Caste-based crimes and economic status: Evidence from India

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A B S T R A C T

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Crimes against the historically marginalized Scheduled Castes and Scheduled Tribes (SC and ST) by the upper castes in India represent an extreme form of prejudice and discrimination. In this paper, we investigate whether changes in relative material standards of living between the SCs/STs and upper castes – as measured by the ratio of consumption expenditures of SCs/STs to that of upper castes – are associated with changes in the incidence of crimes against SCs/STs. Based on the hierarchical social structure implied by the caste system, we posit that an increase in the expenditure ratio is positively correlated with the incidence of crimes committed by the upper castes against the lower castes. Using official district level crime data for the period 2001–2010, we find a positive association between crimes and expenditure of SC/ST vis-á-vis the upper castes. Further, distinguishing between violent and non-violent crimes, we find it is the violent crimes that are responsive to changes in economic gaps. Moreover, this relationship is on account of changes in the upper castes' economic well-being rather than changes in the economic position of the SCs and STs. *Journal of Comparative Economics* **3** (43) (2015) 204–226. Delhi School of Economics, University of Delhi, Delhi 110007, India.

1. Introduction

In India, former untouchable castes and several tribal groups continue to be subjected to discrimination, economic and social exclusion and a stigmatized identity (e.g., Deshpande, 2011; Navsarjan Trust, 2010; Thorat and Newman, 2010). Additionally, similar to hate crimes in other parts of the world, these groups have been victims of crimes and atrocities at the hands of the upper castes – largely on account of their low caste identity – in the form of rape of women, abuse by police personnel, harassment of lower caste village council heads, illegal land encroachments, forced evictions and so on (Human Rights Watch, 1999). These instances are in blatant violation of the Indian constitution that abolished untouchability and upholds the ideal of equality among all citizens. In 2006, acknowledging the gravity of the problem, Indian Prime Minister Manmohan Singh equated the practice of untouchability to that of apartheid (Rahman, 2006).

We analyze crimes against the historically disadvantaged Scheduled Castes and Scheduled Tribes i.e. former untouchables and marginalized tribes (SCs and STs respectively), by the upper castes. The objective of this study is to examine whether regional variations in the incidence of violence by the upper castes against the lower castes are systematically linked to

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variations in relative group economic outcomes of lower castes and tribes and upper castes (as measured by the ratio of per capita expenditure of SCSTs to that of the upper castes). Based on the hierarchical social structure implied by the caste system such that the upper castes have traditionally been economically better-off than the lower castes with resulting social dominance, we posit that an increase in the ratio of SCST expenditures to upper caste expenditures is positively correlated with the incidence of crimes committed by the upper castes against the lower castes.

Theoretically, an increase in the expenditure ratio could lead to either a decrease or an increase in the incidence of caste-based crimes. It could lead to a decrease on account of various factors. An increase in the ratio of expenditures, by improving the relative economic position of SCSTs could result in an increased ability to defend themselves against physical harm by the upper castes by investing in better security measures. It could also lend them greater confidence to report crimes to the police thereby leading to a possible reduction in future crimes.[1] Further, an improvement in their bargaining power could lead to the upper castes having greater respect for the low castes. Conversely, there could be an increase in the incidence of caste-based crimes as firstly, SCSTs could be perceived as more attractive targets for violence especially where the motivation is to extract some form of economic surplus. Secondly, they may be perceived as a threat to the established social, economic and political position of the upper castes. Thirdly, if an improvement in the expenditure ratio is on account of a worsening of the upper caste economic position, crimes could be used as a means of asserting their superiority and expressing their frustration at their worsened relative economic position. Therefore, which of these effects dominate constitutes an interesting empirical question.

While there is some literature on general violent crimes in India (Dreze and Khera, 2000; Prasad, 2012; Roy, 2010) and crimes against women (Iyer et al., 2012; Sekhri and Storeygard, 2014), crimes against SCs and STs remain under-researched. This paper, among the first to analyze data on crimes committed against SCs and STs, has been largely facilitated by the availability of crime data at the district level starting 2001. Bros and Couttenier (2012) use cross-sectional district-level crime data for 2001 and find crimes against SC and ST groups to be higher in districts that have greater commonality of water sources. Common water sources imply water sharing between castes which is considered ritually polluting for the upper castes and is often countered with acts of violence against the lower castes. Our study investigates a different hypothesis and exploits the panel structure of the data through which fixed unobservable factors can be controlled.

Using district level official data on crimes against SCs and STs and per capita expenditures as a proxy for material standard of living, we find that the incidence of caste violence is positively correlated with the ratio of expenditures of lower castes and tribes to that of upper castes. Dividing the crimes into predominantly violent and non-violent crimes, we find that changes in relative material standards of living between groups lead to changes in violent crimes, particularly those aimed at extracting some form of economic surplus or property from the victims. Moreover, these are driven by changes in the upper castes' economic well-being rather than changes in the economic position of the lower castes and tribes.

Although caste-based discrimination has largely been discussed in the context of labor markets and access to public goods (see Deshpande, 2011; Thorat and Newman, 2010 for a review), this is among the first studies to quantitatively analyze extreme discrimination in the form of crimes targeted at the SC and ST groups. As anecdotal evidence suggests that lower castes are targeted predominantly on the basis of their caste identity, broadly speaking, such crimes are comparable to hate crimes. Thus, our study is a new contribution to the discussion of group-based violence in the Indian context. However, there is an extensive social science literature from the United States that has studied racial violence and this paper builds on that literature.

The remainder of this paper is organized as follows. Section 2 provides a background of the existing inequalities on account of the caste system and an overview of the hate crimes literature. Section 3 describes the dataset and the empirical framework. Section 4 presents the summary statistics and results. Section 5 discusses robustness checks and other concerns and Section 6 concludes.

2. Related literature

2.1. The Indian caste system

The caste system is an arrangement of the Hindu population into several thousand groups called 'jatis' (castes). These groups have emerged from the ancient 'varna' system according to which society was divided into initially four, later five, hereditary, endogamous, mutually exclusive and occupation-specific groups. At the top of the varna system were the 'Brahmins' (priests and teachers) and the 'Kshatriyas' (warriors and royalty), followed by 'Vaishyas' (merchants and money-lenders) and finally the 'Shudras' (engaged in lowliest jobs). Over time, the Shudras split into two tiers, with those engaged in the most menial jobs being called the 'Ati-Shudras'. The Ati-Shudras were considered untouchable, such that any contact with them was seen as polluting.[2] They were forced to live in segregated housing, denied access to schools and places of worship attended by upper castes, and required to maintain physical distance from upper castes in order to not pollute them. Additionally, there are the indigenous tribes (or the Adivasis) who on account of geographical isolation, primitive agricultural practices and distinct social customs have been socially distanced and face large-scale exclusion from mainstream Indian society. In 1950, the Constitution extended affirmative action to Dalits and Adivasis (officially termed as Scheduled Castes

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[1] Iyer et al. (2012) find that the political empowerment of women by way of higher mandated representation at local government levels induces strong positive effects on reporting of crimes by women.

[2] Former untouchables prefer to identify themselves as 'Dalit' as a term of pride.

and Scheduled Tribes respectively) in the form of reservations in national and state legislatures, local governments, institutions of higher education and government jobs. In addition, there is a third category known as the 'Other Backward Classes' (OBCs) to which reservations have been extended since the early 1990s. This group, while not burdened with the stigma of untouchability, was socially and educationally backward.

While affirmative action extended to SCs and STs has made a discernible positive impact in some dimensions such as poverty, redistribution of state resources, and some public goods provisions (e.g., Pande, 2003; Besley et al., 2004; Chin and Prakash, 2011), gaps remain between the SCST and non-SCST groups. Shah et al. (2006) in a survey of 565 villages across 11 large states in 2001–2002 document the widespread practice of untouchability in a significant proportion of villages. Moreover, there is a burden of a 'stigmatized ethnic identity' (Berreman, 1971) that even richer Dalits continue to live with.[3] There is ample evidence suggesting that upper castes use and justify various forms of violence as tools to ensure adherence to caste-based norms and traditions by the lower castes. Attacks often take the form of collective punishment, whereby entire communities are punished for the perceived transgressions of individuals who seek to alter established norms or demand their rights. A report by the National Commission of Scheduled Castes and Scheduled Tribes (1997) succinctly states "Whenever Dalits have tried to organize themselves or assert their rights, there has been a backlash from the feudal lords resulting in mass killings, gang rapes, looting of Dalit villages" (*p.*2). This stresses that significant policy initiatives have not been accompanied by social integration and tolerance across caste lines.

2.2. Hate crimes

Hate crimes are characterized by a deliberate intention to victimize an individual because of his membership in a certain social group. The most crucial element that differentiates hate crimes from similar non-hate crimes is the underlying motivation.[4] A review of the literature, most of which comes from the United States and Europe, indicates that among other things, relative economic position of the dominant group vis-à-vis the subaltern group is an important determinant of hate crimes.

Gale et al. (2002) model hate crimes as a function of ill will on the part of the perpetrator with respect to the victim by extending Becker's (1981) model of envy and altruism. While altruism implies that one's utility function depends positively on the well-being of another, envy implies the opposite. Because relative status matters in Becker's framework, it is plausible that if the income gap between the minority and dominant group reduces, this could provoke envious members of the dominant group to resort to violence as a way to reduce the well-being of minority members. Using American state-level data for 1992–1995, they find the ratio of black income to white income to be positively associated with hate crimes.

Our paper can be considered closest in terms of motivation to Mitra and Ray (2014) inasmuch as they too consider the relationship between group-wise economic progress and inter-group conflict. Their theoretical model explains the incidence of ethnic conflict as a function of economic progress of two groups in society where members of either group can be aggressors or victims. Using data on Hindu-Muslim riots from India, they find that Hindu per-capita expenditures have either a negative effect or no effect on conflict while the coefficient on Muslim per-capita expenditures is positive. However, there are two crucial differences between the two studies. Firstly, they analyze communal riots, which represent violence involving a large group of people, while we study individually targeted caste-based crimes. Secondly, and more importantly, their data do not allow separation of perpetrators and victims by religion, except by inference, whereas in our data, the identification between victims (SCST) and perpetrators (non-SCST) is clear from the start.

Competition theory suggests that inter-group conflict is heightened when niches that the minority and dominant groups traditionally operated in start to overlap. Niches could be in the form of occupational sectors, residential patterns, etc. Jacobs and Wood (1999) using data for 165 U.S. cities find that as economic competition for jobs increases between blacks and whites, murders of blacks by whites increase. Additionally, cities with a black mayor experience more murders of blacks by whites.[5] D'Alessio et al. (2002) find that economic competition (measured by the ratio of black and white unemployment rate) has a negative effect on crimes committed by whites against blacks. On the other hand, political threat (ratio of black to white voters) has no significant effect on interracial crimes. Studies of riots and lynchings also suggest that competition for jobs leads to greater inter-racial violence (e.g., Price et al., 2008; Beck and Tolnay, 1990; Olzak, 1990).

The defended neighborhoods view suggests that hate crimes are used as an exclusionary tactic for turf protection and to maintain the existing hierarchy in society. Many hate crimes result from dominant group concerns about minority group encroachment. Research by Lyons (2007) on Chicago neighborhoods and by Green et al. (1998) on New York communities indicates that racially motivated hate crimes are higher in traditionally white neighborhoods experiencing an influx of minority population.

The frustration-aggression thesis of Dollard et al. (1939) and Hovland and Sears (1940) suggests that during periods of economic stress, there is an innate tendency to lash out against a vulnerable scapegoat, which is often an out-group that may be linked to the source of the stress. Pinderhughes (1993) documents attitudes of white hate crime offenders and finds that they blame their economic insecurity on affirmative action policies that increase competition with minorities.

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[3] The following account by a Dalit surgeon effectively summarizes the sentiment behind 'stigmatized ethnic identity': "I am a micro-surgeon specializing in hand and spinal reconstruction, and am [a Member of Legislative Assembly] from Bihar, but I still remain very much a dalit- a dhobi, to be precise- open to routine humiliation from the upper castes." (Kanaujia, 2007)

[4] See Green et al. (2001) for a review of definitional and conceptual issues related to hate crimes.

[5] In a similar vein, Becker (1957) finds that older and more educated blacks face greater discrimination.

3. Data and methodology

3.1. Crime data

The crime data used in this paper are from the annual publication 'Crime in India' by National Crime Records Bureau (NCRB), Government of India. This data is based on complaints filed with the police. While crimes against SCs and STs were reported at the state level since 1992, only since 2001, data on different types of crimes against SCs and STs have become available at the district level. The distinctive feature of this dataset is its classification system. The data are defined in a way such that the victim belongs to the SC/ST group and the perpetrator to a non-SC/ST group. It should be noted at the outset that data are *not* collected by the NCRB under the following circumstances: (i) when the victim is non-SC/ST and perpetrator is SC/ST; (ii) when both victim and perpetrator are SCs/STs; and (iii) when both victim and perpetrator are non-SCs/STs.[6] For this study, we use the crime data from 2001 to 2010 for 415 districts that make up the 18 large states.[7]

There are two main types of crimes: those reported under the Indian Penal Code (IPC) and those that are registered under the Special and Local Laws (SLL). While the IPC category includes mostly violent crimes that affect the broader population in general, the SLL are enacted to counter other social practices prohibited by various laws. IPC crimes include: (i) murder, (ii) rape, (iii) physical assault or hurt, (iv) kidnapping, (v) robbery, (vi) arson, (vii) dacoity[8] and (viii) other classified IPC crimes. Other classified IPC crimes constitutes a residual category that includes crimes such as assaulting public servants, killing cattle, criminal trespass and intimidation. Crimes under SLL are: (i) Protection of Civil Rights Act, 1955, and (ii) The Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989. These acts constitute special social enactments to safeguard the interests of SC/ST groups. Examples of crimes included under SLL are: denying admission to Dalits into places of recreation and worship, educational institutions and hospitals; denying Dalits access to water sources; wrongfully occupying land owned by SC/ST; stripping them naked; practice of untouchability; compelling them to do bonded labor or scavenging jobs and so on.[9] The rules of the Prevention of Atrocities Act specify provisions for rehabilitation and compensation of victims and setting up of special courts to expedite the trial of cases. Broadly, the IPC crimes include acts of overt force and aggression and are predominantly violent crimes. On the other hand, SLL crimes are untouchability related offences with the intention of humiliating members of the lower castes, with some amount of violence. Hence, they are largely non-violent crimes.

The issue of under-reporting of crime is a standard limitation of most official data on crime, even for developed countries. Moreover, low caste victims are likely to hesitate in reporting a crime due to reasons that include fear of reprisals, lack of confidence in the police, and shame in reporting a crime where they have been targeted on account of their social identity. Ideally, one would like to use victimization surveys to study crimes of this nature. However, in the absence of such data, this paper makes use of the best available nationally representative data and we believe that is a good starting point, especially since quantitative evidence on crimes against SCs and STs is limited.[10] The district fixed effects in our regression are able to control for the district-specific time-invariant component of under-reporting.

3.2. Explanatory variables

Since our unit of analysis is the district, district-level information on the explanatory variables is calculated from the large-scale household surveys conducted once in five years by the National Sample Survey Organization (NSSO). We use NSS data from the 'Consumer Expenditure Survey' and 'Employment-Unemployment Survey' modules of 1999–2000 (55th round) and 2004–2005 (61st round). Since there were changes in some district boundaries between the two rounds of NSS data, we make the districts comparable using the weights provided by Kumar and Somanathan (2009).[11]

In order to utilize the entire time series of district-level crime data from 2001 to 2010 and also to match it with the two rounds of district-level data from NSS, for the first period, we aggregate crimes for years 2001 to 2005 and for the second period, we aggregate crimes for years 2006 to 2010. This aggregation also overcomes the problem of many districts reporting zero crimes in a single year. Therefore, we have a two period panel with 415 districts in each period.

The primary variable of interest is the material standard of living of SCs/STs relative to that of the upper castes.[12] In order to measure standard of living, we calculate monthly per capita consumption expenditure (MPCE) from the NSS Consumer Expenditure Survey.[13] Thus, our principal variable is defined as the logarithm of ratio of SCST expenditure to upper caste

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[6] Data on crimes against SCs/STs, women and children are collected since these groups are considered vulnerable.

[7] These are: Haryana, Himachal Pradesh, Punjab, Uttar Pradesh, Uttarakhand, Karnataka, Andhra Pradesh, Kerala, Tamil Nadu, Bihar, Jharkhand, Orissa, West Bengal, Madhya Pradesh, Chhattisgarh, Gujarat, Rajasthan and Maharashtra.

[8] Dacoity is when five or more persons conjointly commit or attempt to commit a robbery.

[9] The complete list of SLL crimes against SC/ST is in Appendix A.

[10] The India Human Development Survey (IHDS) of 2005 asks households whether they have been victims of theft, burglary, physical hurt or threats. However, there is no way of knowing if crimes against SCs/STs were committed by non-SC/STs. Prasad (2013) in a comparative analysis of the IHDS and NCRB data finds that while the NCRB data is under-reported, there is a positive and significant relationship between police-recorded and victim-reported crimes. This suggests that official data are indicative of actual crimes and can enable identification of high and low crime districts.

[11] District mappings across the two rounds of NSS data have been listed in Appendix B.

[12] The NSS defines four broad social groups: Scheduled Castes (SCs), Scheduled Tribes (STs), Other Backward Classes (OBCs) and 'Others'. 'Others' is a reasonable approximation of the upper castes.

[13] Details on computation of real monthly per capita consumption expenditure are in Appendix C. 1999–2000 is used as base year.

expenditure. Ideally, one would like to use some measure of income to study differences in standard of living but that is difficult to collect in a developing country like India. In developing countries, expenditure serves as a good proxy for income for several reasons. Firstly, at low levels of income, savings are negligible resulting in a close correspondence between income and consumption expenditure. Secondly, wage or earnings data, even when reliable, may not account for days of employment and seasonality of work. Moreover, wage or earnings data in the NSS is reported only for those who are employed in regular salaried jobs or as casual labor and not for those who are self-employed. However, wage data for casual workers are often missing or unreliable. Thirdly, payment is often in kind and wage data typically accounts only for the monetary component of earnings. Finally, like in the case of agricultural households, a household is both a production and consumption unit and it is difficult to distinguish between receipts and outflows (Deaton, 1997).

In addition to the above, we control for share of SCSTs in the district population and its squared term. Becker (1957) suggests that the effect of the minority group size can go in either direction. An increase in numbers could reduce prejudice and hostility on account of greater interaction between dominant and minority groups or 'strength in numbers' could help minority groups to better protect themselves. On the other hand, an increase in minority group size could have an adverse effect by fueling fears that the minority group is trying to challenge the dominant group.[14] District-level average monthly per capita expenditure accounts for overall prosperity in the region. Expenditure-based Gini coefficient accounts for overall inequality in the district. We control for percentage of population living in rural areas since caste-based crimes are likely to be a predominantly rural phenomenon due to beliefs in caste hierarchies being more deep-seated. Educational attainment is controlled for by introducing categorical variables for different levels of education: illiterate, primary, secondary, higher secondary and above. Unemployment is an important determinant of crime since unemployed people with no legal income are more likely to engage in illegal activities.[15] However, in India, like in other developing countries, the underemployment rate is a more accurate measure of time utilization (National Commission for Enterprises in the Unorganised Sector, 2008). Underemployment is commonly defined as the underutilization of labor time or skills of the employed either due to seasonality of work or lack of sufficient work.[16] Percentage of males in the 15–24 age groups in the population represents the size of the group that is most likely to engage in criminal activity. We also control for political competition at the state-level by using effective number of parties (Laakso and Taagepara, 1979) that is calculated using data from the state assembly election reports from the Election Commission of India.[17] We would expect states with greater electoral competition (larger effective number of parties) to be more sympathetic to the cause of the SCST groups thereby leading to lesser violence against them. Wilkinson (2004) finds that Indian states with higher effective number of parties experience fewer Hindu-Muslim riots.

3.3. Empirical specification

Our main empirical specification uses a linear fixed effects regression model. The general form of the estimating equation is:

$$y_{dt} = \alpha_1 + \alpha_2 e_{dt} + \Sigma_k \theta^k X_{dt}^k + \delta_d + \gamma_t + \epsilon_{dt} \tag{1}$$

where the dependent variable y_{dt} is the logarithm of the SCST crime rate per 100,000 SCSTs in district d in time period t. Our primary variable of interest e_{dt} is logarithm of the ratio of expenditure of SCs/STs to upper castes. X_{dt}^k is the vector of k controls in district d at time t which includes the following: district MPCE, share of SCs/STs in the population and its squared term, share of the population residing in rural areas, Gini coefficient, underemployment rate, share of population in different education categories (illiterate, primary, secondary, with higher secondary and above being omitted group), share of young males in the population and effective number of parties. District fixed effects δ_d control for the time-invariant district-specific under-reporting of crime, long-standing caste relations in the district, etc. A time dummy γ_t controls for factors that are common across districts but vary across time such as changes in national-level policies that might affect caste-based crimes. ϵ_{dt} is the error term. Standard errors are clustered at the district level to account for possible correlated shocks to district-level crimes over time. Based on the hierarchical nature of inter-caste relations discussed previously, we expect the coefficient of the expenditure ratio, α_2, to be positive.

An alternative specification uses group-wise expenditures instead of relative expenditures to determine which group's economic changes are driving this relationship:

$$y_{dt} = \beta_1 + \beta_2 SCSTexp + \beta_3 OBCexp + \beta_4 UCexp + \Sigma_k \mu^k X_{dt}^k + \omega_d + \eta_t + \varepsilon_{dt} \tag{2}$$

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[14] Blumer (1958) posits that perceived threat among the dominant group manifests in the following ways: (i) a feeling of superiority; (ii) a feeling that the subordinate group is intrinsically different; (iii) a feeling of exclusive claim over certain privileges; and (iv) a fear that the subordinate group desires a greater share of the dominant group's prerogatives.

[15] Evidence on the relationship between unemployment rates and hate-motivated crimes is quite mixed. For example, Falk et al. (2011) find unemployment rates to positively affect violent and non-violent right wing extremist crimes in Germany. However, Krueger and Pischke (1997) find no relationship between incidence of anti-foreigner crimes and unemployment rate in post-unification Germany during 1991–1993.

[16] Details on calculation of underemployment and unemployment rates are in Appendix D.

[17] The formula for effective number of parties is $n = 1/\Sigma p_i^2$ where p_i is the proportion of votes received by party i in the state elections. Instead of using the total number of parties, this measure places greater weight on parties that have a higher share of votes as compared to those with a low vote share.

Table 1
Summary statistics.

Variable	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6
	Both periods		Period 1		Period 2	
	Mean	Std dev	Mean	Std dev	Mean	Std dev
Crime incidence:						
Total crimes against SCSTs	430	(419)	418	(435)	441	(403)
IPC crimes against SCSTs	288	(351)	275	(351)	302	(352)
SLL crimes against SCSTs	142	(176)	144	(174)	140	(178)
IPC body crimes against SCSTs	95	(113)	93	(112)	97	(114)
IPC non-body crimes against SCSTs	193	(281)	182	(272)	205	(289)
General IPC crimes	21,033	(20,059)	19,503	(18,370)	22,564	(21,530)
Crime rates:						
SCST total crime rate	99.8	(135.1)	104.4	(164.3)	95.3	(97.7)
SCST IPC crime rate	66.5	(107.1)	68.9	(125.6)	64.2	(84.6)
SCST SLL crime rate	33.3	(52.7)	35.5	(58.6)	31.2	(46)
SCST body crime rate	23.1	(42.1)	24	(44.3)	22.2	(39.7)
SCST non-body crime rate	43.5	(75.4)	44.9	(89.6)	42	(57.9)
General IPC crime rate	1544.3	(1492.7)	1552.9	(1884.3)	1535.7	(954.5)
Explanatory variables:						
SCST MPCE/upper caste MPCE	0.68	(0.16)	0.71	(0.16)	0.64	(0.17)
MPCE	535.1	(186.3)	471.3	(132.2)	598.9	(209.5)
SCST MPCE	433.17	(128.2)	394.53	(100.6)	471.72	(140.8)
Upper caste MPCE	679.07	(274.2)	574.53	(172.2)	783.85	(314.7)
Other backward classes MPCE	523.11	(179.1)	459.39	(126.3)	585.9	(200.2)
% SCST population	29.8	(15.2)	29.9	(15.5)	29.6	(15)
% Rural population	79.39	(17.3)	79.31	(18.1)	79.48	(16.5)
% Underemployed	16.02	(7.6)	15.33	(7.5)	16.7	(7.5)
% Young males	9.41	(1.9)	9.31	(1.7)	9.52	(2)
Gini (based on MPCE)	0.25	(0.05)	0.24	(0.04)	0.27	(0.06)
Effective number of political parties	4.6	(1.3)	4.4	(1.3)	4.7	(1.4)
% Illiterate	45.87	(15.4)	47.9	(15.6)	43.8	(14.9)
% Primary education	19.92	(6.4)	19.56	(6.6)	20.18	(6.1)
% Secondary education	24.06	(9.1)	23.34	(9.4)	24.78	(8.7)
% Higher secondary and above education	10.15	(5.7)	9.06	(5.2)	11.24	(6.1)

Note: Total crimes against SCSTs is the sum of IPC and SLL crimes against them. IPC crimes are the sum of murder, rape, kidnap, hurt, dacoity, robbery, arson and other IPC crimes. SLL crimes are the sum of crimes registered under the Prevention of Atrocities Act and the Protection of Civil Rights Act. IPC body crimes are the sum of murder, rape, kidnapping and physical assault. IPC non-body crimes are the sum of dacoity, robbery, arson and other IPC crimes. Mean and standard deviation for crime incidence have been rounded off to whole numbers. Crime rate against SCSTs computed per 100,000 SCST population. General IPC crime is total IPC crimes less IPC crimes against SCSTs (proxy for crimes against non-SCSTs). General IPC crime rate is calculated per 100,000 non-SCST population. Young males refer to males in the 15–24 age groups. MPCE refers to real monthly per capita expenditure.

where the dependent variable y_{dt} is the logarithm of the SCST crime rate per 100,000 SCSTs in district d in time period t and $\beta_2, \beta_3, \beta_4$ are the coefficients on logarithm of expenditure terms for each of the three broad social groups: SCSTs, Other Backward Classes (OBCs) and upper castes (UCs) respectively. Since we have group-wise expenditures, we do not control for overall expenditure. The other control variables, district fixed effects and time dummy are included the same way as in Eq. (1).

4. Analysis

4.1. Summary statistics

Table 1 contains the summary statistics for each of the two periods separately as well as for the full data. Of the average 430 total crimes against SCSTs per district, approximately 288 are IPC crimes and 142 are SLL crimes. We define SCST total crime rate as the number of total crimes against SCSTs per 100,000 SCST population. IPC crime rate and SLL crime rate are similarly defined. The SCST total crime rate is 100 while the SCST IPC crime rate is 67 and SCST SLL crime rate is 33. Among the IPC crimes, the body crime rate is 23 and non-body crime rate is 43. On average, crime rates against SCSTs registered a decline between the two periods.

The average district MPCE is Rs. 535. The SCST average MPCE is Rs. 433, while it is Rs. 679 and Rs. 523 for the upper castes and OBCs respectively. Between the two periods, all social groups witnessed an increase in expenditures: SCST expenditures increased 19.6 percent, whereas expenditure of upper castes and OBCs grew 36.4 percent and 27.5 percent respectively, indicating that the rate of increase was slowest for the SCST groups. Therefore, this translates into a decline in the ratio of SCST expenditure to upper castes' expenditure over the two periods from 71 percent to 64 percent.

SCSTs account for 29 percent of the district population and 79 percent of the population is in rural areas. The underemployment rate is around 16 percent. Males in the 15–24 age groups make up 9 percent of the population. 46 percent of the

Table 2
Effect of relative economic status on crimes against SCSTs.

	Col. 1 Total crime rate	Col. 2 IPC crime rate	Col. 3 SLL crime rate
Ln (SCST exp/UC exp)	0.304** (0.118)	0.355** (0.149)	0.298 (0.294)
Ln (expenditure)	−0.008 (0.283)	−0.378 (0.389)	0.413 (0.591)
% SCST population	−0.087*** (0.0096)	−0.1*** (0.011)	−0.08*** (0.022)
% SCST population squared	0.0007*** (0.0001)	0.0009*** (0.0001)	0.0006** (0.0003)
% Rural population	0.005 (0.0041)	0.0004 (0.0053)	0.005 (0.0098)
Gini	1.050 (1.009)	2.656** (1.239)	−0.378 (1.942)
Underemployment rate	0.003 (0.0043)	0.003 (0.0058)	0.011 (0.0089)
% Young males	−0.014 (0.0163)	0.022 (0.0241)	−0.031 (0.0343)
% Illiterate	−0.01 (0.0096)	−0.001 (0.0131)	−0.019 (0.0217)
% Primary education	0.008 (0.0129)	0.007 (0.0165)	0.005 (0.024)
% Secondary education	−0.0021 (0.0132)	−0.0083 (0.0177)	0.001 (0.0272)
Effective number of parties	0.0344 (0.0716)	0.134 (0.0977)	−0.386** (0.162)
Number of districts	828	828	828
F	16.45	9.96	4.53
R^2	0.342	0.221	0.126

Note: Standard errors clustered at the district level are reported in parentheses. All regressions include district fixed effects, time dummy and a constant term. All dependent variables are in logarithm terms. Crime rate is number of crimes per 100,000 SCST population. IPC crimes are the sum of murder, rape, kidnap, hurt, dacoity, robbery, arson and other IPC crimes. SLL crimes are the sum of crimes registered under the Prevention of Atrocities Act and the Protection of Civil Rights Act. For education dummy variables, 'higher secondary and above' is the omitted category.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

population is illiterate, 20 percent have completed primary education, 24 percent have completed secondary education and only 10 percent has completed higher secondary and higher levels of education. The state-level effective number of parties is around 4.6.

4.2. Regression results

Table 2 presents the main results. In column 1, the dependent variable is the total crime rate against SCSTs. The coefficient of the expenditure ratio is positive and significant, as expected. Since crime rates and expenditure ratios show a downward trend between the two periods, a coefficient of 0.304 indicates that a 10 percent decrease in the expenditure ratio or widening of the gap between lower and upper castes is associated with about a 3 percent decrease in total crime rate. Share of SCSTs in the district population and its quadratic term are negative and positive respectively, suggesting that an increase in the share of SCSTs is associated with a decrease in victimization and the decrease is slower as the share of SCSTs increases. Coefficients on the share of SCST variables imply a decrease of 6.3 percent in total crime rate for a 10 percent increase in share of SCSTs. Across all regressions, we obtain a convex relationship between crime rates and the share of SCSTs. This is in line with Krueger and Pischke (1997) who find that while the percentage of foreigners has no effect on anti-foreigner crimes in western Germany, in eastern Germany, foreigner victimization rate falls as their relative number increases. In fact, in all regressions that follow, the share of SCSTs is a consistently robust determinant of crimes and often has higher economic significance or magnitude than the expenditure variables.

We now disaggregate the total crimes into IPC crimes and SLL crimes with the former being the largely violent crimes and the latter representing the non-violent caste-based crimes. In column 2 of Table 2, the dependent variable is the IPC crime rate against SCSTs. We use the same explanatory variables as in column 1. Results are qualitatively similar to column 1. A 10 percent decrease in the expenditure ratio is associated with a 3.5 percent decrease in IPC crimes – largely violent

Table 3
Effect of group-wise expenditures on total, IPC and SLL crime rates.

	Col. 1 Total crime rate	Col. 2 IPC crime rate	Col. 3 SLL crime rate
Ln (SCST expenditure)	0.138 (0.191)	−0.134 (0.309)	0.496 (0.474)
Ln (UC expenditure)	−0.341** (0.143)	−0.563*** (0.185)	−0.158 (0.341)
Ln (OBC expenditure)	−0.0393 (0.196)	0.112 (0.319)	−0.107 (0.454)
% SCST population	−0.091*** (0.009)	−0.097*** (0.0109)	−0.091*** (0.0251)
% SCST population squared	0.0008*** (0.0001)	0.0009*** (0.0001)	0.0008** (0.0003)
% Rural population	0.0052 (0.0041)	−0.0004 (0.0053)	0.006 (0.0102)
Gini	0.978 (0.936)	2.652** (1.142)	−0.393 (1.898)
Underemployment rate	0.0009 (0.0043)	0.002 (0.0057)	0.0109 (0.0095)
% Young males	−0.0163 (0.0158)	0.0269 (0.0253)	−0.0448 (0.0349)
% Illiterate	−0.0077 (0.0098)	0.0031 (0.0131)	−0.0195 (0.0211)
% Primary education	0.0092 (0.0133)	0.0093 (0.0164)	0.0045 (0.0239)
% Secondary education	0.0045 (0.0128)	0.0028 (0.0166)	0.0043 (0.0276)
Effective number of parties	0.0428 (0.0707)	0.151 (0.0975)	−0.396** (0.164)
Number of districts	818	818	818
F	15.81	9.54	4.25
R^2	0.345	0.218	0.127

Note: Standard errors clustered at the district level are reported in parentheses. All regressions include district fixed effects, time dummy and a constant term. All dependent variables are in logarithm terms. Crime rate is number of crimes per 100,000 SCST population. IPC crimes are the sum of murder, rape, kidnap, hurt, dacoity, robbery, arson and other IPC crimes. SLL crimes are the sum of crimes registered under the Prevention of Atrocities Act and the Protection of Civil Rights Act. For education dummy variables, 'higher secondary and above' is the omitted category.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

crimes – committed by the upper castes against the SCST groups. Overall higher inequality in the district, as measured by the Gini, is positively associated with IPC crime rates. This result is in accordance with other literature that finds inequality to be significant determinant of violent crimes in society (e.g., Kelly, 2000; Fajnzylber et al., 2002). In column 3 of Table 2, the dependent variable is the SLL crime rate against SCSTs. In this regression, the expenditure ratio coefficient is insignificant thereby indicating that the relative economic position of SCSTs vis-à-vis the upper castes is not associated with the SLL crime rate. The coefficient on the effective number of parties which was insignificant in columns 1 and 2, is now negative and significant implying that as the number of parties competing in the state increases, SLL crimes against SCSTs register a decline.

To understand how group-wise economic progress is related to the incidence of caste violence, in Table 3, instead of using expenditure ratio, we enter the logarithm of group-wise expenditures: expenditure of SCSTs, expenditure of OBCs and the expenditure of upper castes. In column 1, the dependent variable is the SCST total crime rate. While OBC expenditure and SCST expenditure have no significant association with crime rate, the upper castes' expenditure coefficient is negative and significant implying that a 10 percent increase in their expenditure is associated with a 3.4 percent decrease in crime rates.[18] As we show later as a robustness check in Section 5, upper castes' expenditure has no influence on the incidence of non caste-based general crimes implying that it is the lower castes that are differentially targeted with changes in the economic position of upper castes. Moreover, as our data indicate, the average expenditure increased most rapidly for the upper castes and slowest for the SCST groups, thereby increasing the gap between the two groups and diminishing the perceived threat associated with the economic position of the subordinate group relative to the dominant group.

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[18] The reason for 10 fewer observations in Table 3 as compared to Table 2 is that in five districts in each period, there was no household belonging to OBC category and therefore, these districts get dropped in the group-wise expenditure specification.

In column 2, the dependent variable is the SCST IPC crime rate. Again, while SCST and OBC expenditure is insignificant, a 10 percent increase in upper castes' expenditure is associated with a 5.6 percent decrease in IPC crime rates. In column 3, the dependent variable is the SCST SLL crime rate. All the group-wise expenditure terms are insignificant. The coefficient on the effective number of parties is negative and significant. As in Table 2, the Gini coefficient is positively associated with IPC crime rate but uncorrelated with SLL crime rate.

Results from Tables 2 and 3 jointly show that firstly, while the expenditure ratio is an important determinant of caste-based crimes, it is the perpetrator characteristics and not the victim characteristics driving the results. Secondly, while violent IPC crimes are correlated with the changes in the economic status of groups, non-violent SLL crimes are not. This seems to be consistent with anthropological accounts from field surveys that indicate increases in violent acts by upper castes whenever lower castes try to assert their rights that may be perceived as challenging existing caste hierarchies. Also, low castes are often made scapegoats and instant violent punishment is meted out to them as revenge in the event of upper castes feeling insecure of their own dominant economic or social position.[19] On the other hand, non-violent SLL crimes that seek to insult and humiliate victims on account of their lower social status occur on a more routine basis as a result of prejudiced long term social attitudes, for instance beliefs about hierarchy or the "right" order of the world, place of the Dalits in the social hierarchy and therefore, they might not be as closely related to changes in economic status. This also relates to the idea of "stigmatized ethnic identity", discussed in Section 2.1, which implies that economic mobility of Dalits is not always correlated with their social mobility, such that even middle class or rich Dalits continue to be vulnerable to discrimination and routine humiliation.

In Table 4, we decompose the IPC crimes into two mutually exclusive categories: crimes against body and non-body crimes. Body crimes are the sum of murder, rape, kidnapping and physical assault/hurt. Non-body crimes are the sum of dacoity, robbery, arson and other classified IPC crimes and comprised of largely property crimes. In columns 1 and 2, where the dependent variable is the SCST body crime rate, we report results of the expenditure ratio specification and the group-wise expenditure specification respectively. Neither expenditure ratio nor the upper castes' expenditure is associated with the incidence of body crimes. In columns 3 and 4, the dependent variable is the SCST non-body crime rate. Column 3 indicates a positive association between the expenditure ratio and non-body crimes. In column 4, upper castes' expenditure is negatively associated with non-body victimization. The coefficient on the Gini is positive and significant for the non-body crimes but not for the body crimes. These results suggest that it is the non-body crimes component of the IPC crimes against SCSTs that is responsive to changes in the expenditure ratio and upper castes' expenditure. This indicates that IPC crimes against SCSTs occur as crimes with the objective of expropriating or wresting economic surplus from the victims rather than inflicting physical bodily harm. In fact, this observation is supported by evidence on the ground, wherein Dalits are often deprived of their property or markers of material wealth by way of their houses being set on fire or damaged, looting of cash or valuables and forced evictions if caste hierarchies are threatened (e.g., Senthalir, 2012; Katulkar, 2013).

An assumption that is tenable and crucial to this study and especially for our finding of non-body, property crimes being sensitive to changes in economic positions is that the perpetrators can observe the changes in material standard of living of victims. Studies show that the lower castes have made significant strides in terms of consumption expenditure and asset accumulation and specifically, in their expenditures on items of conspicuous consumption. For instance, Prasad et al. (2010) through a recall survey of Dalit households, document substantial changes over two decades in their ownership of consumer durables such as cellphones, scooters, televisions, in grooming practices, eating habits, and expenditure on social occasions such as weddings. All this signals social status and a pattern of status upgrading which are easily observable.[20]

5. Robustness checks and other concerns

This section discusses robustness checks and considers questions and concerns that might follow from the results and addresses how we mitigate these concerns.

The first robustness test is to check the sensitivity of our results to alternative methods of measuring standard of living. In order to do this, we use the underemployment rate instead of the per capita expenditure. This is similar to D'Alessio et al. (2002) and Jacobs and Wood (1999) who use the ratio of unemployment rate of blacks and whites to measure economic competition between racial groups. In panel (A) of Table 5, we regress the crime rates per 100,000 SCSTs on the ratio of underemployment rate of SCSTs to that of upper castes. Results show that the ratio of underemployment rates has a negative and significant coefficient, indicating that a decrease in the ratio or intensifying of economic competition between castes is associated with an increase in violence. Further, in panel (B) of Table 5, we use group-wise underemployment rates of SCSTs, OBCs and upper castes. We see that it is only the upper caste underemployment rate that is significant and positive, suggesting that an increase in the underemployment rate of the upper castes is associated with them committing more crimes against SCSTs. Moreover, mirroring our results using expenditure specifications, we find underemployment variables to be significant only for total, IPC and non-body crimes and not for SLL or body crimes.

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[19] "When Dalits from the Dalit colony of Veludavur village in Villapuram district, Tamil Nadu, demanded their right to participate in a government auction of common properties in Veludavur, members of seven neighboring caste Hindu villages attacked their colony, destroying 400 huts, attacking women, children, and the elderly, and displacing 700 Dalit families." Center for Human Rights and Global Justice and Human Rights Watch (2007, p. 60).

[20] When Dalits do acquire land, the right of access to land is routinely infringed and their land is often illegally encroached upon by upper castes (Human Rights Watch, 1999).

Table 4
Body crimes and non-body crimes.

	Col. 1 Body crime rate	Col. 2 Body crime rate	Col. 3 Non-body crime rate	Col. 4 Non-body crime rate
Ln (SCST exp/UC exp)	0.0559 (0.154)		0.417** (0.186)	
% SCST population	−0.0897*** (0.0113)	−0.0929*** (0.0105)	−0.100*** (0.0127)	−0.0985*** (0.0146)
% SCST population squared	0.0007*** (0.0002)	0.0008*** (0.0001)	0.0009*** (0.0002)	0.0009*** (0.0002)
Gini	0.362 (1.122)	0.417 (1.048)	4.086*** (1.439)	4.039*** (1.356)
Ln (SCST expenditure)		−0.259 (0.292)		−0.225 (0.365)
Ln (UC expenditure)		−0.182 (0.190)		−0.691*** (0.221)
Ln (OBC expenditure)		0.193 (0.297)		0.308 (0.361)
N umber of districts	828	818	828	818
F	10.34	9.41	7.74	8.09
R^2	0.211	0.202	0.180	0.180

Note: Standard errors clustered at the district level are reported in parentheses. All dependent variables are in logarithm terms. Crime rate is crimes per 100,000 SCST population. Body crimes are the sum of murder, rape, kidnapping and physical assault. Non-body crimes are the sum of dacoity, robbery, arson and other IPC crimes. Controls included (but not shown) are percent rural, percentage of young males, education dummies, log of expenditure, underemployment rate and effective number of parties. All regressions include district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 5
Underemployment rate as an alternative explanatory variable.

	Total crime rate	IPC crime rate	SLL crime rate	Body crime rate	Non-body crime rate
Panel A. Relative underemployment specification					
(SCST underemp/UC underemp)	−0.019*** (0.006)	−0.035*** (0.010)	−0.015 (0.013)	−0.021 (0.014)	−0.027*** (0.010)
Underemployment rate	0.001 (0.004)	0.002 (0.006)	0.010 (0.009)	−0.000 (0.006)	−0.001 (0.007)
Observations	827	827	827	827	827
R^2	0.345	0.235	0.126	0.231	0.184
Panel B. Group-wise underemployment specification					
SCST underemployment	−0.001 (0.004)	0.000 (0.005)	−0.009 (0.007)	−0.001 (0.005)	0.001 (0.005)
OBC underemployment	−0.010 (0.007)	−0.009 (0.007)	0.014 (0.010)	−0.006 (0.007)	−0.013 (0.008)
UC underemployment	0.012*** (0.004)	0.011** (0.005)	0.009 (0.009)	0.008 (0.005)	0.011* (0.006)
Observations	822	822	822	822	822
R^2	0.359	0.217	0.134	0.207	0.177

Note: Standard errors clustered at the district level are reported in parentheses. Controls included (but not shown) are SCST%, SCST% squared, percent rural, percentage of young males, education dummies, log of expenditure, Gini and effective number of parties. All regressions include district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

The second test examines the robustness of our results to changes in particular variable definitions. As can be seen in Table 6, we re-estimate the regressions using alternative variable definitions as follows: (i) measuring the dependent variable as crimes per 100,000 total population instead of 100,000 SC/ST population (panel A); (ii) using district-level real per capita net domestic product instead of district-level per capita expenditure as a measure of level of development of district

Table 6
Robustness checks using alternative variable definitions.

	Total crime rate	Total crime rate	IPC crime rate	IPC crime rate	SLL crime rate	SLL crime rate
Panel A. Measuring crime rate per 100,000 total population						
Ln (SCST exp/UC exp)	0.311***		0.362**		0.305	
	(0.117)		(0.149)		(0.290)	
Ln (SCST expenditure)		0.136		−0.113		0.44
		(0.179)		(0.304)		(0.468)
Ln (UC expenditure)		−0.285*		−0.511***		−0.0924
		(0.154)		(0.187)		(0.342)
Ln (OBC expenditure)		−0.0745		0.076		−0.141
		(0.18)		(0.306)		(0.453)
Number of districts	828	818	828	818	828	818
R^2	0.07	0.218	0.029	0.082	0.059	0.124
Panel B. Using district per capita net domestic product						
Ln (SCST exp/UC exp)	0.315***		0.362**		0.292	
	(0.122)		(0.153)		(0.308)	
Ln (SCST expenditure)		0.079		−0.177		0.259
		(0.213)		(0.327)		(0.497)
Ln (UC expenditure)		−0.359**		−0.579***		−0.219
		(0.148)		((0.189)		(0.354)
Ln (OBC expenditure)		−0.053		0.089		−0.13
		(0.198)		(0.324)		(0.458)
Number of districts	793	783	793	783	793	783
R^2	0.356	0.367	0.226	0.227	0.149	0.149
Panel C. Using unemployment rate						
Ln (SCST exp/UC exp)	0.293**		0.348**		0.277	
	(0.117)		(0.150)		(0.292)	
Ln (SCST expenditure)		0.0110		−0.212		0.350
		(0.184)		(0.311)		(0.473)
Ln (UC expenditure)		−0.323**		−0.543***		−0.108
		(0.154)		(0.186)		(0.347)
Ln (OBC expenditure)		−0.0342		0.107		−0.135
		(0.177)		(0.303)		(0.458)
Number of districts	828	818	828	818	828	818
R^2	0.349	0.444	0.221	0.254	0.125	0.180
Panel D. Using Theil Index						
Ln (SCST exp/UC exp)	0.259**		0.331**		0.244	
	(0.113)		(0.151)		(0.288)	
Ln (SCST expenditure)		−0.00311		−0.247		0.301
		(0.180)		(0.299)		(0.467)
Ln (UC expenditure)		−0.263*		−0.514***		−0.0561
		(0.145)		(0.193)		(0.336)
Ln (OBC expenditure)		−0.0183		0.133		−0.0873
		(0.175)		(0.296)		(0.458)
Number of districts	828	818	828	818	828	818
R^2	0.34	0.44	0.222	0.254	0.127	0.186
Panel E. Using Seat Share for Effective # of Parties						
Ln (SCST exp/UC exp)	0.301***		0.360**		0.257	
	(0.115)		(0.150)		(0.292)	
Ln (SCST expenditure)		0.0974		−0.138		0.402
		(0.175)		(0.292)		(0.478)
Ln (UC expenditure)		−0.302*		−0.534***		−0.06
		(0.154)		(0.186)		(0.345)
Ln (OBC expenditure)		−0.0273		0.141		−0.176
		(0.176)		(0.294)		(0.462)
Number of districts	828	818	828	818	828	818
R^2	0.361	0.455	0.237	0.262	0.123	0.185

Note: Standard errors clustered at the district level are reported in parentheses. All dependent variables are in logarithm terms. All regressions include controls as in previous regressions and district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 7
Alternative specification of dependent variable.

	Total crimes	IPC crimes	SLL crimes	Body crimes	Non-body crimes
Panel A. Relative expenditure specification					
Ln(SCST exp/UC exp)	0.298**	0.351**	0.285	0.051	0.413**
	(0.118)	(0.151)	(0.288)	(0.154)	(0.188)
Ln(expenditure)	0.071	−0.305	0.508	0.030	−0.264
	(0.268)	(0.381)	(0.588)	(0.328)	(0.427)
Observations	828	828	828	828	828
Panel B. Group-wise expenditure specification					
Ln(SCST expenditure)	0.242	−0.030	0.598	−0.154	−0.121
	(0.181)	(0.305)	(0.473)	(0.281)	(0.363)
Ln(UC expenditure)	−0.295**	−0.519***	−0.107	−0.138	−0.646***
	(0.148)	(0.188)	(0.334)	(0.189)	(0.225)
Ln(OBC expenditure)	−0.072	0.078	−0.137	0.159	0.275
	(0.190)	(0.313)	(0.456)	(0.288)	(0.354)
Observations	818	818	818	818	818

Note: Dependent variable is ln (1 + number of crimes). Standard errors clustered at the district level are reported in parentheses. Controls included (but not shown) are SCST%, SCST% squared, percent rural, percentage of young males, underemployment rate, Gini and effective number of parties. Log of population is used as scaling variable on right hand side. All regressions include district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

(panel B)[21]; (iii) using the unemployment rate instead of the underemployment rate (panel C); (iv) using the Theil Index instead of Gini as an inequality measure (panel D)[22]; (v) using seat share instead of vote share to calculate the effective number of parties (panel E). Our results are robust to using these alternative measures of variables.

As a third robustness check, instead of using the log of the crime rate per 100,000 SCSTs as the dependent variable, we use the natural log of the *number* of crimes and estimate the model using linear fixed effects regressions. In order to avoid losing observations where the number of crimes are zero, we add a small value of 1 to the number of crimes. We control for log of total population on the right hand side in addition to the other control variables. In Table 7 (panels A and B), we report results using the relative expenditure and group-wise expenditure specifications respectively for total crimes, IPC crimes, SLL crimes, body crimes and non-body crimes. Results using these specifications are in line with those from Tables 2 and 3.

A fourth test involves iteratively running the entire set of regressions by dropping one state at a time, to rule out the concern that results could be driven by particular high crime states such as Rajasthan, Madhya Pradesh or Uttar Pradesh, such that excluding observations from those states might alter our results. Results using the SCST total crime rate as dependent variable reported in Tables 8 and 9 for the relative expenditure and group-wise expenditure specifications respectively indicate that our results are robust to such exclusions. The bottom panels of both tables show that our results hold even when we drop the high crime states of Rajasthan, Madhya Pradesh and Uttar Pradesh simultaneously.

A fifth concern is that the crimes against SCSTs could be a part of the overall trend of crimes in the district. If the relative economic status of caste groups is also correlated with general non-caste related crimes in the district, then we cannot conclude that it is only crimes against SCSTs that are uniquely linked to relative group economic positions. In order to check for this, in Table 10, we present results of linear fixed effects regressions where the dependent variable is logarithm of 'general IPC crime rate'. The general IPC crime rate is calculated as total IPC crimes in the district less IPC crimes against SCSTs per 100,000 non-SCST population.[23] If the coefficients on our expenditure variables turn out to be insignificant, we can rule out this concern. In column 1, the coefficient of the expenditure ratio is insignificant, as are the group-wise expenditures in column 2, which stress the fact that differences in material standard of living between caste groups uniquely affect crimes against SCST groups and are not associated with general IPC crimes in society. Note that a measure analogous to the general IPC crime rate cannot be constructed for SLL crimes since the types of SLL crimes related to SCSTs (Protection of Civil Rights Act and Prevention of Atrocities Act) do not find parallels with SLL crimes affecting the broader population.[24] Therefore, a 'general SLL crime rate' would not be meaningful. However, we can construct measures of 'general body crime rate' and 'general non-body crime rate' along the lines of general IPC crime rate. Results for the general body crime rate in column 4 indicate that the upper caste expenditure is negatively correlated with the incidence of body crimes affecting the general population. It should be recalled that

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[21] This includes all states with the exception of Gujarat for which we were unable to obtain data.
[22] The formula for Theil Index is $T = \Sigma_p \left\{ (1/n) * (y_p/\mu_y) * ln(y_p/\mu_y) \right\}$ where n is the number of individuals in the population, y_p is the income of person p and μ_y is the average income of the population.
[23] Since the NCRB does not have information on crimes against non-SCSTs, this is a proxy variable that attempts to capture the same idea. It should be noted that while this is the closest approximation of general crimes (i.e. those not targeted at SCSTs) given the available data, it is inclusive of crimes where both victims and perpetrators are SCSTs.
[24] For instance, some of the SLL crimes with respect to the general population are: Excise Act, Dowry Prohibition Act, Arms Act, Prohibition Act, etc.

Table 8
Excluding states one at a time: relative expenditure specification.

	Excl. Andhra Pr.	Excl. Bihar	Excl. Chhattisgarh
Ln (SCST exp/UC exp)	0.304**	0.287**	0.323***
	(0.120)	(0.113)	(0.119)
Number of districts	782	760	814
R^2	0.341	0.361	0.346
	Excl. Gujarat	Excl. Haryana	Excl. Himachal Pr.
Ln (SCST exp/UC exp)	0.326***	0.309**	0.303**
	(0.121)	(0.121)	(0.119)
Number of districts	793	796	806
R^2	0.354	0.329	0.346
	Excl. Jharkhand	Excl. Karnataka	Excl. Kerala
Ln (SCST exp/UC exp)	0.289**	0.292**	0.309**
	(0.115)	(0.122)	(0.120)
Number of districts	792	788	800
R^2	0.336	0.338	0.339
	Excl. Madhya Pr.	Excl. Maharashtra	Excl. Orissa
Ln (SCST exp/UC exp)	0.288**	0.301**	0.314**
	(0.130)	(0.128)	(0.122)
Number of districts	752	768	768
R^2	0.359	0.329	0.378
	Excl. Punjab	Excl. Rajasthan	Excl. Tamil Nadu
Ln (SCST exp/UC exp)	0.299**	0.329***	0.354**
	(0.119)	(0.124)	(0.138)
Number of districts	800	768	783
R^2	0.347	0.340	0.356
	Excl. Uttar Pr.	Excl. Uttarkhand	Excl. West Bengal
Ln (SCST exp/UC exp)	0.347**	0.246**	0.265**
	(0.135)	(0.115)	(0.117)
Number of districts	704	808	794
R^2	0.293	0.354	0.353
	Excl. UP, MP and Rajasthan		
Ln (SCST exp/UC exp)	0.326**		
	(0.162)		
Number of districts	568		
R^2	0.32		

Note: Standard errors clustered at the district level are reported in parentheses. Crime rate is crimes per 100,000 SCST population. All dependent variables are in logarithm terms. Controls included (but not shown) are SCST%, SCST% squared, percent rural, percentage of young males, education dummies, log of expenditure, underemployment rate, Gini and effective number of parties. All regressions include district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

none of the expenditure variables in Table 4 were significant in determining SCST body crime rates. In columns 5 and 6, we do not find the coefficients of the expenditure ratio and group-wise expenditures to be significant in explaining general non-body crime rates. These results indicate that factors driving body and non-body crimes against SCSTs indeed differ from those against the broader population.

For the sixth robustness check, we resort to using a different estimation methodology and model the number of crimes against SCSTs as count data and employ a negative binomial regression model. In panel (A) of Table 11, the 5 columns list results using the relative expenditure specification for number of total crimes, IPC crimes, SLL crimes, body crimes and non-body crimes against SCSTs. In panel (B) of Table 11, the same five outcome variables are regressed on the group-wise expenditure specification. In all these regressions, we add the logarithm of the SCST population on the right hand side. Since the relative expenditure and group-wise expenditures are in log form, the coefficients can be interpreted as elasticities. As is evident from Table 11, our results are robust to alterations in the estimation methodology.

Seventh, while the relationship between hate crimes and non-hate motivated crimes has not been clearly established in the literature, one might argue that areas with higher levels of general crimes are more susceptible to the occurrence of caste-based crimes on account of poorer law enforcement machinery, among other things. It should be noted that the district fixed effects are possibly accounting for a general culture of violence or criminality in the district. However, the general crime rate is surely not time-invariant and is something that varies across the period. To that end, we include the 'general IPC crime rate' in the regression equation. Results from panels (A) and (B) of Table 12 indicate that our main results for total, IPC and SLL crimes are robust to controlling for the general IPC crime rate. Moreover, we find that the coefficient on general

Table 9
Excluding states one at a time: group-wise expenditure specification.

	Excl. Andhra Pr.	Excl. Bihar	Excl. Chhattisgarh
Ln (SCST expenditure)	0.095 (0.196)	0.068 (0.183)	0.163 (0.192)
Ln (UC expenditure)	−0.358** (0.145)	−0.346** (0.138)	−0.358** (0.144)
Ln (OBC expenditure)	−0.027 (0.203)	−0.012 (0.193)	−0.066 (0.197)
Observations	772	750	804
R^2	0.345	0.360	0.349
	Excl. Gujarat	Excl. Haryana	Excl. Himachal Pr.
Ln(SCST expenditure)	0.175 (0.197)	0.148 (0.191)	0.124 (0.196)
Ln(UC expenditure)	−0.354** (0.146)	−0.336** (0.145)	−0.345** (0.143)
Ln(OBC expenditure)	−0.072 (0.199)	−0.013 (0.200)	−0.008 (0.212)
Observations	783	786	800
R^2	0.357	0.333	0.342
	Excl. Jharkhand	Excl. Karnataka	Excl. Kerala
Ln(SCST expenditure)	0.157 (0.194)	0.197 (0.197)	0.154 (0.197)
Ln(UC expenditure)	−0.309** (0.135)	−0.296** (0.147)	−0.338** (0.146)
Ln(OBC expenditure)	−0.051 (0.190)	−0.024 (0.204)	−0.033 (0.200)
Observations	782	778	790
R^2	0.340	0.340	0.343
	Excl. Madhya Pr.	Excl. Maharashtra	Excl. Orissa
Ln(SCST expenditure)	0.035 (0.195)	0.097 (0.205)	0.196 (0.195)
Ln(UC expenditure)	−0.336** (0.156)	−0.346** (0.158)	−0.330** (0.154)
Ln(OBC expenditure)	−0.075 (0.201)	−0.064 (0.201)	−0.027 (0.211)
Observations	742	758	758
R^2	0.370	0.333	0.384
	Excl. Punjab	Excl. Rajasthan	Excl. Tamil Nadu
Ln(SCST expenditure)	0.105 (0.192)	0.119 (0.203)	0.196 (0.195)
Ln(UC expenditure)	−0.349** (0.144)	−0.385** (0.151)	−0.397** (0.173)
Ln(OBC expenditure)	−0.039 (0.208)	−0.055 (0.209)	−0.013 (0.199)
Observations	790	758	773
R^2	0.350	0.345	0.359
	Excl. Uttar Pr.	Excl. Uttarkhand	Excl. West Bengal
Ln(SCST expenditure)	0.252 (0.226)	0.152 (0.192)	0.013 (0.193)
Ln(UC expenditure)	−0.337** (0.162)	−0.308** (0.142)	−0.326** (0.141)
Ln(OBC expenditure)	−0.095 (0.209)	−0.037 (0.196)	0.011 (0.203)
Observations	694	804	784
R^2	0.294	0.359	0.358

Table 9 (*continued*)

	Excl. UP, MP and Rajasthan
Ln (SCST exp)	−0.016
	(0.253)
Ln (UC exp)	−0.358*
	(0.188)
Ln (OBC exp)	−0.176
	(0.234)
Number of districts	558
R^2	0.343

Note: Standard errors clustered at the district level are reported in parentheses. Crime rate is crimes per 100,000 SCST population. All dependent variables are in logarithm terms. Controls included (but not shown) are SCST%, SCST% squared, percent rural, percentage of young males, education dummies, underemployment rate, Gini, and effective number of parties. All regressions include district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 10
Falsification tests using general crime rates.

	General IPC crime rate		General body crime rate		General non-body crime rate	
	Col.1	Col.2	Col.3	Col.4	Col.5	Col.6
Ln(SCST exp/UC exp)	0.060		0.142		−0.002	
	(0.053)		(0.087)		(0.059)	
Ln(SCST expenditure)		0.110		0.104		0.058
		(0.093)		(0.203)		(0.096)
Ln(UC expenditure)		−0.019		−0.228**		0.047
		(0.060)		(0.111)		(0.071)
Ln(OBC expenditure)		−0.003		−0.212		−0.025
		(0.099)		(0.181)		(0.111)
Observations	828	818	828	818	828	818
R^2	0.394	0.373	0.288	0.261	0.319	0.297

Note: Standard errors clustered at the district level are reported in parentheses. Crime rate is calculated per 100,000 non-SCST population. All dependent variables are in logarithm terms. Controls included (but not shown) are percent rural, percentage of young males, education dummies, log of expenditure, underemployment rate, Gini and effective number of parties. All regressions include district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

crime rate is positive and significant suggesting that districts with higher levels of general crimes do in fact experience greater victimization of the SC/ST community.

Endogeneity is another potential concern. Targeted crimes of a violent nature against the SCST community could be a debilitating force leading to reduced earnings and expenditures, which would make them further worse-off compared to the upper castes. This reverse causality concern could be potentially mitigated by the fact that we are using crimes data beginning one year after the expenditure. However, the crime data may be serially correlated such that crimes in the present period are correlated with crimes in the immediate past and future periods. While a dynamic panel model can be used with lagged values of crimes and expenditures as internal instrumental variables (IV) to address this concern, unfortunately, district-level crimes data is available only from 2001, which is the first year of the study period. Further, given available data and the nature of the problem at hand, it is difficult to find a credible external IV or an exogenous policy change that correlates with changes in expenditures, but does not affect caste-based crimes. Omitted variable bias could also exist but that should be controlled to some extent by our use of district fixed effects. We acknowledge that given the potential endogeneity concern, our results should not be interpreted in a causal manner.

Another possible concern could be out-migration of SCs and STs on account of such targeted violence from their districts to other lower crime districts.[25] If this were the case, our coefficients would be underestimated. While, we cannot control for this possibility in our regression analysis since the NSS data do not allow us to identify migration, we cite findings from other

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[25] Tolnay and Beck (1992) find that southern counties in USA that witnessed high levels of mob violence against blacks during 1910–1930 experienced greater black out-migration as compared to other counties.

Table 11
Alternative estimation methodology.

	Total crimes	IPC crimes	SLL crimes	Body crimes	Non-body crimes
Panel A. Negative binomial regressions using relative expenditure specification					
Ln(SCST exp/UC exp)	0.263**	0.286**	0.196	0.104	0.349**
	(0.104)	(0.137)	(0.188)	(0.133)	(0.165)
Ln(expenditure)	0.302	0.038	0.304	0.192	0.269
	(0.188)	(0.239)	(0.292)	(0.250)	(0.263)
Observations	824	820	810	806	810
Panel B. Negative binomial regressions using group-wise expenditure specification					
Ln(SCST expenditure)	0.212	−0.049	0.497	0.033	0.043
	(0.164)	(0.214)	(0.290)	(0.222)	(0.245)
Ln(UC expenditure)	−0.265**	−0.441***	0.023	−0.130	−0.521***
	(0.122)	(0.159)	(0.220)	(0.154)	(0.192)
Ln(OBC expenditure)	0.179	0.290	−0.271	0.157	0.391
	(0.159)	(0.195)	(0.311)	(0.236)	(0.212)
Observations	806	802	792	788	792

Note: Standard errors are reported in parentheses. Controls included (but not shown) are SCST%, SCST% squared, percent rural, percentage of young males, education dummies, underemployment rate, Gini and effective number of parties. Log of SCST population is used as scaling variable on right hand side. All regressions include district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

Table 12
Including a control for general crime rates.

	Total crime rate	IPC crime rate	Body crime rate	Non-body crime rate
Panel A. Relative expenditure specification				
Ln(SCST exp/UC exp)	0.247**	0.305**	0.013	0.369*
	(0.122)	(0.151)	(0.153)	(0.188)
General IPC crime rate	0.953***	0.836***	0.721***	0.793***
	(0.123)	(0.167)	(0.163)	(0.190)
Observations	828	828	828	828
R^2	0.436	0.266	0.248	0.211
Panel B. Group-wise expenditure specification				
Ln(SCST expenditure)	0.030	−0.219	−0.336	−0.307
	(0.184)	(0.305)	(0.292)	(0.362)
Ln(UC expenditure)	−0.322**	−0.548***	−0.169	−0.677***
	(0.153)	(0.185)	(0.184)	(0.222)
Ln(OBC expenditure)	−0.036	0.114	0.195	0.311
	(0.178)	(0.301)	(0.289)	(0.344)
General IPC crime rate	0.981***	0.768***	0.706***	0.741***
	(0.123)	(0.173)	(0.167)	(0.205)
Observations	818	818	818	818
R^2	0.442	0.255	0.236	0.206

Note: Standard errors clustered at the district level are reported in parentheses. Crime rate is measured per 100,000 SCST population. All dependent variables are in logarithm terms. General IPC crime rate is (log of) total IPC crimes less IPC crimes against SCSTs per 100,000 non-SCST population. Controls included (but not shown) are SCST%, SCST% squared, percent rural, percentage of young males, education dummies, log of expenditure, underemployment rate, Gini and effective number of parties. All regressions include district fixed effects, time dummy and constant term.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

data sources to examine this issue. Bhagat (2009) using 2001 Indian Census data documents that 62 percent of the internal migration in India is in the form of intra-district migration. Inter-district and inter-state migration account for 24 percent and 13 percent respectively of total internal migration. For males and females, employment and marriage respectively are the primary reasons for migration indicating that migration is on account of reasons other than violence. More crucially, since our unit of analysis is the district and the largest stream of migration is intra-district, our results are not likely to be affected.

One could also claim that the effects we observe are really those of changes in reporting of crimes rather than changes in actual incidence of crime. We argue that is not the case. Firstly, reporting is expected to a function of victim characteristics

but what is explaining the crime rate in our results are not victim but perpetrator characteristics (Table 3). This gives us good reason to believe that what we are observing is a case of incidence rather than reporting of crime. Secondly, the SLL crimes are caste-based crimes motivated solely by the lower caste status of the victims. Also, SLL crimes result in more serious penalties and punishments for perpetrators. Therefore, this should be the category that is most likely to be sensitive to reporting by victims.[26] However, as our regressions indicate, SLL crimes are not associated with changes in economic status.

Finally, and more in the nature of a caveat, is the fact that since the analysis is conducted at the level of the district, nothing can be definitively said about the nature of individual motivations that leads to the incidence of such crimes. This means that theories that make predictions about individual incentives to engage in such behavior that do not vary across districts, cannot be tested. Having said that, with the available data, these results provide evidence that variations in relative group economic positions are linked to variations in violence levels.

6. Conclusion

This paper provides one of the first analyses of crimes against Scheduled Castes and Tribes in India with a view to understanding how a change in the gap between upper and lower castes' standard of living is associated with the victimization of the SCST community. We find that changes in relative economic position between the lower castes and upper castes are positively correlated with changes in the incidence of crimes, such that a widening of the gap in expenditures between the lower and upper castes is associated with a decrease in crimes committed by the upper castes against the SCSTs. Further, between the IPC and SLL crimes it is the violent IPC crimes that are responsive to changes in economic gaps. Moreover, this is driven by an improvement in the economic well-being of the upper castes rather than a decline in the economic position of the lower castes. We interpret this as the upper castes responding to changes in threat perception created by changes in the relative positions between the two groups. As a re-affirmation of this conjecture, we find that among the largely violent crimes, it is the non-body crimes – crimes that seek to deprive the victim of his property symbolic of his material progress – that are affected by the changes in relative standards of living.

Even though the magnitudes of the associations we obtain are small, this paper documents a perverse consequence of inter-caste equality. We are not suggesting that reducing inequalities is undesirable, but stressing that despite significant social and economic transformation, caste hierarchies continue to remain deeply entrenched in contemporary India and these fraught caste relations often result in violent outcomes that our paper discusses. To that end, a policy recommendation would be to strengthen the judicial response to caste-based atrocities so as to serve as an effective deterrent for perpetrators and to attempt to establish a broader anti-discriminatory climate in the country. While the Prevention of Atrocities Act, 1989 mandates special legal provisions such as special public prosecutors to ensure speedy trial of cases, setting up of special courts in every district, no bail for perpetrators, and socioeconomic rehabilitation and protection of victims and witnesses, in practice, the implementation is severely deficient. For instance, at the end of 2007, 79 percent of cases remained pending for trial showing no significant progress over a pendency rate of 82.5 percent in 2001 (National Coalition for Strengthening SCs and STs Prevention of Atrocities Act, 2010). Such failures in filing, investigating and pursuing cases empower potential perpetrators by signaling that crimes against lower castes will go unpunished and also further disempowers marginalized communities by eroding their trust in the legal system. Moreover, a regular occurrence of such crimes may lead to secondary victimization i.e., it creates a sense of vulnerability and anxiety not just for the victim but also for the wider community (McDevitt et al., 2001).[27]

While our analysis uses the most disaggregated official data that are available, which is a good starting point, a study at the village level would make the analysis much richer since the occurrence of such events is highly dependent on more local dynamics. Future research can aim to do the following: one, study the occurrence of such violence through victimization surveys; two, exploit overlaps in caste and religion identities to study the incidence of crimes; three, use newspaper reports to construct measures of crime incidence since this allows a clear identification of the caste of victims and perpetrators. As was mentioned earlier, the police collect data on crimes by non-SCSTs against SCSTs since these groups are considered vulnerable and figure prominently in public policy. But it would be interesting to study other classifications as well since this might allow us to identify for instance, the extent of retaliation, if any, by the lower castes and tribes. Also, since SCs and STs are a heterogeneous group – although constitutionally assigned the same status – it would be interesting to measure conflict among various sub-castes on account of some sub-castes progressing politically or economically more than others.

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[26] Iyer et al. (2012) find better reporting of SLL crimes after lower castes obtain mandated representation in local councils.

[27] Levin and McDevitt (1993) also argue that such crimes have a more deleterious effect since victims of such crimes are 'interchangeable' i.e. they are singled out on the basis of their social identity and not out of any prior personal vendetta.

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Appendix A. Crimes against SCs/STs included in Special and Local Laws (SLL)

(1) The Protection of Civil Rights Act, 1955

Sections 3–7A of the Act define the following as offences if committed on the ground of "untouchability":

1. Prevention from entering public worship places, using sacred water resources.
2. Denial of access to any shop, public restaurant, hotel, public entertainment, cremation ground, etc.
3. Refusal of admission to any hospital, dispensary, educational institutions, etc.
4. Refusal to sell goods and render services.
5. Molestation, causing injury, insult, etc.
6. Compelling a person on the ground of untouchability to do any scavenging or sweeping or to remove any carcass, etc.

(2) The Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989

Whoever, not being a member of a Scheduled Caste or a Scheduled Tribe:

1. Forces a member of a Scheduled Caste or a Scheduled Tribe to drink or eat any inedible or obnoxious substance.
2. Acts with intent to cause injury, insult or annoyance to any member of a Scheduled Caste or a Scheduled Tribe by dumping excreta, waste matter, carcasses or any other obnoxious substance in his premises or neighborhood.
3. Forcibly removes clothes from the person of a member of a Scheduled Caste or a Scheduled Tribe or parades him naked or with painted face or body or commits any similar act which is derogatory to human dignity.
4. Wrongfully occupies or cultivates any land owned by, or allotted to, or notified by any competent authority to be allotted to, a member of a Scheduled Caste or a Scheduled Tribe or gets the land allotted to him transferred.
5. Wrongfully dispossesses a member of a Scheduled Caste or a Scheduled Tribe from his land or premises or interferes with the enjoyment of his rights over any land, premises or water.
6. Compels or entices a member of a Scheduled Caste or a Scheduled Tribe to do 'begar' or other similar forms of forced or bonded labor other than any compulsory service for public purposes imposed by Government.
7. Forces or intimidates a member of a Scheduled Caste or a Scheduled Tribe not to vote or vote for a particular candidate or to vote in a manner other than that provided by law.
8. Institutes false, malicious or vexatious suit or criminal or other proceedings against a member of a Scheduled Caste or a Scheduled Tribe.
9. Gives any false or frivolous information to any public servant and thereby causes such public servant to use his lawful power to the injury or annoyance of a member of a Scheduled Caste or a Scheduled Tribe.
10. Intentionally insults or intimidates with intent to humiliate a member of a Scheduled Caste or a Scheduled Tribe.
11. Assaults or uses force to any woman belonging to a Scheduled Caste or a Scheduled Tribe with intent to dishonor or outrage her modesty.
12. Being in a position to dominate the will of a woman belonging to a Scheduled Caste or a Scheduled Tribe and uses that position to exploit her sexually to which she would not have otherwise agreed.
13. Corrupts or fouls the water of any spring, reservoir, or any other source ordinarily used by members of the Scheduled Caste or the Scheduled Tribe so as to render it less fit for the purpose for which it is ordinarily used.
14. Denies a member of a Scheduled Caste or a Scheduled Tribe any customary rite of passage to a place of public resort or obstructs such members so as to prevent him for using or having access to a place of public resort to which other members of public or any section thereof have a right to use or access to.
15. Forces or causes a member of a Scheduled Caste or a Scheduled Tribe to leave his house, village, or any other place of residence.

Appendix B. Mapping districts across 1999–2000 and 2004–2005

Since there were changes in the district boundaries between the NSS 55th and 61st rounds, it is important to make the districts comparable across the two rounds so that a panel can be constructed. In order to do so, weights calculated by Kumar and Somanathan (2009) have been used. This appendix details for each state, the changes that have been made to districts to make them compatible between the two NSS rounds. New "child" districts have been merged back to their "parent" districts in the NSS 55th round. Where a new "child" district was formed by carving out areas from multiple "parent" districts, the exact weights have been reported.

There were no changes across the two NSS rounds for the following states:

1. Kerala
2. Andhra Pradesh
3. Orissa
4. Himachal Pradesh.

Uttar Pradesh:

1. Hamirpur and Mahoba were combined to form Hamirpur district.
2. Kaushambi and Allahabad were combined to form Allahabad district.
3. Bahraich and Shrawasti were combined to formed Bahraich district.
4. Kushinagar and Deoria were combined to form Deoria district.
5. Varanasi and Sant Ravidas Nagar were combined to form Varanasi district.
6. Gautam Buddha Nagar was formed from parts of Ghaziabad and Bulandshahar and the weights were 0.55 and 0.45 respectively.
7. Sant Kabir Nagar was formed from parts of Basti and Sidharthnagar and the weights were 0.91 and 0.09 respectively.
8. Ambedkar Nagar was formed from parts of Faizabad and Azamgarh and the weights were 0.98 and 0.02 respectively.

Uttarakhand:

1. Rudraprayag district was formed from parts of Chamoli, Tehri Garhwal and Garhwal and the weights were 0.65, 0.3 and 0.05 respectively.
2. Almora and Bageshwar were combined to form Almora district.
3. Nainital and Udham Singh Nagar were combined to form Nainital district.

Haryana:

1. Panchkula and Ambala were combined to form Ambala district.
2. Fatehabad and Hissar were combined to form Hissar district.
3. Rohtak and Jhajjar were combined to form Rohtak district.

Punjab:

1. Moga was formed from parts of Ferozepur and Faridkot and the weights were 0.2 and 0.8 respectively.
2. Nawanshahr was formed from parts of Jalandhar and Hoshiarpur and the weights were 0.71 and 0.29 respectively.
3. Muktsar and Faridkot were combined to form Faridkot district.

Madhya Pradesh:

1. Sheopur and Morena were combined to form Morena district.
2. Umaria and Shahdol were combined to form Shahdol district.
3. Neemuch and Mandsaur were combined to form Mandsaur district.
4. Harda and Hoshangabad were combined to form Hoshangabad district.
5. Katni and Jabalpur were combined to form Jabalpur district.
6. Dindori and Mandla were combined to form Mandla district.

Chhattisgarh: The state was formed on November 1, 2000 when 16 districts in south-eastern Madhya Pradesh gained separate statehood. In the NSS 1999–2000, the state of Chhattisgarh did not exist in the data whereas it did exist in the NSS 2004–2005 round.

1. Raipur, Mahasamund and Dhamtari were combined to form Raipur district.
2. Surguja and Koriya were combined to form Surguja district.
3. Bilaspur, Korba and Janjgir-Champa were combined to form Bilaspur district.
4. Bastar, Kanker and Dantewada were combined to form Bastar district.
5. Jashpur and Raigarh were combined to form Raigarh district.
6. Kabirdham (Kawardha) was formed from parts of Rajnandgaon and Bilaspur and the weights were 0.68 and 0.32 respectively.

West Bengal:

1. Uttar Dinajpur district and Dakshin Dinajpur were combined to form West Dinajpur district.

Rajasthan:

1. Hanumangarh and Ganganagar were combined to form Ganganagar district.
2. Sawai Madhopur and Karauli were combined to form Sawai Madhopur district.

Gujarat:

1. Anand and Kheda were combined to form Kheda district.
2. Dahod and Panchmahal were combined to form Panchmahal district.
3. Navsari and Valsad were combined to form Valsad district.
4. Porbandar and Junagadh were combined to form Junagadh district.
5. Narmada was formed from parts of Bharuch and Vadodara and the weights were 0.89 and 0.11 respectively.
6. Patan was formed from parts of Banskantha and Mehsana and the weights were 0.17 and 0.83 respectively.

Maharashtra:

1. Gondia and Bhandara were combined to form Bhandara district.
2. Hingoli and Parbhani were combined to form Parbhani district.
3. Washim and Akola were combined to form Akola district.
4. Dhule and Nandurbar were combined to form Dhule district.

Karnataka:

1. Bagalkot and Bijapur were combined to form Bijapur district.
2. Chamrajnagar and Mysore were combined to form Mysore district.
3. Gadag, Haveri and Dharwad were combined to form Dharwad district.
4. Koppal and Raaichur were combined to form Raichur district.
5. Udupi and Dakshin Kannada were combined to form Dakshin Kannada district.
6. Davanagere was formed from parts of Bellary, Chitradurga and Shimoga and the weights were 0.15, 0.56 and 0.29 respectively.

Tamil Nadu:

1. Kancheepuram and Thiruvallur were combined to form Chengelpattu district.
2. Madurai and Theni were combined to form Madurai district.
3. Salem, Namakkal and Karur were combined to form Salem District.
4. Tiruchirappalli, Ariyalur and Perambalur were combined to form Tiruchirappalli district.
5. Since Thiruvarur district was formed out parts of Thanjavur and Nagapattinam and the weights were not available, it was assumed to be 0.5 each.

Bihar:

1. Sheohar and Sitamarhi were combined to form Sitamarhi district.
2. Munger and Lakhisarai were combined to form Munger district.
3. Sheikhpura and Nalanda were combined to form Nalanda district.

Jharkhand: The state was formed on November 15, 2000 by carving out 18 districts of Bihar. The eighteen districts namely Garhwa, Palamu, Chatra, Hazaribagh, Koderma, Giridih, Deoghar, Godda, Sahebganj, Pakur, Dumka, Dhanbad, Bokaro, Ranchi, Lohardaga, Gumala, West Singhbhum and East Singhbhum were included under the state of Bihar in the 1999–2000 NSS data but under Jharkhand in the 2004–2005 NSS data.

Appendix C. Real monthly per capita expenditure calculation

This section discusses the calculation of monthly per capita expenditure using NSS consumer expenditure surveys of 1999–2000 and 2004–2005.

Reference period: This is the period of time to which the information collected relates. It may vary from item to item. Mixed Reference Period (MRP) refers to 365-day recall for low-frequency items and 30-day recall for everything else. Uniform Reference Period refers to 30-day recall for all items (high and low frequency).

NSS 61st Consumer Expenditure Survey (2004–2005): The reference periods used in the 61st round for different groups of consumption items are given below:

1. **'Last 30 days'**: all food; pan, tobacco and intoxicants; fuel and light; miscellaneous goods and services including non-institutional medical, rents and taxes.
2. **'Last 30 days' and 'Last 365 days'**: clothing, bedding, footwear, education and medical (institutional) and durable goods.

NSS 55th Consumer Expenditure Survey (1999-2000): For food, pan, and tobacco, each household was asked to report all items over both a 7-day and 30-day recall period. At the same time, the traditional 30-day recall period for durables, clothing, educational and institutional medical expenses was replaced by a 365-day recall only.

1. **'Last 7 days' and 'Last 30 days'**: food items, pan, tobacco and intoxicants.
2. **'Last 30 days'**: fuel and light, miscellaneous goods and services including non-institutional medical, rents and taxes.
3. **'Last 365 days'**: educational, medical (institutional), clothing, bedding, footwear and durable goods.

Since the data collection methodology in the 55th round was different from those in other rounds of NSS data, there is a problem of deriving compatible estimates across rounds for the purposes of comparison (see Sen and Himanshu, 2004 for details). In calculating the MPCE, the 30–365 day estimates have been used for both rounds.

Firstly, we add up expenditures on 30-day recall basis for food items, pan, tobacco, intoxicants, fuel and light, non-institutional medical, conveyance entertainment, rents and taxes. To this we add expenditures on 365-day recall basis for clothing, bedding, footwear, education, institutional medical and durables that have been adjusted for a 30-day recall period. Monthly per capita expenditure is then derived by dividing this total expenditure on 30-day recall by the household size.

From the two NSS rounds, we obtain MPCE at nominal prices. In order to assess the real changes in MPCE, we use the official poverty lines specified by the Planning Commission as deflators. The poverty lines are stated separately for the rural and urban sectors. In order to derive the combined rural–urban MPCE, the sector-wise deflated MPCE are combined using population weights for rural and urban sectors. 1999–2000 is used as the base year for these calculations.

Appendix D. Unemployment and underemployment rate calculation

Employment and unemployment are measured using three different approaches, viz. usual status, current weekly status and current daily status. The reference period for these approaches differs – being 365 days preceding the date of survey for 'usual status', 7 days preceding the date of survey for 'current weekly status' and each day of the 7 days preceding the date of survey for 'current daily status'. For this analysis, the unemployment rate is based on the usual status measure and the underemployment rate is based on the current daily status measure.

A person could be in one or a combination of the following three activity or work statuses during a reference period, (i) working or engaged in economic activity; (ii) not engaged in economic activity but either making tangible efforts to seek work or being available for work if the work is available; (iii) not engaged in any economic activity and also not available for work.(i) and (ii) are associated with 'being in labor force' and (iii) with 'not being in the labor force'. Within the labor force, (i) and (ii) are associated with 'employment' and 'unemployment' respectively.

The usual status refers to:

1. The usual principal activity status (UPS): conditional on being in the labor force, a person is considered employed if he has spent a relatively longer time during the 365 days preceding the date of survey (i.e. major time criterion) engaged in economic activity.
2. Usual principal and subsidiary activity status (UPSS): widens the UPS definition by considering a person as employed if he has pursued some subsidiary economic activity for 30 days or more during 365 days preceding the date of survey.

For this analysis, the unemployment rate is based on the broader UPSS measure. The unemployment rate is calculated as the ratio of the number of people employed to the number of people in the labor force.

Underemployment is commonly defined as the underutilization of labor time of the workers. Some of the persons categorized as usually employed, do not have work throughout the year due to seasonality in work, etc. as a result of which their labor time is not fully utilized – they are, therefore, underemployed. We use the current daily status among the usually employed to construct an underemployment measure.

The current daily activity status for a person is determined on the basis of his activity status on each day of the reference week. Each day of the reference week is comprised of either two 'half days' or a 'full day' for assigning the activity status. For

recording time spent on activities pursued by a person in a day, an intensity of 1 is given for an activity that was done for full day and an intensity of 0.5 for the activity that was done for half day. A person is considered employed for the full day if he had worked for 4 h or more during the day. In this way, a person-day measure can be made wherein a person can be a combination of employed, unemployed or outside of the labor force during the last 7 days. The underemployment rate is defined as the proportion of usually employed who were found to be either unemployed or not in labor force according to the current daily status criteria.

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