0.95	1.57	0.78	1.22
	Did not receive post-natal care	1.36	1.46	0.82	0.53	1.34	1.31

Notes: ST = Scheduled Tribe. SC = Scheduled Caste. OBC = Other Backward Caste. UC Hindu = Upper Caste Hindus. 1 Estimated from NSS-68. 2 Estimated from NSS-60. 3 Estimated from NSS-64. 4 In Hindi, the term for a permanent or an all-weather house would be a *Pucca* house. In the survey, the respondents have an option to categorize the structure of their home as *pucca*, *semi-pucca*, *servicable-kutcha*, *kutcha*, or *no-structure*. The odds measure the likelihood that the respondent lives in a *pucca* house. 5 Survey options for source of energy for cooking: Coke, Coal; Firewood and Chips; LPG; Gobar Gas; Dung Cake; Charcoal; Kerosene; Electricity; Others; No Cooking Arrangement. 6 Options: No drainage system; Open drain; Open but *pucca*; Covered *pucca* drain; Underground drain. 7 Options: None; Pit; Septic tank and flush system; No latrine; Others. 8 In India, knowledge of English is essential for most private and government jobs. Furthermore, the medium of instruction in higher education in India is almost entirely English.

Christians and *Muslims* are 1.63 and 1.03, respectively.

Table 2 shows inequality by others dimensions such as living conditions, sanitation, education, and healthcare. A detailed account and discussion of each dimension is available online as supplementary reading material. Table 2 shows that ordering or ranking of groups is very consistent. Desirable outcomes are generally ranked in the following order Scheduled Tribe < Scheduled Caste < Other Backward Caste ↔ Muslim < Upper Caste Hindus ↔ Christians.

3.4 *Horizontal Inequality is Persistent*

This section demonstrates the persistence of inequalities. Figure 2 shows inequality in consumption measured in five different ways. First, inequality is measured in terms of two ratios: 1) ratio of consumption at the 90th percentile to consumption at the 10th percentile (p90/p10) and 2) ratio of consumption at the 90th percentile to consumption at the 50th percentile (p90/p50). In 1993-94: p90/p10 equaled 4.07; and p90/p50 equaled 2.27. In 2011-12: p90/p10 equaled 4.8 and p90/p50 equaled 2.5. By this metric, inequality appears to have increased between 1993 and 2012. Third, inequality is measured using the popular Gini Coefficient. Between 1993 and 2012, the Gini Coefficient of Consumption increased from 0.3 to 0.4. The increase in Gini by 0.1 suggests a substantial increase in inequality. Figure 2 also shows inequality measured using the Theil Index and the Atkinson Index [AE(e)].¹² When $e=2$, the Atkinson Index is more sensitive to inequality at the bottom of the distribution. Between 1993 and 2012, the Theil Index for Consumption increased from 0.24 to 0.354; the AE(2) for Consumption changed from 0.29 to 0.36. Thus, all five measures indicate that consumption based vertical inequality increased between 1993 and 2013. The time period overlaps with a period of structural and economic reforms and high economic growth in India.

Figure 2 shows that vertical inequality in India has increased over the last two decades. Figure 3 measures inequality of consumption within groups and between groups. GTheil Index is used as a measure of inequality. Overall, inequality within the groups, *Scheduled*

¹²Where $e>0$ is the inequality aversion parameter.

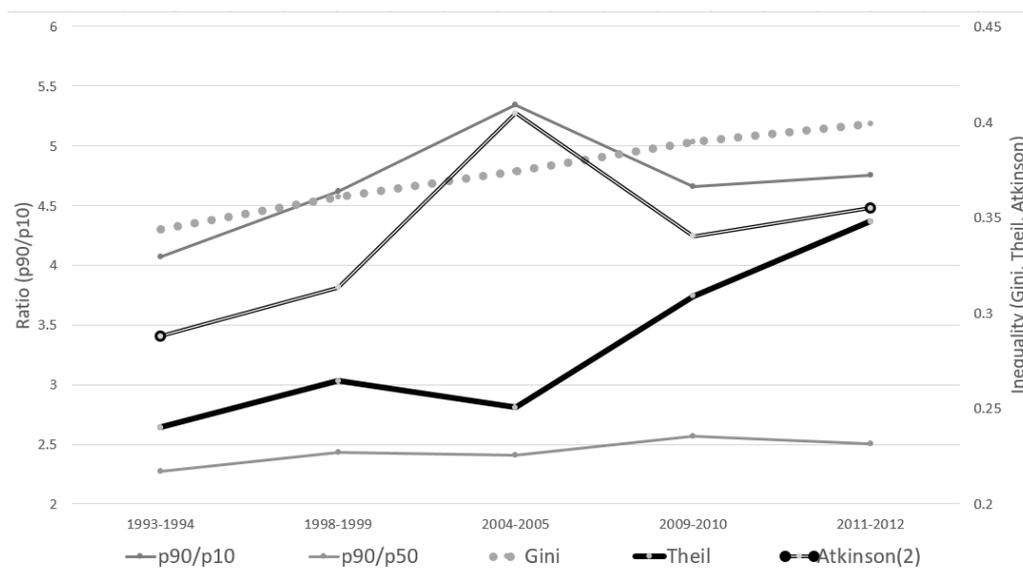


Figure 2: Inequality in Consumption Expenditure

Caste, *Scheduled Tribe*, *Other Backward Caste*, and *Muslim* is low (Theil Index between 0.20 and 0.25); and inequality within the groups *Upper Caste Hindus* and *Christians* is high (Theil Index 0.37 and 0.50, respectively). Figure 3 shows that the aggregate inequality between groups has increased. As explained earlier, the measure does not provide any information on the ranking of groups, the distribution of inequality between the groups, the relative performance of each group.

Figures 4a and 4b use Odds Ratios to measure persistence of inequality in consumption and in educational attainment. Figure 4a shows the odds that a member of the *Scheduled Caste* is in the top $1/6^{\text{th}}$ in terms of consumption has increased from 0.5 to 0.8; the corresponding odds for *Upper Caste Hindus* has decreased from 1.7 to 1.3. Overall, the odds have improved for historically poor and oppressed groups, and the odds have reduced for historically dominant groups. This demonstrates some improvement in social equity. However, in spite of the progress, inequalities persist and are significant. Figure 4b measures persistence in terms of educational attainment. On educational attainment, there has been very little progress. The odds that women complete higher secondary education has improved from 0.45 to 0.6. While the improvement in odds is significant, that the odds is still 0.6 shows large gender inequality in educational outcomes. Furthermore, the odds that members of the *Scheduled Caste*, *Scheduled Tribe*, and *Muslims*

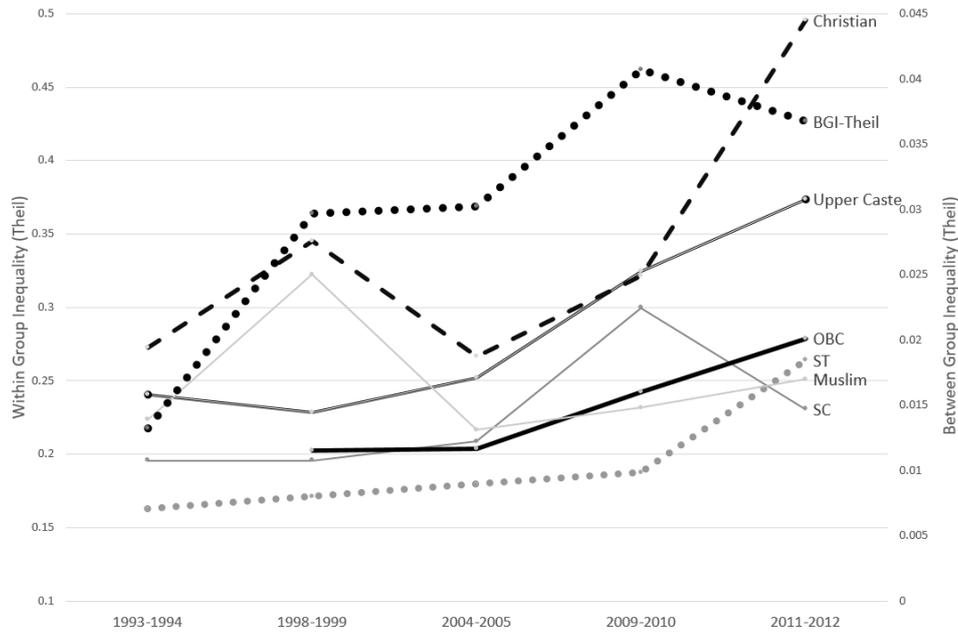


Figure 3: Within- and Between-Group Inequality in Consumption Expenditure

Notes: BGI-Theil measures inequality between the groups *Scheduled Caste*, *Scheduled Tribe*, *Upper Caste Hindus*, *Other Backward Caste*, *Muslim*, and *Christians*.

complete higher secondary education is still very low. For example, in 1993, the odds that a member of the *Scheduled Caste*, *Scheduled Tribe*, and *Muslims* completed higher secondary education was 0.28, 0.28, and 0.39, respectively. In 2012, the odds for members of the *Scheduled Caste*, *Scheduled Tribe*, and *Muslims* improved to 0.36, 0.43, and 0.44, respectively. In the same period, the odds that an *Upper Caste Hindu* completes higher secondary education improved from 2.75 to 2.87. Likewise the odds for *Christians* improved from 1.69 to 1.87. This implies that while members of the deprived groups are relatively better off than they were in 1993, the gap between the deprived and the privileged groups remains significantly large.

Overall, Section 3.3 shows that material opportunities and living circumstances vary by caste and by religion; and Section 3.4 shows that these inequalities have persisted over the last two decades. In the next section, this paper tests if members of deprived groups have lower access to government provided goods and services. In doing so, it seeks to establish a link between the persistence of inequalities between caste and religion-based groups and inequality in access to government provided goods and services.

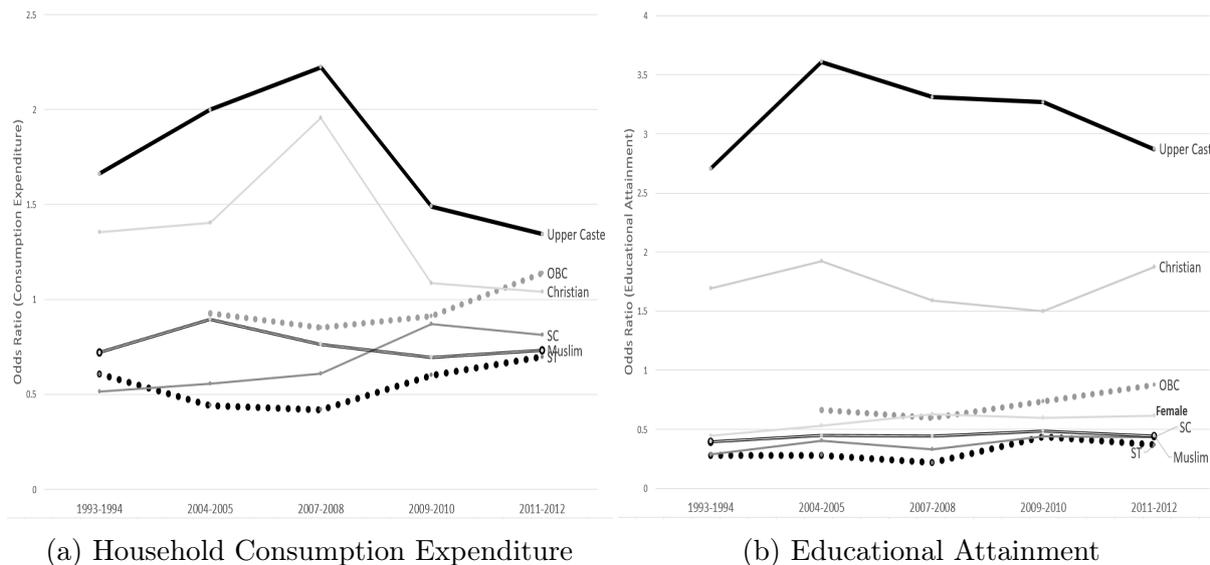


Figure 4: Persistence of Inequality Using Odds Ratios

Notes: Housing Consumption Expenditure measures the odds of having a consumption equal to the top 16 percentile. Educational Attainment measures the odds of having studied beyond 12th Grade.

4 Measuring Inequality in Access to Government Provided Goods and Services

4.1 The India State Survey

This paper uses data from a new module of questions – *Measuring User Experience with Service Delivery* – added to the “Gallup 2016 India State Survey.”¹³ Among others, the survey measures access to government provided goods and services. The survey – conducted by Gallup, Inc. on behalf of the World Bank – provides the first detailed portrait of service delivery at the local level in India. The indicators are based on survey responses for a sample of 14,000 adults in 14 Indian states: Andhra Pradesh (including Telangana), Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Uttar Pradesh, and West Bengal. Although the survey is not nationally representative, it is representative for these states, which make up about 80 percent of the country’s population according to the latest government census conducted in 2011. Gallup conducted the survey between January-March of 2016. In addition to a wide range of questions regarding demographic, employment, and income characteristics, it included a specific module to estimate access to government provided goods and services.

¹³See Demircuc-Kunt *et al.*, 2017 for a detailed description of the *India State Survey*.

This paper includes the following goods and services provided by the government:

- 1) Government run or government aided schools.
- 2) Government run hospitals, clinics, and health services.
- 3) Registration of land/property.
- 4) Issuance of driver's licenses.
- 5) Access to utilities such as electricity, gas and water.
- 6) Issuance of Identity cards: 6A) Voter ID cards; 6B) Aadhaar biometric cards.

Except for identity cards, which are issued by the federal government, all others goods and services are delivered by the state government.

4.2 Measuring Access—What is meant by ‘Access’

This paper uses a binary variable, ‘Access’, to indicate the ability (Access=1) or the inability (Access=0) to obtain government provided goods or services. ‘Access=1’ is relatively easy to observe – those who applied for and obtained a government provided good or a service, had access. However, the lack of access ‘Access=0’, is difficult to estimate. This group should:

- 1) Include those who applied and did not obtain the service;
- 2) Include those who did not apply but would have applied if they had the necessary know-how and resources needed to make an application;
- 3) Exclude those who did not apply because they did not need the government provided good or service.

Among the three groups, the first, those who applied but were denied the service or good, can be observed. The second and the third types are difficult to identify. To disentangle those who do not apply because they are priced out from those who do not apply because they do not need the good or the service, we need to identify ‘Need’: Where ‘Need=1’ implies that the respondent needs a good or a services, while ‘Need=0’ implies that the respondent did not need a good or a service. With Access and Need, we have the following three scenarios:

1. Access=1, Need=1: Those who needed a good or a service, applied for the good or the service, and obtained the good or service. This group has access.
2. Access=0, Need=1: Those who needed a good or a service, applied for the good or the service, and did not obtain the good or service. This group does not have access.

3. Need=0: Those who did not need a good or a service and therefore did not apply for the good or the service. This group is excluded from the analysis.

Based on the criterion set above, we have three different ways of estimating Need=1.

4.2.1 Type I (Self-reported Needs)

Under Type I, Need=0, when respondents say so. For example, all those who did not apply for a driving license were asked if they did not apply because they did not need a driver's license. To this question, those who replied Yes – meaning they did not apply for a driver's license because they did not need a driver's license – were coded as “Did Not Need and Did Not Apply for a Driving License.” Self-reported needs may bias downwards the estimate of those who need but did not apply. This is because this includes respondents who have been priced out from applying. Type I, therefore suffers from a Type 1 selection error, wherein it excludes some respondents who needed a public good or a service but did not apply.

4.2.2 Type II (Controlling for Lack of Affordability, Know-how, or Documents)

Under Type II, Need=0, when: 1) respondents say so; 2) and when they do not cite lack of affordability, know-how, or documents as an impediment to applying for a government delivered good or service.

Often, one's self-perceived needs or demands are adjusted by one's affordability. For example, one may report that they do not need a service, such as piped gas, because they cannot afford the cost of application or because they cannot afford the service. To identify such instances, the survey asked the following three questions to those who did not apply for a good or a service: 1) You did not apply because you could not afford to apply?; 2) You did not apply because you did not have the necessary documents?; 3) You did not apply because you did not know how to apply? Figure 5 outlines how often respondents report they did not ‘need’ a public good or a service because of lack of affordability, know-how, or documents. Of the three, affordability is the biggest barrier. 33% of those who did not apply for a driver's license also reported that they could not

afford the cost of application. Likewise, among those who did not apply for access to public utilities, 25% also reported that could not afford to apply; the corresponding estimate for public schools and healthcare is 20%. Some services are paid — such as electricity, gas, or water — while some are supposed to be free, such as government-provided health care or government run public schools.¹⁴ However, even when there are no usage fees, a high application cost may deter the very poor from applying. Lack of affordability may result from the direct financial burden of applying — such as application fees, travel costs, and processing fees — and/or from indirect costs, including a loss of wages caused by multiple trips to government offices. Other non-monetary barriers can also restrict access to government provided goods and services. For example, if the application process requires too many documents or too many trips to a government office, it imposes non-monetary barriers. These barriers disproportionately affect women, the poor and uneducated citizens (Demirguc-Kunt *et al.*, 2017.) One out of every five respondents who did not apply for access to healthcare also reported that they did not know how to apply.

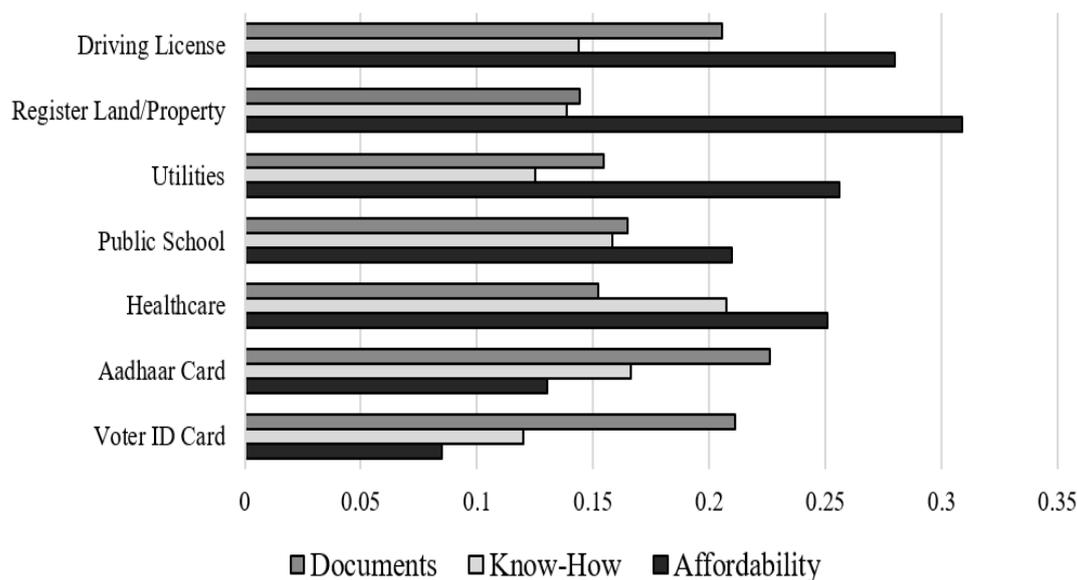


Figure 5: Barriers to Access

Percentage of respondents that “Needed and Did Not Apply” for a Government provided good or service.

¹⁴Paul *et al.*, 2004 (2004, p. 925): “Healthcare facilities provided by the government are expected to cater to the needs of the poor and underprivileged by being free or subsidized. Around 40 percent of inpatients and 18 percent of outpatients paid a fee for the healthcare service. About 16 percent of inpatients reported payment of bribes.”

Type II applies a more stringent criteria as compared to Type I. Compared to Type I, Type II is likely to suffer from a Type 2 selection error: wherein some respondents who did not need a public good or a service are also included in the analysis. Figure 7 provides a break-up of respondents classified under the three buckets. For example, 52 percent of the respondents reported they needed but could not apply for a driver's license; 21 percent reported they needed and applied for a license; and 27 percent reported they did not need a license. "Access" is measured as: among those who needed a government provided good or a service, the percentage who could apply for the good or service. Thus, access to a driver's license is: among those who needed a license, $(52+21=73)$, the percentage that could apply for a license $(21/73 = 29 \text{ percent.})$ ¹⁵

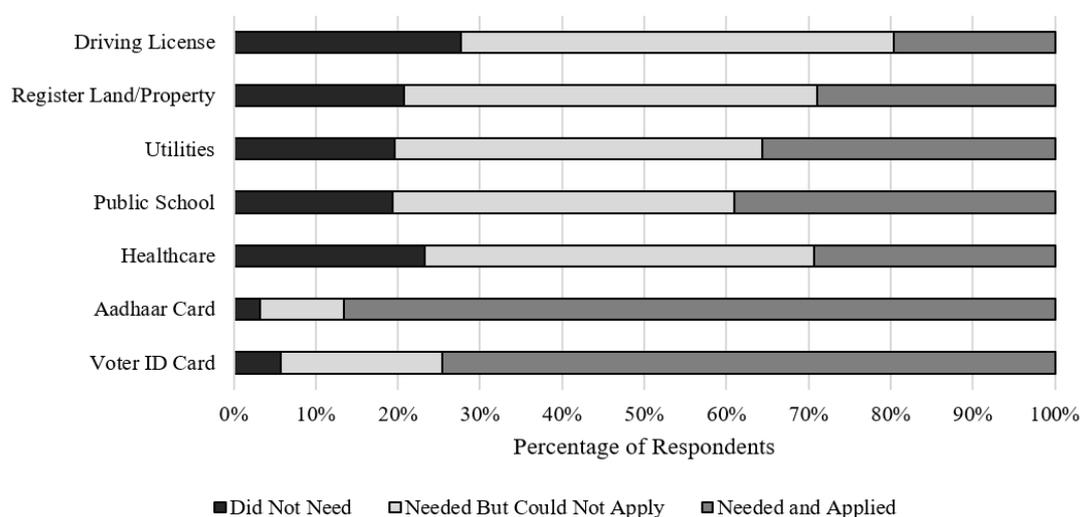


Figure 6: Percentage of Respondents Who Needed and Applied for a Good or Service

Notes: Percentage of All Adults. Type II

4.2.3 Type III: Estimated Needs (For Access to Public Schools Only)

Types I and II use self-reported needs to estimate the residual category, Need=0. The argument in favor of using self-reported needs is that to draw inferences based on actual user experience, the respondent should have applied to a government provided good or service. If the respondent did not apply for a public good or a service, then one cannot

¹⁵These measures of access are consistent with Paul *et al.*, 2004' finding that, in India: 55% had access to piped water supply; 40% had access to government healthcare; 50% had access to public transport (government bus); 72% had access to the Public Distribution System; and 59% had access to public schools (access to public schools in urban areas was estimated to be 42%).

ascertain access or the lack thereof. Furthermore, if the respondent did apply for a good or a service, and was not able to obtain the good or service: then it is more likely that unequal access was not driven by lack of ‘effort’ from the applicant. However, the argument against using self-reported needs is that they differ from actual needs. For example, an illiterate subsistence farmer with little knowledge of the labor market may not prioritize education. As a result, he or she may not apply for access to a public schools. The lack of an application cannot be construed as lack of need for public schools. Also, information asymmetries, may result in an inability to accurately articulate needs.¹⁶

Under Type III, Need is estimated on the basis of demographic information. Need=1, if the respondent had kids below the age of 18. Need=0, if the respondent did not have kids below the age of 18. However, this criterion is applied only for access to public schools. The underlying rationale is that anybody who has children below the age of 18 has an intrinsic need for access to schools.

4.3 Research Design

The paper uses a multi-level logit model to estimate group based inequality in access. The following specification is used;

$$\begin{aligned}
 Access_{i,s} = & \beta_0 + \beta_1(\text{Individual-Level Gender})_{i,s} \\
 & + \beta_2(\text{Individual-Level Caste-Category})_{i,s} \\
 & + \beta_3(\text{Individual-Level Religion})_{i,s} \\
 & + \beta'_4(\text{Controls})_{i,s} + \beta_5(\text{State-Level Controls})_s \\
 & + \mu_s + \epsilon_{i,s}
 \end{aligned} \tag{4}$$

where, $Access_{i,s}$ measures access to public goods and services for individual ‘i’ in state ‘s’. The term μ_s in equation 4 is the random intercept. It is used to shift the intercept for each state and capture state level effects.

¹⁶For example, while examining the state of public health services in rural Rajasthan, Banerjee *et al.* (2004, p. 330) noted that villagers’ health is poor, the quality of public service is abysmal, and private players are unregulated and for the most part unqualified to provide the bulk of health care and yet villagers self-reported satisfaction with the state of both their health and the health care facilities. That the villagers did not demand better public health services does not imply that they do not need access to better health services.

Except for identity cards (Aadhaar and Voter ID), all other goods and services included in the survey are delivered by the state government. States vary significantly in their capacity to deliver goods and services (Demirguc-Kunt *et al.*, 2017.) Within a state, variance in capacity to deliver different types of goods and services is lower than inter-state variation in capacity to deliver goods and services. High inter-state variation coupled with relatively low intra-state variation necessitates the use of a mixed effects model.¹⁷ Instead of one general random-effect that captures how each observation deviates from the predicted fixed-effects, the mixed effects model generates multiple random-effects that capture how observations deviate within a state, and how each state deviates from the overall group. Thus, with a mixed effects model, the exact intercept and the slope describing the relation between identity and access will differ between Kerala (a state with high capacity to deliver public goods and services) and Bihar (a relatively poor state with low capacity to deliver public goods.) For each model, the Interclass Correlation (ICC) is reported. ICC gives information on correlation of observations within a state. If ICC approaches 0 then there is no variance to explain at the state-level, if the ICC approaches 1 then there is no variance to explain at the individual level.

4.4 Results

Table 3 shows that access to public schools and healthcare is lower for members of the *Scheduled Caste*, *Scheduled Tribe*, and *Muslims*. Also, across all specifications, the coefficient for the indicator variable, *Woman*, is negative and statistically significant at the 99% confidence level. In terms of Odds Ratios, Column 3 of Table 3 can be so interpreted: Factors associated with having lower access to public schools include 1) being a member of the *Scheduled Tribe* (OR=0.70, 99% CI: 0.58, 0.82); 2) or, being a member of the *Scheduled Caste* (OR=0.76, 99% CI: 0.68, 0.85); 3) or, being a *Muslim* (OR=0.79, 99% CI: 0.68, 0.90) with the base residual population consisting of *Upper Caste Hindus*

¹⁷Peng and Lu (2012) apply a mixed model to the 2000 American National Election Study to study the factors that an individual's feeling towards George W Bush. One of the reasons they nest individuals within states is because in the U.S., attitudes towards political leaders or parties tend to be mediated by social and cultural contexts at the state level. For additional examples see: O'Rourke and Sinnott, 2006; Andersen and Fetner, 2008; Anderson and Singer, 2008; Weldon, 2006; Arzheimer, 2009; Hooghe *et al.*, 2009; Kedar and Shively, 2017; Peng and Lu, 2012

and members of the *Other Backward Caste*.¹⁸ Irrespective of caste or religion, a woman has lower access to public schools (OR=0.61, 99% CI: 0.56, 0.66). See Appendix A and B for replication of Table 3 with OLS State Fixed Effects and OLS Clustered Errors.

The coefficients are consistently negative and statistically significant for the *Scheduled Caste*. In contrast, for *Scheduled Tribe* and *Muslims*, the coefficients are negative but not statistically significant in 2 of the 5 models. A possible explanation could be that: 1) While the SCs constitute 19.5% of the Indian population, STs and Muslims constitute 8.7% and 14.2% of the population, respectively. 2) The SCs account for more than 15% of the population in the states of Punjab, Rajasthan, Uttar Pradesh, West Bengal, Odisha, Andhra Pradesh, and Kerala, and more than 10% of the population in the state of Madhya Pradesh, Maharashtra, Bihar, and Jharkhand. Together, these states account for more than 75% of the Indian population (all of these states were a part of the ‘India State Survey’.) In contrast, the STs are geographically concentrated. They account for more than 75% of the population in the states of Mizoram, Manipur, Meghalaya, Nagaland, Arunachal Pradesh. But together these states account for less than 5% of the population (none of these states were a part of the survey.) Outside of the seven sparsely populated northeastern states of India, the ST population is largely concentrated in rural areas of two backward states, Jharkhand and Chattisgarh. Likewise, Muslims are also geographically concentrated. About 47% of all Muslims live in Uttar Pradesh, West Bengal, and Bihar. This may cause the results for STs and Muslims to be biased downwards. Appendix C includes a specification where state fixed effects are excluded. Appendix C shows that the coefficient for Muslims and STs are negative and statistically significant. Furthermore, the coefficient for Christians is positive and statistically significant.

Table 4 examines inequality in access to goods and services other than education and healthcare. While education and healthcare are more closely related to the availability of material opportunities, other goods and services may influence quality of life, living circumstances, or opportunities. Furthermore, in case of schools or healthcare, private alternatives are available. In contrast, only the government can issue a driving license,

¹⁸Table 3 displays β coefficients. The β coefficients have been converted to Odds Ratio to compare with base categories.

Table 3: Regression Results for Access to Public Schools and Healthcare

	(1)	(2)	(3)	(4)	(5)
	Public Schools			Healthcare	
	Type 1	Type 2	Type 3	Type 1	Type 2
Scheduled Tribe	-0.161*	-0.116	-0.363***	0.019	0.103
	(0.083)	(0.078)	(0.088)	(0.084)	(0.080)
Scheduled Caste	-0.311***	-0.199***	-0.272***	-0.208***	-0.106**
	(0.053)	(0.050)	(0.057)	(0.056)	(0.054)
Muslim	-0.023	-0.052	-0.240***	-0.148**	-0.119*
	(0.068)	(0.064)	(0.072)	(0.073)	(0.071)
Christian	-0.013	-0.140	0.320	0.219	0.161
	(0.176)	(0.161)	(0.240)	(0.174)	(0.165)
Woman	-0.406***	-0.340***	-0.488***	-0.211***	-0.186***
	(0.040)	(0.037)	(0.043)	(0.042)	(0.040)
Income (In SD)	0.004	0.013	0.040**	0.043**	0.025
	(0.016)	(0.015)	(0.019)	(0.018)	(0.016)
Rural	-0.035	-0.074*	-0.152***	0.090*	0.056
	(0.046)	(0.043)	(0.050)	(0.049)	(0.046)
Illiterate	0.080*	0.062	0.044	0.221***	0.184***
	(0.045)	(0.042)	(0.048)	(0.048)	(0.046)
Log (State GDP)	-0.006	-0.110	-0.224	-0.217	-0.297
	(0.158)	(0.133)	(0.190)	(0.267)	(0.296)
% Below Poverty Line	-0.026**	-0.023**	-0.025*	-0.015	-0.016
	(0.011)	(0.009)	(0.013)	(0.019)	(0.021)
Infant Mortality Rate	0.006	0.001	-0.007	0.008	0.006
	(0.010)	(0.009)	(0.012)	(0.017)	(0.019)
SD (State)	0.40	0.34	0.48	0.68	0.76
ICC (CI)	(0.02,0.09)	(0.02,0.07)	(0.03,0.13)	(0.06,0.23)	(0.08,0.27)
χ^2 Test	345.43	270	440.40	1007.48	1380.94
H ₀ : Random Effects=0	0	0	0	0	0
N	11230	12901	9763	10,831	13,229

Notes: The base category for 'Caste or Religion' are the remaining population which consists of *Upper Caste Hindus, Other Backward Caste*, and other minority religions. For *Women* the base category is *Men*. For *Rural* the base category is *Urban* or *Semi-urban*. For *Illiterate* the base category is *Literate*.

* p<0.1, ** p<0.05, *** p<0.01

register land or property, issue a Voter ID or an Aadhaar card. In most of India, government or government agencies are also monopoly providers of water and electricity.

Access is consistently low for members of the *Scheduled Caste*, *Scheduled Tribe*, and women. The odds that a member of the *Scheduled Caste* had access to Voter ID Cards equals 0.69 (99% CI: 0.58, 0.83); Driving License equals 0.65 (99% CI: 0.57, 0.75); Registration of Land or Property equals 0.82 (99% CI: 0.70, 0.95); and Public Utilities equals

Table 4: Regression Results for Access to Other Government Provided Goods and Services (Type 1)

	(1) Voter-ID Card	(2) Aadhaar Card	(3) Driving License	(4) Register Land	(5) Public Utilities
Scheduled Tribe	-0.368*** (0.090)	-0.401*** (0.116)	-0.518*** (0.117)	-0.325*** (0.095)	-0.320*** (0.090)
Scheduled Caste	-0.256*** (0.058)	0.054 (0.079)	-0.427*** (0.069)	-0.385*** (0.058)	-0.352*** (0.057)
Muslim	0.018* (0.076)	0.175* (0.092)	0.237*** (0.087)	-0.200*** (0.078)	-0.109 (0.074)
Christian	-0.665*** (0.187)	-0.782*** (0.213)	0.395** (0.200)	-0.467** (0.194)	-0.062 (0.190)
Woman	-0.261*** (0.045)	-0.287*** (0.059)	-1.311*** (0.053)	-0.939*** (0.045)	-0.875*** (0.044)
Income (In SD)	0.021 (0.019)	0.043 (0.027)	0.068*** (0.019)	0.059*** (0.018)	0.017 (0.017)
Rural	-0.095* (0.053)	0.013 (0.068)	-0.519*** (0.056)	0.099** (0.051)	-0.426*** (0.049)
Illiterate	0.229*** (0.052)	-0.222*** (0.066)	-0.428*** (0.063)	0.346*** (0.050)	0.080 (0.050)
Log (State GDP)	0.050 (0.288)	-0.176 (0.427)	-0.366 (0.371)	-0.314 (0.262)	-0.343 (0.284)
% Below Poverty Line	-0.036* (0.020)	-0.040 (0.030)	-0.024 (0.026)	-0.019 (0.018)	-0.032 (0.020)
Infant Mortality Rate	0.020* (0.019)	0.047* (0.028)	-0.006 (0.024)	-0.016 (0.017)	-0.015 (0.018)
SD (State)	0.73	1.18	0.95	0.67	0.72
ICC (CI)	(0.07,0.25)	(0.14,0.43)	(0.11,0.37)	(0.06,0.22)	(0.07,0.25)
χ^2 Test	1049.84	1480.46	1001.21	818.56	1056.21
H ₀ : Random Effects=0	0	0	0	0	0
N	12973.27	13408.8	10214.99	11100.8	11231.57

Notes: The base category for 'Caste or Religion' are the remaining population which consists of *Upper Caste Hindus, Other Backward Caste*, and other minority religions. For *Women* the base category is *Men*. For *Rural* the base category is *Urban* or *Semi-urban*. For *Illiterate* the base category is *Literate*. * p<0.1, ** p<0.05, *** p<0.01

0.70 (99% CI: 0.61, 0.87).¹⁹ Likewise, the odds that a woman had access to Voter ID Cards equals 0.77 (99% CI: 0.70, 0.84); Aadhaar Card equals 0.75 (99% CI: 0.67, 0.84); Driving License equals 0.27 (99% CI: 0.24, 0.30); Registration of Land or Property equals 0.39 (99% CI: 0.36, 0.43); Public Utilities equals 0.42 (99% CI: 0.38, 0.45).

The results also indicate a drawback of measuring delivery of goods and services in terms of coverage. The population-coverage of Aadhaar Card and Voter-ID is high in

¹⁹The base population consists mainly of members of the *Upper Caste* and *Other Backward Caste*.

India. As of 2016, more than 92 percent of adults in India had an Aadhaar card.²⁰ Among the survey respondents, about 87 percent of respondents were able to apply for an Aadhaar card and 75 percent were able to apply for a voter ID card. In measuring access in terms of coverage one misses the population characteristics of those excluded. While less than 15% reported not having access to Aadhaar card; Women and members of the *Scheduled Caste*, and *Scheduled Tribe* constituted the majority among those who did not have access. In developed countries, such as the U.S., where literacy often reaches saturation levels, unequal access to schools is still relevant because minority groups tend to be overrepresented among those with limited access to schools or those with limited access to quality schools (Hero, 1998.) If the target is to merely improve coverage, one could increase number of public schools. However, if the target is to reduce inequality in educational attainment, a targeted policy towards inclusion of girl students and students from deprived castes and religion may be required.

Another important distinction between Tables 3 and 4 is the difference in the importance of individual income. Income is normalized with mean equal to zero and standard deviation equal to one for each state. Each individual's income is then measured in terms of standard deviations from the mean state income. When there is a private alternative, low income is not an impediment to access to public goods and services (Figure 7.) For example, from the mean value of access to public schools, a one standard deviation increase in income results in 0.5% to 1% increase in access—the increase is statistically not significant. However, in the absence of private alternatives, low income is an impediment to access: From the mean value of access to driving license, a one standard deviation increase in income results 2.5% to 4% increase in access. This does not, however, imply that the poor can afford private alternatives. Instead it implies that when the rich do not have private alternatives, they crowd-out the poor. As a result, in addition to identity and gender, income also becomes a determinant of access.

²⁰The Times of India. 2016. "92% of India's Adult Population Has Aadhaar Card - Times of India."

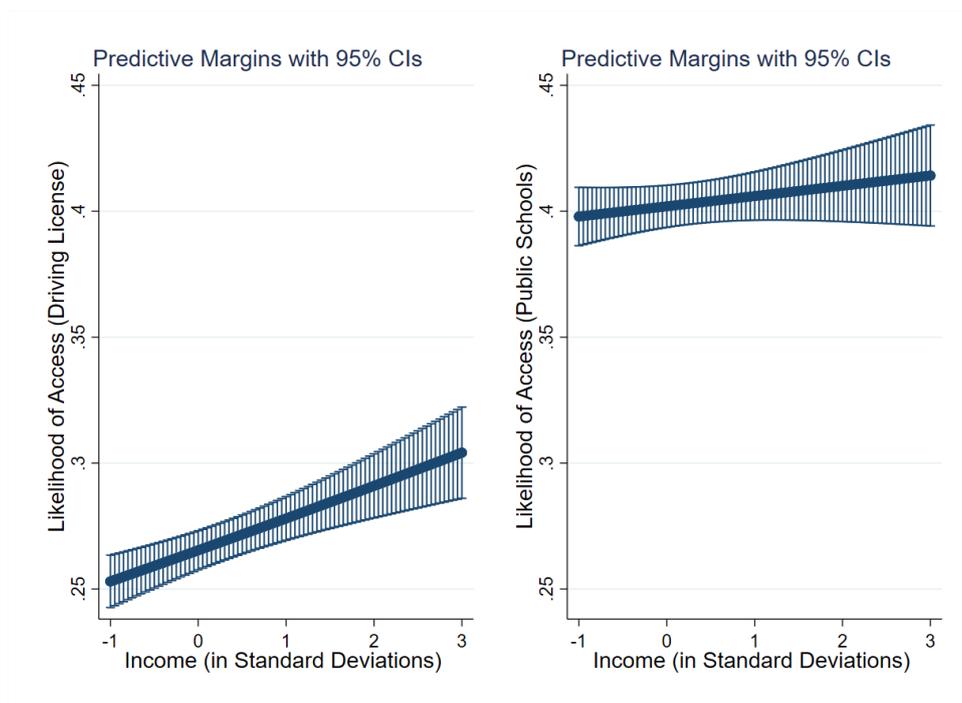


Figure 7: Income and Likelihood of Access

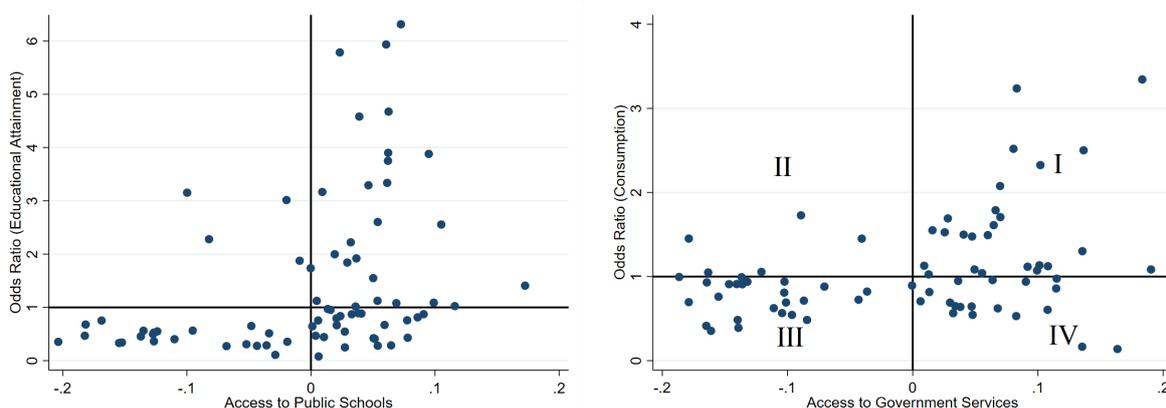
Notes: Likelihood is measured in percentage. Income is measured in terms of standard deviations from the mean state-level income.

5 Discussion

Among others, Section 3 shows that members of the *Scheduled Caste* are less likely to complete higher secondary education; and Section 4 shows that members of the *Scheduled Caste* are less likely to be able to access public schools. But are the two causally linked? The next step would be to probe if inequality in access to public schools leads to unequal outcomes in educational attainment. This paper does not test or enunciate the causal mechanisms linking unequal access to unequal outcomes. However, this section does demonstrate a strong correlation between the two. It does so using Figure 8.

Figure 8a below plots the odds of completing higher secondary education against access to public schools. Each dot represents a unique combination of an identity group and a state; for example, one of the dots represents *Scheduled Caste* in the state of Maharashtra. On the vertical axis, if Odds Ratio > 1 , then it implies that compared to the rest of the population in Maharashtra, the *Scheduled Caste* are more likely complete higher secondary school; alternately, if Odds Ratio < 1 , then it implies that compared to the rest of the population in Maharashtra, the *Scheduled Caste* are less likely complete

higher secondary school. On the horizontal axis, if $Access = +0.1$, it implies that compared to the rest of the population in Maharashtra, the *Scheduled Caste* are 10 percentage points more likely to have access to public schools; alternately, if $Access = -0.1$, it implies that compared to the rest of the population in Maharashtra, the *Scheduled Caste* are 10 percentage points less likely to have access to public schools.



(a) Public Schools & Educational Attainment (b) All Public Goods and Services & Consumption

Figure 8: Correlation Between Unequal Outcomes and Unequal Access

Notes: Each dot represents a unique combination of an identity group and a state. The figure has the following identity groups: Scheduled Caste, Scheduled Tribe, Other Backward Caste, Upper Caste, Christian, and Muslim. The vertical axis shows Odds Ratios, measuring the likelihood that consumption is 1 SD greater than the mean consumption. Access is measured by each group and state. For example, $Access = 0.1$ for Scheduled Caste in Maharashtra implies that compared to the rest of the population in Maharashtra, the Scheduled Caste are 10 percentage point more likely to have access to government provided goods and services.

The graph area in Figure 8a and 8b can be divided into four quadrants. In Figure 8a, Quadrant I stands for high access to public schools and high educational attainment; while Quadrant III implies less access to public schools and low educational attainment. Had all observations been in Quadrants I and III, then for the sample population, one could have suggested that access to public schools is a *necessary and sufficient* condition for high educational attainment.²¹ However, Figure 8a also includes many observations in Quadrant IV which implies high access to public schools and low educational attainment. Furthermore, there are very few observations in Quadrant II, which implies low access to public schools yet high educational attainment. Given that most of the observations fall in Quadrants I, III, and IV, there is evidence to support the claim that for the

²¹The causality is unlikely to run in the opposite direction. ‘Access to Public Schools’ \Rightarrow ‘High Educational Attainment’ is plausible. ‘High Educational Attainment’ \Rightarrow ‘Access to Public Schools’ is not plausible

sample population, access to public schools is a *sufficient* condition for high educational attainment. In other words, to observe ‘high educational attainment’ in the sample population, one has to observe ‘high access to public schools’; but ‘high access to public schools’ may not always lead to ‘high educational attainment.’ Likewise, Figure 8b shows that access to government provided goods and services is a *sufficient* condition for high consumption expenditure.

6 Conclusion

Investments in universal education and public infrastructure should ideally reduce inequality and improve social mobility. However, delivery of services such as education is seldom perfect. Weaknesses in delivery systems can reproduce and reinforce (and sometimes even exacerbate) unequal economic and social structures. This paper uses caste and religion based inequality in India to illustrate one such instance where goods and services that ordinarily level the playing field, due to weaknesses in service delivery, end up reinforcing socio-economic inequality.

Theoretically, the results support targeted provision of goods and services. The paper shows that the ‘equal opportunity’ maxim, wherein governments provide goods and services agnostic of caste, gender, or religion, only reproduces the incumbent unequal socio-economic structure. Conceptually, the paper distinguishes between two ways of measuring group-based inequality: 1) The Theil Index which measures average inequality between groups; 2) And the Odds Ratios which measure relative performance of individual groups. It shows that the latter is more pertinent to a discussion on unequal economic and social structures. Empirically, the paper has two contributions: 1) It uses the National Sample Survey from 1993 to 2012 to measure inequality between caste and religion-based groups. It shows that inequality is multi-dimensional and persistent. 2) It uses new survey data to measure inequality in access to government provided goods and services in India. The results also open some new avenues for research. For example, the paper does not test the micro-causal mechanisms that could link unequal access to horizontal inequality. Hence, one avenue for future research is to conduct further qual-

itative and quantitative studies that hone in on how exactly unequal access reproduces unequal social and economic structures. Additionally, to determine the portability of the findings, it would be desirable to conduct similar tests in different countries where social or economic rank is not defined by historically existing caste differences.

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A Replicating Table 3 with OLS State Fixed Effects

	(1)	(2)	(3)	(4)	(5)
	Public Schools			Healthcare	
	Type 1	Type 2	Type 3	Type 1	Type 2
Scheduled Tribe	-0.156 (0.082)	-0.122 (0.077)	-0.360*** (0.087)	0.022 (0.083)	0.099 (0.079)
Scheduled Caste	-0.300*** (0.053)	-0.187*** (0.050)	-0.268*** (0.057)	-0.204*** (0.055)	-0.095 (0.054)
Muslim	-0.025 (0.067)	-0.065 (0.063)	-0.270*** (0.071)	-0.127 (0.073)	-0.105 (0.070)
Christian	0.031 (0.176)	-0.114 (0.160)	0.205 (0.229)	0.193 (0.173)	0.143 (0.164)
Woman	-0.405*** (0.039)	-0.345*** (0.037)	-0.490*** (0.043)	-0.212*** (0.042)	-0.187*** (0.040)
Income (In SD)	0.010 (0.016)	0.018 (0.015)	0.047* (0.020)	0.054** (0.018)	0.031 (0.016)
Rural	-0.027 (0.045)	-0.068 (0.042)	-0.140** (0.050)	0.099* (0.049)	0.051 (0.046)
Illiterate	0.085 (0.045)	0.069 (0.042)	0.032 (0.048)	0.219*** (0.048)	0.184*** (0.045)
Log (State GDP)	-1.511*** (0.174)	-1.402*** (0.162)	-1.696*** (0.174)	-2.058*** (0.184)	-1.886*** (0.176)
% Below Poverty Line	0.040*** (0.012)	0.050*** (0.011)	0.022 (0.012)	0.056*** (0.013)	0.101*** (0.012)
Infant Mortality Rate	0.033*** (0.005)	0.027*** (0.005)	0.021*** (0.005)	0.047*** (0.005)	0.053*** (0.005)
Constant	39.299*** (4.442)	36.184*** (4.147)	45.299*** (4.439)	52.191*** (4.713)	46.356*** (4.513)
Fixed Effects	State	State	State	State	State
N	11421	13110	9932	11017	13444

Notes: The base category for ‘Caste or Religion’ are the remaining population which consists of *Upper Caste Hindus, Other Backward Caste*, and other minority religions. For *Women* the base category is *Men*. For *Rural* the base category is *Urban* or *Semi-urban*. For *Illiterate* the base category is *Literate*. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

B Replicating Table 3 with OLS Clustered Robust Standard Errors

	(1)	(2)	(3)	(4)	(5)
	Public Schools			Healthcare	
	Type 1	Type 2	Type 3	Type 1	Type 2
Scheduled Tribe	-0.061 (0.231)	-0.035 (0.221)	-0.166 (0.209)	0.193 (0.174)	0.370** (0.184)
Scheduled Caste	-0.254** (0.128)	-0.145 (0.108)	-0.240** (0.117)	-0.246** (0.116)	-0.039 (0.131)
Muslim	-0.062 (0.215)	-0.020 (0.183)	-0.330 (0.186)	-0.321*** (0.087)	-0.185 (0.124)
Christian	0.259 (0.414)	0.122 (0.276)	0.539 (0.336)	0.589** (0.272)	0.703*** (0.243)
Woman	-0.379*** (0.137)	-0.328** (0.129)	-0.448*** (0.149)	-0.191** (0.093)	-0.157 (0.093)
Income (In SD)	-0.008 (0.022)	0.005 (0.018)	0.022 (0.029)	0.042 (0.034)	0.019 (0.032)
Rural	-0.112 (0.132)	-0.121 (0.114)	-0.230** (0.103)	-0.040 (0.118)	-0.081 (0.122)
Illiterate	0.060 (0.152)	0.054 (0.134)	-0.014 (0.153)	0.227 (0.179)	0.171 (0.169)
Log (State GDP)	0.025 (0.136)	-0.078 (0.123)	-0.211 (0.180)	-0.129 (0.233)	-0.226 (0.214)
% Below Poverty Line	-0.025*** (0.009)	-0.021** (0.008)	-0.025** (0.012)	-0.011 (0.018)	-0.012 (0.020)
Infant Mortality Rate	0.006 (0.010)	0.002 (0.009)	-0.005 (0.011)	0.012 (0.016)	0.010 (0.017)
Constant	-0.227 (3.655)	2.319 (3.323)	6.956 (4.833)	2.841 (6.383)	5.175 (5.860)
N	11421	13110	9932	11017	13444

Notes: The base category for 'Caste or Religion' are the remaining population which consists of *Upper Caste Hindus, Other Backward Caste*, and other minority religions. For *Women* the base category is *Men*. For *Rural* the base category is *Urban* or *Semi-urban*. For *Illiterate* the base category is *Literate*. * p<0.1, ** p<0.05, *** p<0.01

C Replicating Table 3 with No State Fixed Effects

	(1)	(2)	(3)	(4)	(5)
	Public Schools			Healthcare	
	Type 1	Type 2	Type 3	Type 1	Type 2
Scheduled Tribe	-0.061 (0.079)	-0.035 (0.075)	-0.166** (0.083)	0.193** (0.077)	0.370*** (0.074)
Scheduled Caste	-0.254*** (0.051)	-0.145*** (0.049)	-0.240*** (0.055)	-0.246*** (0.052)	-0.039 (0.050)
Muslim	-0.062 (0.063)	-0.020 (0.059)	-0.330*** (0.065)	-0.321*** (0.067)	-0.185*** (0.064)
Christian	0.259 (0.170)	0.122 (0.154)	0.539** (0.220)	0.589*** (0.164)	0.703*** (0.156)
Woman	-0.379*** (0.039)	-0.328*** (0.036)	-0.448*** (0.042)	-0.191*** (0.040)	-0.157*** (0.038)
Income (In SD)	-0.008 (0.016)	0.005 (0.015)	0.022 (0.018)	0.042** (0.017)	0.019 (0.015)
Rural	-0.112** (0.044)	-0.121*** (0.041)	-0.230*** (0.048)	-0.040 (0.046)	-0.081 (0.043)
Illiterate	0.060 (0.043)	0.054 (0.041)	-0.014 (0.046)	0.227*** (0.045)	0.171*** (0.042)
Log (State GDP)	0.025 (0.028)	-0.078*** (0.026)	-0.211*** (0.031)	-0.129*** (0.029)	-0.226*** (0.027)
% Below Poverty Line	-0.025*** (0.002)	-0.021*** (0.002)	-0.025*** (0.002)	-0.011*** (0.002)	-0.012*** (0.002)
Infant Mortality Rate	0.006*** (0.002)	0.002 (0.002)	-0.005** (0.002)	0.012*** (0.002)	0.010*** (0.002)
Constant	-0.227 (0.759)	2.319*** (0.717)	6.956*** (0.855)	2.841*** (0.777)	5.175*** (0.743)
N	11421	13110	9932	11017	13444

Notes: The base category for 'Caste or Religion' are the remaining population which consists of *Upper Caste Hindus*, *Other Backward Caste*, and other minority religions. For *Women* the base category is *Men*. For *Rural* the base category is *Urban* or *Semi-urban*. For *Illiterate* the base category is *Literate*. * p<0.1, ** p<0.05, *** p<0.01

D For Access to Other Government Provided Goods and Services (Type 2)

	(1)	(2)	(3)	(4)	(5)
	Voter-ID Card	Aadhaar Card	Driving License	Register Land	Public Utilities
Scheduled Tribe	-0.293*** (0.085)	-0.324*** (0.108)	-0.393*** (0.113)	-0.337*** (0.090)	-0.261** (0.086)
Scheduled Caste	-0.180*** (0.055)	0.176** (0.074)	-0.309*** (0.067)	-0.281*** (0.056)	-0.236*** (0.054)
Muslim	-0.037 (0.070)	0.219** (0.085)	0.220*** (0.080)	-0.267*** (0.073)	-0.133* (0.070)
Christian	-0.567*** (0.183)	-0.723*** (0.199)	0.389** (0.182)	-0.373** (0.180)	-0.149 (0.171)
Woman	-0.230*** (0.042)	-0.287*** (0.053)	-1.308*** (0.051)	-0.883*** (0.042)	-0.858*** (0.041)
Income (In SD)	0.032 (0.018)	0.073*** (0.026)	0.088*** (0.017)	0.059*** (0.016)	0.039** (0.016)
Rural	-0.054 (0.048)	-0.026 (0.061)	-0.549*** (0.052)	0.086 (0.048)	-0.452*** (0.046)
Illiterate	0.236*** (0.047)	-0.258*** (0.059)	-0.398*** (0.060)	0.312*** (0.047)	0.057 (0.047)
Log (State GDP)	0.030 (0.287)	-0.341 (0.401)	-0.493 (0.333)	-0.405 (0.232)	-0.435 (0.272)
% Below Poverty Line	-0.026 (0.020)	-0.038 (0.028)	-0.019 (0.023)	-0.013 (0.016)	-0.029 (0.019)
Infant Mortality Rate	0.015 (0.019)	0.045* (0.026)	-0.012 (0.022)	-0.022 (0.015)	-0.021 (0.018)
Constant	0.429 (7.783)	10.473 (10.877)	13.484 (9.027)	11.331 (6.277)	13.146 (7.378)
SD (State)	0.73	1.02	0.85	0.59	0.69
ICC (CI)	(0.07,0.25)	(0.13,0.40)	(0.09,0.32)	(0.05,0.18)	(0.06,0.24)
χ^2 Test	1265.03	1649.18	874.81	696.42	1095.91
H ₀ : Random Effects=0	0	0	0	0	0
N	13711.2	13862.71	13064.67	13238.5	13345.35

Notes: The base category for 'Caste or Religion' are the remaining population which consists of *Upper Caste Hindus, Other Backward Caste*, and other minority religions. For *Women* the base category is *Men*. For *Rural* the base category is *Urban* or *Semi-urban*. For *Illiterate* the base category is *Literate*.

* p<0.1, ** p<0.05, *** p<0.01

E Online Supplementary Reading

E.1 Inequality in Living Conditions

To proxy living conditions, the paper uses three indicators: 1) type of structure for housing; 2) source of energy for lighting; and 3) source of energy for cooking. In India, houses are generally built from bricks or cement.²² In Hindi, the term for a permanent or an all-weather house would be a *Pucca* house; and a mud house or an otherwise weak house would be called a *Kutchra* house. In the survey, the respondents have an option to categorize the structure of their home as *pucca*, *semi-pucca*, *servicable-kutchra*, *kutchra*, or *no-structure*. This section measures and shows the odds that a member of a given group lives in a permanent all-weather house – *pucca* house. Members of the group *Upper Caste Hindus* are 2.75 times more likely than the rest of the population to have a brick all-weather home. In contrast, the odds of living in a *pucca* house is 0.18, 0.60, and 1.03 for members of the *Scheduled Tribe*, *Scheduled Caste*, and *Other Backward Caste*, respectively. By religion, the odds for *Christians* and *Muslims* are 1.33 and 0.90, respectively.

Next, the paper measures the odds that a household uses electricity for lighting. The use of electricity for lighting is meant to proxy access to electricity. The underlying assumption is that if a household has access to electricity then they would use electricity as a source of lighting. Members of the group *Upper Caste Hindus* are 2.90 times more likely than the rest of the population to use electricity for lighting. In contrast, the odds of using electricity for lighting is 0.72, 0.54, and 0.88 for members of the *Scheduled Tribe*, *Scheduled Caste*, and *Other Backward Caste*, respectively. The odds for *Christians* and *Muslims* are 2.40 and 0.76, respectively.

Third, the paper measures the odds of using LPG as a source of fuel for cooking. Use of LPG is meant to proxy access to piped gas or access to gas cylinders.²³ The results for use of LPG follows the exact same trend as use of electricity. However, compared to

²²Wood is generally not used to construct houses in India

²³In the survey, the respondents could indicate the following: Source of Energy for Cooking: Coke, Coal; Firewood and Chips; LPG; Gobar Gas; Dung Cake; Charcoal; Kerosene; Electricity; Others; No Cooking Arrangement. Source of Energy for Lighting: Kerosene; Other Oil; Gas; Candle; Electricity; Others; No Lighting Arrangement.

electricity, the differences are less stark. The members of the group *Upper Caste Hindus* are 1.09 times more likely than the rest of the population to use electricity or LPG for cooking. In contrast, the odds of using electricity or LPG for cooking is 0.92, 0.93, and 0.87 for members of the *Scheduled Tribe*, *Scheduled Caste*, and *Other Backward Caste*, respectively. The odds for *Christians* and *Muslims* are 1.60 and 0.84, respectively.

E.2 Sanitation

To measure health and sanitation related outcomes, the paper uses the NSS-60 survey. The NSS-60 had a special emphasis on health and morbidity. This section measures the odds of having a covered or underground drainage system and the odds of having a toilet with a septic tank and flush system. Both measures are meant to proxy sanitation.

When asked about the drainage system, of the 383,831 responses: 1) 162,555 (42%) said that they did not have a drainage system; 2) 75,005 (19.5%) had a open *kutchra* (meaning not permanent or made of mud) drain; 3) 81,400 (21.2%) had a open but *pucca* (meaning permanent, perhaps lined with bricks or cement) drain; 4) 35,137 (9.15%) had a covered *pucca* drain; and 5) 29,734 (7.74%) had an underground drain. This subsection measures the odds of having either a covered *pucca* or an underground drainage system. Members of the group *Upper Caste Hindus* are 2.82 times more likely than the rest to have a covered *pucca* or an underground drainage. In contrast, the odds of having a similar drainage system is 0.20, 0.45, and 0.73 for members of the *Scheduled Tribe*, *Scheduled Caste*, and *Other Backward Caste*, respectively. The odds for *Christians* and *Muslims* are 1.14 and 1.05, respectively.

Likewise, the paper measures the odds that a household has a toilet with a septic tank and a flush.²⁴ Members of the group *Upper Caste Hindus* are 3.24 times more likely than the rest to have a toilet with a septic tank and a flush. In contrast, the odds of having a similar toilet is 0.15, 0.40, and 0.71 for members the *Scheduled Tribe*, *Scheduled Caste*, and *Other Backward Caste*, respectively. The odds for *Christians* and *Muslims* are 1.62 and 1.15, respectively.

²⁴Survey options for toilet included: 1) service; 2) pit; 3) septic tank and flush system; 4) no latrine; 5) others.

E.3 Preventative Health - Clean Water

This subsection measures access to clean water. It does so in three steps. The first step includes odds of having access to piped water. The survey has the following options for ‘Source of Drinking Water’: 1) Bottled water; 2) Tap water; 3) Tube-well/hand pump; 4) Tankers; 5) *Pucca* well; 6) Tank/pond reserved for drinking; 7) River/canal; 9) Others. Access to piped water will imply that the household uses tap water as a source for drinking water. The second step measures the odds that a household treats the water before drinking it. The third measures, among households that treat water, the odds that a household treats water using UV, resins, or reverse osmosis technology. The survey has the following options for ‘Type of Water Treatment’: 1) Ultra-violet/resin/reverse osmosis; 2) Boiling; 3) Filter; 4) Cloth screen; 5) Any disinfectant; 6) Others. Of all options, Option 1 (ultra-violet/resin/reverse osmosis) has been shown to be most effective at purifying water.

With each level, the inequality between groups becomes larger. For example, *Upper Caste Hindus* are 1.6 times more likely to have piped water supply at their home. They are also 1.6 times more likely to treat water before consuming it. But, they are 5.8 times more likely to treat the water using technologies such as UV, resin, or reverse osmosis. In contrast, the odds that a member of the *Scheduled Caste* has piped water is 0.35; the corresponding odds for treating the water is 0.44; and the corresponding odds for using UV, resin, or reverse osmosis is 0.22.

E.4 Healthcare

The NSS-60 survey asked respondents about their own health (self-perceived and self-reported health.) The respondents could report that they believed that their health to be; 1) excellent or very good; 2) good or fair; 3) or poor. While self-reported health may not be an accurate reflection of one’s health, it could proxy one’s well-being. *Upper Caste Hindus* are 1.5 times more likely than the rest to have a positive view of their own health; the corresponding odds for *Scheduled Caste* is 0.66.

However, for the purposes of measuring inequality, access to health services is more

important than self-reported health. This subsection measures the likelihood that a person received treatment at a public hospital or public dispensary. In contrast with all earlier observations, the odds that an *Upper Caste Hindu* received treatment at public hospital or dispensary is 0.91; the corresponding odds for members of the group *Schedule Caste* is 1.27. This may either imply that the poor have better access to public hospitals or the rich prefer private hospitals over public hospitals. The latter is most likely the reason for this counter-intuitive observation. In India, government provided healthcare is generally of a very poor standard (Banerjee *et al.*, 2004.) The survey question on the source of treatment included the following possible responses: 1) public hospital; 2) public dispensary 3) private hospital; and 4) private doctor. That the elite are less likely to have received treatment at a public hospitals could be due to two factors: First, the survey question precluded people who did not receive any treatment. Second, the preference ordering is most likely the following: No Treatment < Public Hospital < Private Hospital. As a result, the bucket ‘did not receive treatment in a public hospital’ consists of those who received treatment at a private hospital and those who did not receive treatment at all.

Using a survey question administered only to those who did not receive any treatment, inequality in access to healthcare can be measured. The respondents could indicate the following as one of the reasons for not receiving treatment: 1) no medical facility available in the neighborhood; 2) long waiting; 3) financial reasons. *Upper Caste Hindus*, with odds of 0.49, are less likely to report lack of medical facility, long waiting, or affordability as a reason for not availing treatment. The corresponding odds for *Scheduled Caste* is 1.68. Furthermore, the odds of not receiving post-natal care (private or public) for *Upper Caste Hindus* is 0.52; the corresponding odds for members of the *Scheduled Caste* is 1.46.

E.5 Education

In case of educational attainment, it is possible to observe differences in intra-household outcomes. In contrast, for outcomes such as type of dwelling, access to piped water, access to electricity, one would not expect intra-household variation. Furthermore, for

outcomes such as consumption expenditure, one would expect intra-household variation to exist, but it would be difficult to observe such variation (the NSS survey does not record or report intra-household variation.) Therefore, in this subsection, inequality in outcomes by gender is included in addition to caste and religion.

First, the odds of having English as a medium of instruction is measured. In India, knowledge of English is essential for most private and government jobs. Furthermore, the medium of instruction in higher education in India is almost entirely English. The importance of English is captured in this quote “The dominance of English dims the prospects of students who are too poor to attend an English-language school. But the government, for various reasons, including cultural prejudice, has not done enough to take English to its poorest. Most of its free or cheap schools do not have English as the medium of instruction.”²⁵ *Christians* and *Upper Caste Hindus* are 4 and 2.35 times more likely to attend a school where the medium of instruction is English. In contrast, the odds that a *Muslim*, *Scheduled Caste*, or a *Scheduled Tribe* attend an English medium school is 0.96, 0.39, and 0.17, respectively. Furthermore, odds do not vary significantly by Gender. This might suggest that access to English medium education is determined at the level of household: if a household has access to an English medium school, then both the boy and the girl child will have access to English medium education.

Second, this subsection looks at the odds of having a school-bus or public transit to reach school. In the absence of a school-bus or public transit, students would have to either walk to school or use a bicycle. This would limit access to schools for all students in general and for girl students in particular. For example, in one of the poorest states in India, Bihar, the female literacy was twenty percent lower than the male literacy rate in 2007. Particularly, drop-out rates after completion of the 8th Grade was very high among girl students. The high dropout was attributed to lack of high schools within walking distance: “We found that the high school dropout rate soared when girls reached the ninth grade. This was primarily because there are fewer high schools and girls had to travel longer distances to get to school,” said Anjani Kumar Singh, Bihar’s principal

secretary overseeing education. To address high drop out rate, the government launched a program to give free bicycles to all girl students. Within four years, the number of girls registered in the 9th Grade in Bihar’s state-run schools more than tripled, from 175,000 to 600,000.²⁶ *Christians* and *Upper Caste Hindus* are 2 times more likely to have access to a school-bus or public transit. In contrast, the odds that a *Muslim*, *Scheduled Caste*, or a *Scheduled Tribe* use public transit or school bus is 0.72, 0.58, and 0.37, respectively.

The first two proxy quality of education. The third measures the odds of completing higher secondary education. Grade 10 equals completion of secondary education (called the ‘Secondary School Certificate’), and Grade 12 equals completion of higher secondary (called the ‘Higher Secondary Certificate’). Most organized and formal jobs require higher secondary education as a minimum requirement. *Upper Caste Hindu* men are 2.1 times more likely than the rest to have access to have completed higher secondary education; the corresponding odds for *Upper Caste Hindu* women is 1.5. At the other of the spectrum, the odds that a man belonging to the *Scheduled Caste* completes higher secondary education is 0.75; the corresponding odds for women of the *Scheduled Caste* is 0.43.

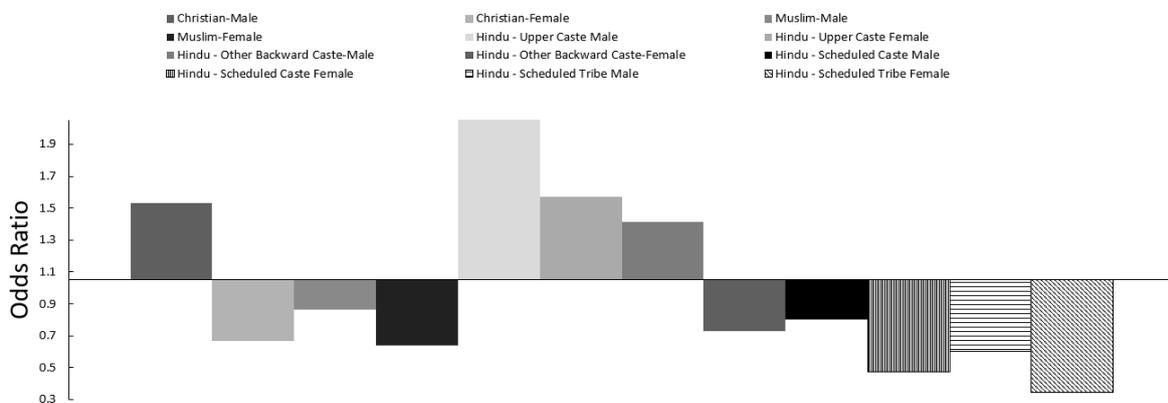


Figure 9: Horizontal Inequality in Education: Educational Attainment

Notes: Educational Attainment measures the odds of having completed higher secondary education.

The fourth measures the odds of having completed (or being enrolled in) a professional or technical course . Once again, outcomes vary by caste, religion, and gender. *Upper Caste Hindu* men are 2.7 times more likely than the rest to have access to have completed or be enrolled in a professional or technical course; the corresponding odds for *Upper Caste*

²⁶ Associated Press, 2012

Hindu women is 2.3. At the other of the spectrum, the odds that a man belonging to the *Scheduled Caste* completes or enrolls in a professional or technical course is 0.34; the corresponding odds for women of the *Scheduled Caste* is 0.27.

This entire Section (Section 3.3) shows that multi-dimensional nature of inequality. Caste and religion-based inequality predates systematic or programmatic provision of goods and services in India (Dumont, 1981; Dirks, 2001; Kolff, 2002; Gupta, 2000; Chakravarti, 2001.) This means that unequal access to public goods could not have caused caste and religion-based inequality. However, unequal access can cause inequality to persist, and can reinforce the unequal social and economic structure. In this direction, the next subsection (Section 3.4) demonstrates the persistence of religion and caste-based inequality in India.