Visible inequality, status competition and conspicuous consumption: evidence from rural India

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Abstract

If individuals care about their status, defined as their rank in the distribution of conspicuous consumption, a fall in the level of visible inequality is likely to cause them to spend more on conspicuous goods due to increased status competition. I examine this hypothesis using micro data from rural India. Employing an identification strategy based on instrumental variables, I find robust evidence that visible inequality has a negative and significant impact on household conspicuous consumption. Further, my results indicate that the increase in conspicuous expenditure in response to a fall in visible inequality is diverted from education spending which is perceived to have positive social externalities. This suggests that traditional redistributive policies that seek to reduce the level of economic inequality, by encouraging 'wasteful' spending of households, might have adverse welfare consequences.

JEL Classification: D12, O12, Z13.

1 Introduction

Social status has always been considered among the most compelling inducements of human behavior.[1] People care about social status not only for the sake of itself but also because high social status confers many material and non-material benefits (Truyts, 2010). As Weiss and Fershtman (1998, p. 802) put it:

> A person of high status expects to be treated favorably by other individuals with whom he might engage in social and economic interactions. This favorable treatment can take many forms: transfer of market goods, transfer of non-market goods (through marriage, for instance), transfer of authority (letting the high status person be the leader), modified behavior (such as deference or cooperation) and symbolic acts (such as showing respect).

Although the idea of social status is somewhat abstract, one can loosely describe social status of individuals as their relative position in the society that can be 'displayed' to their peers. According to Veblen (1899), the chief way to 'display' social status is through conspicuous consumption, which refers to spending money or other resources on goods that are 'positional' and 'socially visible'.[2] Conforming to this argument, economists have traditionally modeled social status of individuals as their relative rank in the distribution of conspicuous consumption within their peer or reference group, with higher rank implying higher status (e.g. Frank, 1985; Robson, 1992).

Under the assumption that individuals derive positive utility from status tied to their rank in the distribution of conspicuous consumption, it can be argued that their incentive to consume conspicuous goods increases as the dispersion in conspicuous consumption expenditure within their reference group falls. Defining dispersion in conspicuous consumption expenditure as *visible* inequality,[3] this implies that there is likely to exist a negative relationship between conspicuous consumption expenditure of individuals and reference group visible inequality.

[1] The idea that social status is a key motivator of human behavior goes back to the writings of early economists like Veblen (1899) and Duesenberry (1949) and sociologists such as Bourdieu (1979).

[2] According to Hirsch (1976), positional goods are those for which social pressure affects choices more (e.g. clothing, cars, etc.). Socially visible goods are those that are easily observable in social interactions.

[3] Visible inequality, as the term suggests, is the level of economic inequality that is socially visible since this is measured based upon conspicuous consumption which is purely a visible act.

The intuition underlying the argument above follows from an interesting paper by Hopkins and Kornienko (2009) and can be explained follows: A fall in the level of reference group visible inequality – or equivalently a compression of the within-reference group distribution of conspicuous consumption – increases individuals' marginal returns from investing in conspicuous goods since a given increase in conspicuous consumption now allows one to jump over more of one's contemporaries.[4] This, therefore, encourages those who belong to the lower end of the social ladder (i.e. the distribution of conspicuous consumption) to spend more on conspicuous goods in order to overtake the ones who are further up the social ladder in the contest for social status. This, in turn, strengthens the incentives for those belonging to the middle and higher end of the social ladder to acquire more conspicuous goods in order to defend their social status. Put more succinctly, if people are status concerned, a fall in the level of reference group visible inequality, by intensifying the degree of competition for social status, causes conspicuous consumption of *every* individual to rise.

Interestingly, the increase in the individuals' conspicuous expenditure in response to a fall in visible inequality not only represents inefficient transfers from spending on others goods (e.g. healthcare, education) and/or savings (Frank, 2000), but is also 'wasteful' from a social stand point (Hopkins and Kornienko, 2004). This is because, although everyone increases spending on conspicuous goods owing to higher status competition, any gain in status is cancelled out by the similarly increased expenditure of others. As Hopkins and Kornienko (2004) remark, this situation is very similar to the Red Queen effect in Lewis Carroll's 'Through the Looking Glass' in which 'it takes all the running you can do to keep in the same place.'

In this paper, I empirically examine whether a fall in the level of reference group visible inequality – by augmenting status competition – causes conspicuous consumption of households to increase, particularly in a less developed country setting. To do so, I use household level data from rural India. I define a household's reference group as other households living in its village. Strikingly, I find that reference group visible inequality has a significant negative impact on household conspicuous consumption expenditure given permanent income and other demographic controls. More specifically, a one standard deviation decline in visible inequality within the reference group

[4] In other words, the marginal utility from investing in status is higher in a more densely packed reference group since the closer the individuals are together, the easier is it to get ahead of others in status.

causes household conspicuous spending to increase by roughly 15%. This clearly lends support to the hypothesis of status competition. I also find that the sign of the effect of visible inequality on conspicuous consumption is consistently negative across different subsamples (although the magnitude of the effect varies when the sample is cut in certain ways). Further, my results indicate that the higher conspicuous spending of the rural households is drawn from education spending. This is particularly a reason for concern since cutting down expenditure on education not only might cause households to become more economically vulnerable and less resilient to economic shocks in the long run, but it might also have severe negative social spillover effects. Thus, my findings suggest that public policies that are designed to reduce economic inequality might have serious unintended consequences.

Empirical evidence relating to conspicuous consumption is scarce. Charles et al. (2009) examine the impact of race on conspicuous consumption behavior in the context of the United States and show that Blacks and Hispanics devote larger shares of their expenditure bundles to conspicuous goods than do comparable Whites. Khamis et al. (2012), Kaus (2013) and Chai and Kaus (2013) provide additional evidence of the robust link between social identity and conspicuous consumption using data from developing countries like India and South Africa. Brown et al. (2011) empirically analyse the causes of a sharp increase in conspicuous consumption in recent years in China. Heffetz (2011), in an interesting paper, using data from the United States relates income elasticities of goods to their level of visibility. Friehe and Mechtel (2014) provide evidence on the influence of political regimes on the relative importance of conspicuous consumption using German data.

Of these studies, only Brown et al. (2011) and Chai and Kaus (2013) explore the idea of status competition as a possible explanation of their findings. These studies provide evidence of a link between reference group income inequality and conspicuous consumption of individuals and interpret the mechanism underlying this link as status competition. Their assumption, therefore, is that competition for status or rank that influences conspicuous spending of individuals, is primarily driven by within reference group income inequality. However, this approach is hampered by the fact that income of an individual is an opaque measure and unobserved by peers or neighbors (Hicks and Hicks, 2014). Therefore, attributing behavioral responses of individuals to income inequality within a reference group seems inappropriate since a prerequisite of a measure of inequality to trigger any sort of behavioral response must be that it is observable by individuals (so as to allow them to

condition their behavior on). Also, from an econometric perspective income inequality as the main explanatory variable is likely to generate problem of measurement error in the regression as income inequality, although is observable to the econometrician, is not something that households know.

The present paper circumvents this issue by focusing on visible inequality. This is likely to more appropriately match both theory and intuition, compared to use of income inequality to examine the inequality-status competition-conspicuous consumption relationship. Unlike income, conspicuous consumption of others in the reference group is visible. Hence an inequality metric based on conspicuous consumption, is what should actually be used to capture a behavioral response like status competition. The creation of this novel measure of inequality to examine how status competition influences conspicuous consumption is, in fact, the main contribution of this paper. Additionally, this paper extends the literature which looks at social preferences (such as desires for rank or status) and conspicuous consumption, specifically, in a less developed country context. As such, the results of this study are likely to be useful for the policymakers to design more effective redistributive programs and social safety nets to reduce economic inequality and alleviate poverty.

The paper unfolds as follows. In section two, I layout the basic econometric framework, describe the data, discuss various issues related to model identification and finally present the identification and estimation strategy. The results are presented in section three. The last section concludes.

2 Empirics

2.1 Econometric Model

Consider an economy consisting of G non-overlapping social groups ($g = 1, 2, ..., G$) and let N_g denote the number of households ($i = 1, 2, ..., N_g$) that belong to the gth group. A social group - also referred to as reference group or peer group - is defined as a structure in which households are potentially tied by a social link. I assume that household i who belongs to group g is excluded from his own reference group. Given this setting of social interactions, the main econometric model that I intend to estimate is the following:

$$\begin{aligned} \ln(Conspicuous\ Consumption)_{ig} &= \alpha + \beta(Visible\ Inequality)_{-ig} + \gamma \ln(Permanent\ Income)_{ig} \\ &\quad + \mathbf{X}'_{ig}\lambda + \xi_{ig}, \qquad (1) \\ i &= 1, 2, ...N_g;\ g = 1, 2, ..., G. \end{aligned}$$

My dependent variable, $\ln(Conspicuous\ Consumption)_{ig}$, is the (log) annual expenditure on conspicuous goods of household i who belongs to group g. My variable of interest, $(Visible\ Inequality)_{-ig}$, is the reference group visible inequality faced by household i (the negative sign before the subscript denotes household i is excluded from his reference group). Since, in this paper, visible inequality refers to the dispersion of conspicuous consumption, I use the (log) standard deviation of conspicuous consumption ($\ln \sigma(Conspicuous\ Consumption)$) calculated based upon conspicuous spending of all households belonging to a particular group except the focal household as my baseline measure of reference group visible inequality. I will use other inequality metrics to measure visible inequality (namely, coefficient of variation and Gini index) as robustness checks for my baseline results.

The control variables include (log) *Permanent Income*[5] of household i and a vector of demographic characteristics $\mathbf{X}$, which include variables that might be correlated with household consumption expenditure. The error term ξ_{ig} reflects other unobservable characteristics associated with i. It is likely to consist of two components

$$\xi_{ig} = \mu_g + \varepsilon_{ig} \qquad (2)$$

where μ_g and ε_{ig} are group- and household-specific components of the error respectively.

In equation (1), the parameter of interest is β which measures the effect of reference group visible inequality on conspicuous spending of households. A nonzero β coefficient implies that households' conspicuous expenditure depends on the level of reference group visible inequality. Note that if $\beta < 0$, conspicuous spending of households declines with reference group visible inequality, which

[5] I control for permanent income instead of current income because current income comprises of a transitory as well as a permanent component and it is only the permanent component of current income that impacts consumption expenditure (Modigliani and Brumberg,1954; Friedman, 1957).

is consistent with the status competition hypothesis.

2.2 Data

2.2.1 The Indian Human Development Survey (IHDS) 2005

This paper uses the rural sub-sample of the India Human Development Survey (IHDS) 2005 which is a nationally representative household survey conducted by the National Council for Applied Economic Research (NCAER) in New Delhi and University of Maryland (Desai, Reeve and NCAER, 2009).

The IHDS survey - conducted between November 2004 and October 2005 - covers 41,554 households in 1,503 rural villages and 971 urban neighborhoods located throughout India.[6] The rural sub-sample of the IHDS covers 26,734 households. As pointed out by Khamis et al. (2012), the main advantage of using this survey is that it includes many questions that are not asked in the larger and more commonly used Indian household survey, the National Sample Survey (NSS). In particular, detailed questions on income and consumption expenditure are asked in the IHDS which are important for my analysis.

2.2.2 Conspicuous Consumption

There are forty-seven consumption categories in the IHDS. Thirty of the consumption categories, which are frequently purchased items, use a thirty day time frame while the other seventeen use a three hundred and sixty five day time frame. I convert all expenditures to the annual time frame before estimation.

Conspicuous consumption is understood as the use of money or other resources to display one's high social status in relation to others (Veblen, 1899). Goods that are particularly suited to this objective should (i) be readily observable, and (ii) give the impression that individuals who consume more of them are, on average, better off than those who consume less of them. To determine the composition of the conspicuous consumption basket, Khamis et al. (2012) conducted an online survey in India. This survey was modeled after the conspicuous goods surveys conducted

[6] The survey covered all the states and union territories of India except Andaman and Nicobar, and Lakshadweep. These two account for less than 0.05 percent of India's population. The data is publicly available from the Data Sharing for Demographic Research program of the Inter-university Consortium for Political and Social Research (ICPSR).

by Charles et al. (2009) and Heffetz (2011) – both of which were carried out in the United States.

In this paper I adopt Khamis et al.'s (2012) definition of conspicuous goods since to my knowledge this is the first and, until now, the only survey conducted in India. Moreover, this survey was designed specifically to determine the conspicuousness of the consumption goods covered in the IHDS. Based on Khamis et al.'s (2012) survey, I consider conspicuous consumption to consist of personal transport equipment, footwear, vacations, furniture and fixtures, social functions, repair and maintenance, house rent and other rents, entertainment, clothing and bedding, jewelry and ornaments, recreation goods and personal goods. Conspicuous consumption does not include goods and services with little or no visibility and/or limited status effects, such as food consumed at home, insurance premiums, books, tobacco, education and health expenditures. I will use the definitions of conspicuous consumption proposed by Charles et al. (2009), Heffetz (2011) and Friehe and Mechtel (2014) as robustness checks for my baseline analysis (Table SA1 in the Supplementary Appendix provides a list of the conspicuous goods as per each definition).

2.2.3 Reference Group

Given the lack of information on the structure of relevant social interactions in the IHDS data, I assume that the peer group or the reference group of a household is comprised of all other households in its village. The latent assumption is that a household's own village serves as the self-evaluative space that it uses to make social comparisons and assess its relative economic position. This is probably a reasonable assumption given that villages are basically small geographic units[7] populated by households who are 'similar' in many dimensions and are exposed to similar geographic and institutional conditions (Singer, 1981). Moreover, social interactions are also more likely to take place among people living in the same locality which may in turn affect household decision making (Akerlof, 1997).[8] Consequently, the reference group visible inequality corresponding to a particular household is computed as the (log) standard deviation of conspicuous consumption expenditure of all other households in its village.

[7] The average area of villages included in the IHDS 2005 is approximately 3.3 square miles.

[8] Cojocaru (2014) summarizes various empirical studies confirming that reference groups that are used by individuals for social comparisons are indeed local.

2.2.4 Permanent Income and Demographics

IHDS reports current income of households which is the sum total (for each household) of wages and salaries, non-farm business income, net agricultural income, remittances, property and other income and public benefits.[9] I, however, need a measure of permanent income which is extremely difficult to get from survey data. Previous literature has generally relied on proxying permanent income by using one or more of the following variables: average current income, education level (Dynan et al., 2004), total consumption expenditure (Charles et al., 2009; Khamis et al. 2012), etc. Following these studies, I use total consumption expenditure as a proxy for permanent income.

The set of demographic controls can be classified into two categories: characteristics of household heads and socioeconomic features of households. Characteristics of household heads include age, quadratic in age, gender, marital status, literacy status and educational attainment (if literate). Also a set of dummy variables indicating caste/religious affiliation are included: Brahmin, non-Brahmin high caste, other backward caste (OBC), Dalit, Adivasi, Muslim, Christian, and a combined category for Sikhs and Jains.

The socioeconomic features of households that are used as controls are: household size, number of years they have been living in their current village, official socioeconomic status (i.e. whether the household can officially be categorized as 'poor'),[10] proportion of children, adolescents and adults in the household, number of married household members and binary variables indicating the extent of media exposure of men, women and children in the household.[11]

[9] Each of these incomes are in turn constructed from more than fifty different sources of income queried in the survey.

[10] The classification of households into 'poor' and 'non-poor' socioeconomic groups is based on the definition of poverty line used in the IHDS. The poverty line varies by state and urban/rural residence. It is based on 1970s calculations of income needed to support minimal calorie consumption and has been adjusted by price indexes since then.

[11] To capture media exposure of households, the IHDS asks every household head how often do men, women and children in the household (i) listen to the radio, (ii) read the newspaper and (iii) watch TV. Household heads had to respond either by saying 'Never' (=0), 'Sometimes' (=1) or 'Regularly' (=2). Based on this question, I create my variables of media exposure. In particular, I create three dummy variables capturing media exposure of each group (i.e. men, women and children) in the household. The dummy takes a zero value if a particular group neither reads newspaper, nor listens to radio, nor watches TV, and takes a value 1 otherwise. Note that it is important to include these variables in my analysis as previous studies have documented significant impact of social media exposure on consumption-savings decisions of households (see for e.g. Schor, 1998).

2.2.5 Analytic Sample

My estimation sample consists of 23,471 households from 1,468 villages located across 277 districts: these are households in the IHDS where I have individual level information for household heads and for which household head is between 18 and 65 years of age, annual household current income is more than or equal to zero but less than Rs. 1,000,000 (equivalent to $16,667), annual household total consumption expenditure is more than zero but less than Rs. 1,000,000, annual household conspicuous consumption expenditure is more than or equal to zero, information on household's literacy level and educational attainment are non-missing and finally the household lives in a village with not less than three (sampled) members.[12]

Table 1 presents the descriptive statistics of all the variables used in the analysis. The mean annual household conspicuous consumption expenditure is around Rs. 8,200 (equivalent to $126). The mean of within reference group standard deviation of annual household conspicuous spending (i.e. visible inequality) is around Rs.13,500 (equivalent to $208). The mean annual total household consumption is around Rs. 45,000 (equivalent to $692). On average, 13% of total household consumption expenditure represents conspicuous consumption. The mean annual household current income is around Rs. 40,000 (equivalent to $615). Each household, on average, has five members. The mean age of household head is 44. Around 91% of the households are male-headed and of all the household heads, 60% are literate and 88% are married. The caste/religion-composition of the analytic sample is as follows: 18% of the households are members of high castes, 33% belong to OBC, 23% are Dalits, 11% are Adivasis, 9% are Muslims, 1% are Sikhs/Jains and the rest are Christians. Finally, the average number of households sampled from each village included in my analytic sample is 18 (implying that, on an average, a typical household's reference group consists of 17 households).

2.3 Identification Issues

There are several challenges in identifying the parameters of my baseline econometric model. Firstly, there may be some unobservable environmental attributes that are specific to reference groups

[12] Households with zero conspicuous consumption expenditure and zero total consumption expenditure are incopo-rated in the analysis by using the inverse hyperbolic sine transformation (Burbidge et al., 1988) since these variables enter the empirical model in logarithmic form. See Friedline et al. (2015) for detailed description of this approach.

and/or common to all members of a particular group. Econometrically, this would imply existence of non-zero correlation between the group unobservables, μ_g, and reference group visible inequality, $(Visible\ Inequality)_{-ig}$, (and possibly other regressors) in the baseline econometric model. If there are such unobserved heterogeneity across reference groups, then the ordinary least squares (OLS) estimates of the effect of reference group visible inequality on household conspicuous consumption may be biased.

Secondly, reference groups may not be exogenous. This problem arises if households self-select into reference groups with specific objectives (Falk and Knell, 2004). Nesse (2004) argues that motivated to satisfy particular psychological desires, individuals can create their own social groups. One way of doing this is typically via migration or residential relocation (Stark and Taylor, 1991). For instance, a poor person living in a prosperous village, to reduce his feeling of relative deprivation, might want to relocate to a less prosperous village. Frequently there is such positive selection in which 'similar' people join or are assigned to the same group (Sacerdote, 2011). This positive selection could cause substantial upward bias in the estimated magnitude of the effect of reference group visible inequality on household conspicuous consumption.

Thirdly, reference group visible inequality is, by definition, endogenous. To see this consider a reference group g consisting of three households i, j and k with conspicuous consumption c_{ig}, c_{jg} and c_{kg} respectively. Note that c_{ig} depends on c_{jg} and c_{kg} through i's reference group visible inequality. Likewise, c_{jg} (c_{kg}) depends on c_{ig} (c_{ig}) and c_{kg} (c_{jg}). Thus an unobserved household specific shock that affects c_{jg} (call it ε_{jg}) also affects c_{ig}. In other words, $\dot{c}_{ig}$ is correlated with ε_{jg}. Therefore, the reference group visible inequality faced by j (that depends on c_{ig}) will be correlated ε_{jg}. Analogous correlation will exist between reference group visible inequality faced by households i (k) and unobserved shock specific to household i (k). This correlation between the household specific error term and visible inequality renders the OLS estimates of parameters of the baseline regression model biased.

Finally, notice that apart from visible inequality, there is also another source of endogeneity in my model. This is due to the fact that I have conspicuous consumption as my dependent variable and total consumption expenditure (proxying permanent income) as one of my controls. Since conspicuous consumption is a part of total consumption expenditure, any unobserved idiosyncratic shock that affects conspicuous consumption will also affect total consumption, in turn, implying

the existence of a non-zero correlation between the error term and total consumption.

2.4 Identification Strategy

To achieve model identification, I implement an approach based on instrumental variables (IV). I instrument reference group visible inequality by measures of reference group income inequality and reference group educational inequality. More precisely, I use (log) standard deviation of reference group income, standard deviation of reference group literacy status (whether literate or not) and (log) standard deviation of reference group educational attainment (number of years of education) as instruments for (log) standard deviation of reference group conspicuous consumption which measures the reference group visible inequality.[13] The instruments work well under three conditions. First, own income, own literacy status and, own educational attainment should be significantly correlated with own conspicuous spending—as a result, (log) standard deviation of peer income, standard deviation of peer literacy status, and (log) standard deviation of peer educational attainment should affect (log) standard deviation of peer conspicuous consumption. Second, income, literacy status and educational attainment should be household specific and should not affect conspicuous spending decisions of other households, even those located in the same village. Third, village level unobservables affecting conspicuous consumption, if present, should be uncorrelated with the exogenous characteristics of the households.

I argue that the first two conditions are likely to hold in my setup due to the following reasons. Firstly, income, literacy status and educational attainment, undoubtedly, are crucial determinants of own conspicuous consumption. Secondly, peer income and peer educational characteristics are typically opaque measures as argued by Hicks and Hicks (2014), and hence, are not visible to a household. In other words, people are typically unaware of others' income and educational characteristics even if they live in the same village (or neighborhood). Hence it is not possible for households to condition their own conspicuous spending decisions on these peer attributes. Finally, even if peer income, peer literacy status and peer educational attainment are assumed to be partially visible, it is hard to think of channels (that are distinct from peer group visible inequality) through which these peer attributes affect households' own conspicuous spending.[14]

[13] A similar strategy is used widely in estimation of spatial econometric models (Gibbons et al., 2015) and models of social interaction (Gaviria and Raphael, 2001; Helmers and Patnam, 2014; McVicar and Polanski, 2014).

[14] In the Supplementary Appendix, I allow reference group income inequality to have a direct effect on household

Unlike the first two conditions, the third condition required for the proposed set of instruments to be valid may not always hold in practice. This is especially true if there is the possibility of households self-selecting into villages via migration. But this, perhaps, is not a cause of concern in my case, given that the spatial mobility is extremely low in India (Munshi and Rosenzweig, 2009). In fact, as Ravallion and Lokshin (2005) argue, people in rural India typically live in the same village or nearby for most of their lives. However, even in absence of a self-selection into villages, one might argue that there might be some other village specific characteristics correlated with the characteristics of the households living in it. To alleviate this concern, I incorporate a full set of district fixed effects. Districts, which represent administrative divisions of an Indian state, are clusters of several villages located in the same geographical area.[15] The logic behind including the district fixed effects is that these would capture the unobserved heterogeneity at the level of districts. Since villages within a particular district are likely to be 'similar',[16] the incorporation of the district fixed effects should be sufficient for the above discussed IV strategy to produce unbiased parameter estimates even allowing for village-specific unobservables to be correlated with the regressors.[17]

I also need to instrument (log) total consumption expenditure - used as a proxy for household permanent income - which is endogenous due to the reasons mentioned previously. Following Charles et al. (2009) and Khamis et al. (2012), I use a vector of income controls to instrument for total consumption expenditure. This vector consists of (log) current income and an indicator variable for whether current income takes the value zero.

To establish the validity of my instruments and rule out any 'weak instruments' concern, I carry out all the standard IV diagnostic tests which are described in details below.

conspicuous spending to examine whether this instrument works even if the exclusion restriction is not satisfied.

[15] In India, as of 2014, there are 29 states and, on an average, there are 23 districts in each state.

[16] In India, districts are divided on the basis of ethical, cultural and social interaction rather on the basis of easiness or prosperity (Indian National Census, 2011). As such, villages within a particular district are likely to be similar along observable and unobservable ethical and cultural dimensions.

[17] This amounts to saying that for the IV strategy to work, correlated unobservables may be present at the district level but not at the village level. Also note that, my identification strategy ensures that it is not the 'price effect' that is driving my result. This is because my IV strategy will produce consistent parameter estimates even when there are unobserved differences in prices of conspicuous goods across villages. In fact, if prices are the only omitted village level characteristics, I do not even need to use district fixed effects since prices, presumably, are uncorrelated with the demographic characteristics of households.

2.5 Model Estimation and Diagnostic Tests

I estimate my baseline model by the technique of Generalized Method of Moments (GMM) clustering standard errors at the state level.[18] Since my model is overidentified, I report the two-step GMM estimates or optimal GMM estimates, which is the most efficient GMM estimator for overidentified models with heteroscedastic errors of unknown form (for a detailed overview of the two-step GMM see Cameron and Trivedi, 2005 and Baum et al., 2007).

Several diagnostic tests are conducted to assess the reliability and efficiency of the two-step GMM. Firstly, I report Hansen's (1982) J statistic, which is an overidentification test for the validity of the instruments. The joint null hypothesis of this test is that the instruments are valid instruments (i.e. uncorrelated with the error term), and that the excluded instruments are correctly excluded from the estimated equation. A rejection of the null hypothesis casts doubt on the validity of the instruments. Next, I report the Kleibergen and Paap's (2006) rk LM test which seeks to test whether that the excluded instruments are correlated with the endogenous regressors. The null hypothesis of this test is that the minimum canonical correlation between the endogenous variables and the instruments is not statistically different from zero. Rejection of the null hypothesis indicates that the model is identified. Further, since IV estimates based on weak instruments are biased towards OLS estimates (Bound et al., 1995; Staiger and Stock, 1997; Stock et al., 2002), I report Angrist and Pischke's (2009) multivariate F-statistic from the first stage regressions which is the test to examine strength of instruments in a model with multiple endogenous variables. Following Staiger and Stock (1997), researchers usually use an F-statistic value of 10 (or higher) as an indication of a strong instrument.

[18] I cluster standard errors at the state level (instead of village or district level) following the proposal of Cameron and Miller (2015). They recommend using bigger and more aggregate clusters, up to and including the point at which there is concern about having too few clusters. For instance, if the dataset includes individuals within counties within states, Cameron and Miller (2015) recommend clustering at the state level since if there is within-state crosscounty correlation of the regressors and errors, then ignoring this correlation (for example, by clustering at the county level) would lead to incorrect inference.

3 Results

3.1 Main Results

Table 2 reports the two-step GMM estimates of my baseline econometric model. I report results of several specifications. My preferred specification is the one which includes the full set of demographic controls and district fixed effects, in addition to reference group visible inequality and household permanent income, as the right hand side variables. The results of my preferred specification is reported in column 4. Column 1 reports the results for the specification in which I do not include any district fixed effects or demographic controls other than permanent income. Column 2 reports the results for the specification in which I control for permanent income and other household characteristics but do not include district dummies. Column 3 reports the regression results when district fixed effects are included as regressors but not the vector of demographic controls.[19]

First, notice that each specification performs fairly well in terms of the Hansen's (1982) overidentification test, Kleibergen and Paap's (2006) rk LM test for underidentification as well as Angrist and Pischke's (2009) multivariate F test to assess the strength of the instruments. More precisely, in three out of four specifications - including my preferred specification (column 4) - based on the Hansen's (1982) J statistic, I am strongly unable to reject the joint null hypothesis that the instruments are uncorrelated with the error term, and that the excluded instruments are correctly excluded from the estimated equation. I can, however, only weakly reject this joint null hypothesis in the second specification. Next, across all specifications reported, the estimated Kleibergen and Paap's (2006) rk LM statistic allows me to clearly reject the null hypothesis that the instruments are uncorrelated with the endogenous regressors and that the model is not identified. Finally, the multivariate F-statistic (Angrist and Pischke, 2009) computed for each endogenous variable lies well above 10 across all specifications, which clearly indicates that none of the specifications suffer from the weak instrument problem.

In terms of actual two-step GMM estimates, I find a negative and statistically significant impact of visible inequality on conspicuous spending across all specifications with magnitudes of the coefficients ranging between -0.07 (s.e. = 0.03) and -0.13 (s.e. = 0.05). Notice that the magnitudes of these coefficients are economically significant as well, since these coefficients of visible inequality can

[19] See Tables SA2 and SA3 in the Supplementary Appendix for OLS and IV first-stage results.

be interpreted as elasticities given that both conspicuous expenditure as well as visible inequality are in logarithms.

To get a deeper sense of the economic significance of these estimated elasticities, I calculate the impact of a standard deviation change in visible inequality on household conspicuous expenditure. Judging from the specification in column 4, evaluated at the sample mean, a one standard deviation decline in (log) visible inequality (roughly 1.30) implies 0.11 log points increase in conspicuous consumption expenditure, which translates into an increase in the level of conspicuous consumption expenditure by roughly a factor of 1.15 (=exp(1.30 x 0.11)), or 15%. This implies that a household spending close to the mean level of Rs. 8,200 ($126) on conspicuous goods will increase its spending by Rs. 1,230 ($19) to a level close to Rs. 9,500 ($146) in response to a one standard deviation fall in (log) visible inequality. Overall, thus, my results suggest the existence of a negative relationship between reference group visible inequality and household conspicuous consumption expenditure. This is in conformity to the hypothesis of status competition.

3.2 Subsample Analysis

Table 3 reports the results of the estimation carried out to examine the effect of reference group visible inequality on conspicuous consumption expenditure of households when the estimation sample is cut in different ways. This allows me to examine if the relation between reference group visible inequality and household conspicuous spending are different for some sub-populations than others.

I find that the sign of the effect of visible inequality on household conspicuous consumption is consistently negative across all the different subsamples.[20] However, the magnitude of this effect seems to vary across subsamples when the sample is split along certain dimensions. For example, the impact of visible inequality on conspicuous consumption is much higher for households headed by younger individuals (i.e. those who are below 45 years of age, which is the median age of the households in the working sample) and/or unmarried individuals compared to those that are headed by relatively older and/or married individuals. This may be because younger and/or unmarried people, given their greater involvement in marriage and other social markets as they search for

[20] That the effect of visible inequality on conspicuous consumption is negative for the subsample that includes relatively poor households as well as for that which includes relatively rich households is, in particular, noteworthy. This is because the status competition hypothesis predicts that a fall in reference group visible inequality would cause an increase in conspicuous consumption for everyone in the reference group. Thus, this finding enhances the credibility of the hypothesized mechanism.

spouses, are likely to be more concerned than the married people about outsider's assessment of their social status (Hopkins and Kornienko, 2004; Charles et al., 2009) and hence respond more to status competition brought about by a fall in the level of visible inequality. Additionally, the subsample analysis reveals a clear gender dimension in the impact of visible inequality on conspicuous consumption: The increase in conspicuous consumption in response to a fall in visible inequality is substantially more for female headed households than male headed ones. Thus, female headed households seem to be more responsive to status competition compared to male headed households. On a broader level this indicates that women, compared to men, might have a lower level of self-control and are, therefore, more susceptible to social pressure.

3.3 Non-Conspicuous Consumption

If households spend more on conspicuous goods in response to a fall in reference group visible inequality, on what expenditures do they spend less? The intertemporal budget constraint implies that the observed higher spending on conspicuous goods must come from another component of current consumption and/or from future consumption (i.e. current savings) and/or from taking up more loans. Table 4 looks at the impact of reference group visible inequality on spending of households on other consumption categories. Along with conspicuous consumption, these consumption categories compose the universe of consumption expenditures in the IHDS. The coefficients in Table 4 come from a regression identical to that reported in column 4 of Table 2, except that the dependent variable is now the log of the particular non-conspicuous consumption category.

I find that households spend significantly less on education in response to a fall in reference group visible inequality. The effect of reference group visible inequality on expenditure on food and health expenditure are not significant.[21] This indicates that the higher conspicuous spending of rural households owing to greater status competition is diverted from education spending.

3.4 Robustness Checks

To assess the robustness of the estimated impacted of reference group visible inequality on household conspicuous consumption, I carry out a series of robustness checks. Strikingly, I find that my main

[21] However, note that that since more than 30% of the sampled rural households report zero health expenditure, the fit of the model with $ln(Health)$ as the dependent variable is extremely poor, and hence the findings based on it may not be very reliable.

results are robust to changes in the definition of conspicuous consumption, changes in the definition of reference group, changes in the metric used to measure visible inequality, as well as to inclusion of mean and median reference group (permanent) income as additional controls. Additionally, I show that households spend more on conspicuous consumption when 'local density' (Chai and Kaus, 2013) increases (i.e. the proportion of households in a particular household's social space increases), which is suggestive of the fact that the mechanism driving my findings is indeed status competition. Finally, I find that my results remain qualitatively unaltered even when I let reference group income inequality (which is my key instrumental variable) to have a direct impact on household conspicuous expenditure (Conley et al., 2012). Detailed discussion of all the robustness checks can be found in the Supplementary Appendix.

4 Conclusion

The status competition hypothesis predicts that if agents care about their social status as determined by their rank in the distribution of conspicuous consumption expenditure, a fall in reference group visible inequality (i.e. the dispersion of conspicuous consumption expenditure within reference group) is likely to cause them to increase their spending on conspicuous goods. Such spending, in anticipation of achieving higher societal rank, not only represents inefficient diversion of resources from other consumption categories and/or savings, but is also 'wasteful' as rank improvement does not materialize due to parallel action of others in the comparator group.

In this paper I empirically examine the main prediction of the status competition hypothesis. Using microlevel data from rural India, consonant with the status competition hypothesis, I find that a reduction in visible inequality within reference groups does indeed cause household spending on conspicuous goods to increase significantly. My results also indicate that the higher conspicuous spending of the rural households is drawn from education spending. My findings are robust to a number of alternative specifications, as well as to alternative definitions of conspicuous consumption, visible inequality and reference group.

While I do find that greater equality increases status competition and causes people to spend more on conspicuous consumption, it should be noted that this is not in itself an argument for maintaining or extending existing inequality. Rather, my findings suggest that redistributive policies

that (directly or indirectly) reduce the level of local visible inequality may have unintended side-effects and casts doubt about the effectiveness of such policies in augmenting economic efficiency and social justice. As such, a more effective approach might be to combine such redistributive policies with *social* policies focusing on relationships with friends, neighbors and coworkers (Ordabayeva and Chandon, 2011) that represses one's desire to compete in status. One way to do this, as suggested by Putnam (2007), is to promote a broad sense of 'we' among members of the same community or reference groups through popular culture, education and common experiences. Such policies might not eliminate status competition entirely but might be helpful in transforming and moderating the adverse effects of falling inequality and consequent status competition on consumption behavior of households.

Future work in this area should focus more on exploring the role of status seeking behavior and status competition as the key drivers of the relation between 'local' inequality and conspicuous spending behavior of economic agents. Further research is also needed to have a better understanding of how traditional redistributive policies might be combined with social policies to minimize 'conspicuous arms races'.

Supplementary material

Supplementary material (the Appendix and the data files) is available online at the OUP website.

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Table 1. Summary Statistics

	Mean	Standard Deviation
Dependent Variable		
Conspicuous Consumption	8,149	26,070
ln(Conspicuous Consumption)	8.68	1.41
Measure of Visible Inequality		
σ (Conspicuous Consumption)	13,543	21,412
ln σ(Conspicuous Consumption)	8.71	1.30
Demographics		
Income	40,071	52,479
ln(Income)	10.80	1.11
Total Consumption Expenditure	44,770	44,083
ln(Total Consumption Expenditure)	11.13	0.70
Household Size	5.33	2.47
Age	44.70	11.09
Male (=1 if household head is male)	0.91	0.29
Married (=1 if household head is married)	0.88	0.33
Literate (=1 if household head is literate)	0.60	0.49
Years of Education (of household head)	4.46	4.47
Household member proportion: 0-14 years	0.30	0.23
Household member proportion: 15-21 years	0.14	0.18
Household member proportion: >21 years	0.55	0.21
Household married members: Zero	0.07	0.25
Household married members: 1-5	0.89	0.32
Household married members: >5	0.05	0.21
Poor (=1 if officially classified as poor)	0.21	0.41
Years in Village (=1 if years in same village >10)	0.97	0.16
Media Exposure: Men	0.77	0.42
Media Exposure: Women	0.70	0.46
Media Exposure: Children	0.66	0.47
Upper Caste Brahmin	0.04	0.19
Upper Caste Non-Brahmin	0.14	0.35
OBC	0.36	0.48
Dalit	0.23	0.42
Adivasi	0.11	0.32
Muslim	0.09	0.29
Sikh/Jain	0.01	0.11
Christian	0.01	0.12
N	23,471	

Table 2. Estimated Impact of Visible Inequality on Household Conspicuous Consumption: Instrumental Variables Approach

Variables	[1]	[2]	[3]	[4]
ln σ(Conspicuous Consumption)	-0.095**	-0.131***	-0.067**	-0.082***
	(0.045)	(0.046)	(0.027)	(0.027)
ln(Permanent Income)	1.396***	1.373***	1.545***	1.791***
	(0.049)	(0.116)	(0.031)	(0.069)
Demographic Controls	NO	YES	NO	YES
District Fixed Effects	NO	NO	YES	YES
Observations	23,471	23,471	23,471	23,471
Adjusted R-squared	0.457	0.256	0.456	0.300
Hansen J statistic	5.373	7.001	3.699	1.536
	[p=0.146]	[p=0.0719]	[p=0.296]	[p=0.674]
Kleibergen-Paap rk LM statistic	16.790	18.180	15.400	17.190
	[p=0.002]	[p=0.001]	[p=0.003]	[p=0.001]
Angrist Pischke F-statistics				
ln σ(Conspicuous Consumption)	38.900	57.510	57.180	60.580
ln(Permanent Income)	106.290	79.670	149.360	87.780

Notes: Estimation via two-step GMM. The dependent variable is ln(Conspicuous Consumption). ln σ(Conspicuous Consumption) measures the reference group visible inequality which is the natural log of standard deviation of conspicuous consumption expenditure of households at the village level. The set of demographic controls include Household size, Age, Age^2, Male, Married, Poor, Literate, Years of Education, Household member prop.: 0-14 years, Household member prop.: 15-21 years, Household member prop.: > 21 years, Household married members: Zero, Household married members: 1-5, Media Exposure (Men), Media Exposure (Women), Media Exposure (Children), Years in Village, Upper Caste Brahmin, Upper Caste Non-Brahmin, Dalit, Adivasi, Muslim, Sikh/Jain. ln σ(Conspicuous Consumption) and ln(Permanent Income) are endogenous. First stage instruments include ln(Income) which is the natural log of household (reported) income, Zero Income which is a dummy taking a value 1 if household income is zero, ln σ(Income) which denotes natural log of standard deviation of income of households at the village level, σ(Literate) which denotes of standard deviation of literacy state (indicated by the dummy variable Literate) of household heads at the village level and σ(Education) which denotes standard deviation of years of education of household heads at the village level. All village level measures are calculated leaving out the focal household. All regressions include a constant. Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 3. Estimated Impact of Visible Inequality on Household Conspicuous Consumption: Subsample Analysis

	Subsample									
Variables	Relatively Poor	Relatively Rich	Age<45	Age≥45	Not Married	Married	Female	Male	Education ≤10years	Education >10 years
ln σ(Conspicuous Consumption)	-0.123***	-0.115***	-0.082**	-0.077**	-0.202***	-0.078***	-0.150**	-0.082***	-0.071***	-0.225***
	(0.0457)	(0.0317)	(0.032)	(0.031)	(0.055)	(0.025)	(0.067)	(0.025)	(0.025)	(0.073)
ln(Permanent Income)	1.814***	1.965***	1.862***	1.797***	1.759***	1.806***	1.884***	1.796***	1.831***	1.544***
	(0.241)	(0.0867)	(0.092)	(0.089)	(0.155)	(0.079)	(0.230)	(0.082)	(0.080)	(0.089)
Observations	12,104	11,366	11,251	12,218	2,852	20,610	2,160	21,296	21,458	1,989
Adjusted R-squared	0.123	0.284	0.247	0.314	0.230	0.296	0.211	0.295	0.281	0.344
Hansen J statistic	0.0373	1.805	5.103	2.466	3.892	0.794	3.363	0.928	3.687	6.643
	[p=0.998]	[p=0.614]	[p=0.164]	[p=0.481]	[p=0.273]	[p=0.851]	[p=0.339]	[p=0.819]	[p=0.297]	[p=0.084]
Kleibergen-Paap rk LM statistic	18.09	16.48	16.42	16.78	16.37	16.79	16.45	16.86	17.67	14.60
	[p=0.000]	[p=0.002]	[p=0.003]	[p=0.002]	[p=0.003]	[p=0.002]	[p=0.002]	[p=0.002]	[p=0.001]	[p=0.005]
Angrist Pischke F-statistics										
ln σ(Conspicuous Consumption)	34.23	49.51	36.14	58.87	31.20	62.16	30.37	61.57	57.63	24.35
ln(Permanent Income)	29.71	57.00	43.87	96.61	59.41	74.49	26.89	86.20	72.23	29.07

Notes: Estimation via two-step GMM. The dependent variable is ln(Conspicuous Consumption). ln σ(Conspicuous Consumption) and ln(Permanent Income) are endogenous. All specifications include demographic controls and district fixed effects. Relatively Poor (Rich) subsample includes those households whose permanent income is lesser than or equal to (strictly greater than) group median permanent income. For definition of variables, full list of demographic controls and first stage instruments see note below Table 2 and main text. All regressions include a constant. Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table 4. Estimated Impact of Visible Inequality on Household Non-Conspicuous Consumption: Different Categories

	Dependent Variable			
Variables	ln(Food)	ln(Food+)	ln(Health)	ln(Education)
ln σ(Conspicuous Consumption)	-0.014	-0.011	-0.069	0.169**
	(0.009)	(0.008)	(0.077)	(0.082)
ln(Permanent Income)	0.391***	0.730***	-0.236	0.517***
	(0.041)	(0.031)	(0.182)	(0.194)
Observations	23,471	23,471	23,471	23,471
Adjusted R-squared	0.441	0.604	-0.009	0.343
Hansen J statistic	4.835	4.772	1.977	5.426
	[p=0.184]	[p=0.189]	[p=0.577]	[p=0.143]
Kleibergen-Paap rk LM statistic	19.18	19.18	19.18	19.18
	[p=0.000]	[p=0.000]	[p=0.001]	[p=0.001]
Angrist Pischke F-statistics				
ln σ(Conspicuous Consumption)	59.87	59.87	59.87	59.87
ln(Permanent Income)	135.76	135.76	135.76	135.76

Notes: Estimation via two-step GMM. Food includes annual household expenditure on rice, wheat, sugar, kerosene, other cereals, cereal products and pulses. Food+ includes all items under the Food category plus meat, sweeteners, edible oil, eggs, milk, milk products, vegetables, salt, other food items, tobacco, fruits and nuts. Health includes annual household expenditure on out-patient and in-patient services. Education includes annual household expenditure on school fees, books and school supplies. ln σ(Conspicuous Consumption) and ln(Permanent Income) are endogenous. All specifications include demographic controls and district fixed effects. For definition of variables, full list of demographic controls and first stage instruments, see note below Table 2 and main text. All regressions include a constant. Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Supplementary Appendix

Visible inequality, status competition and conspicuous consumption: evidence from rural India

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1 Robustness Checks

To assess the robustness of my main results, I carry out several robustness checks in this section.

Alternate Definitions of Conspicuous Consumption. In my first check, I examine whether the identified effect of reference group visible inequality on conspicuous spending of households is robust to alternate definitions of conspicuous consumption expenditure. Specifically, I use three different definitions of conspicuous consumption: Charles et al. (2009), Heffetz et al. (2011) as adopted by Friehe and Mechtel (2014)[1] and Friehe and Mechtel's (2014) own definition. Results of the regressions estimated using these alternative definitions of conspicuous consumption are reported in Table SA4.

I find the estimated coefficient of visible inequality to be negative and highly significant in each of the specifications. The average value of the coefficient of visible inequality based on these specifications is roughly -0.08 which is exactly equal to that obtained from my preferred baseline model (where I defined the conspicuous consumption basket based on Khamis et al.'s (2012) survey). This indicates that the identified relation between reference group visible inequality and conspicuous consumption expenditure is robust to variations in definitions of conspicuous spending and that the baseline findings are not driven in anyway by how conspicuous consumption is defined.

Alternate Measures of Visible Inequality. Next, instead of measuring reference group visible inequality as log of standard deviation of conspicuous expenditure within reference group, I use the Gini coefficient and coefficient of variation (both calculated at the village level leaving out the focal individual as before) to measure the degree of visible inequality within the reference group. The main criticism that is often levelled against using of the second moment as a measure of inequality is that it is not scale-invariant and it depends on the measurement unit: for example, by multiplying all income of the baseline distribution by a number λ, the variance increases by λ^2. This problem can be typically avoided by alternative 'scale invariant' measures of inequality like the Gini coefficient and coefficient of variation. Thus, although these measures (particularly

[1] Heffetz (2011) constructs a list of visible goods ranked according to degree of visibility. Following Friehe and Mechtel (2014), I use the goods that are ranked between 2 and 11 by Heffetz (2011) to construct the Heffetz' basket of conspicuous goods. Although as per Heffetz' survey cigarettes seem to be most visible (and hence is ranked first), this item is exclude from the basket of conspicuous goods as cigarettes do not fulfill the second requirement of our definition of conspicuous consumption – namely, the impression that those who consume more of it are, on average, better off than individuals who consume less (Friehe and Mechtel, 2014).

Gini index) may not be as appropriate as the second moment to capture the local dispersion or spread of conspicuous consumption, using these as alternative ways to measure reference group visible inequality would give an idea about the extent to which the relation between reference group visible inequality and household conspicuous spending is sensitive to how visible inequality is measured.

Table SA5 reports the results obtained from two step GMM regressions when using the alternate unit free measures of reference group visible inequality. I find that, when Gini index is used as measure of visible inequality instead of natural log of standard deviation, visible inequality has a significant negative effect on household conspicuous expenditure. More specifically, when the Gini index increases by 0.1, household conspicuous spending drops by roughly 5%. The impact of visible inequality on conspicuous consumption is also negative and statistically significant when visible inequality is measured by coefficient of variation. These results imply that the relation between reference group visible inequality and conspicuous consumption is not driven by how visible inequality is measured.

Caste- and Religion-based Reference Group. The importance of caste and religious group affiliation in determining households' social identity particularly in India has been highlighted in various studies (see for instance Khamis et al., 2012). This in turn could potentially imply that self-identification is stronger among members of the same social group living in the same region than among households living in the same locality but belonging to very different social groups. To acknowledge this fact, I construct reference groups based on caste and religious affiliation of households.

The ideal way to construct reference groups for households would be based on caste/religion and village of residence instead of districts. However, I am unable to do so purely because of inadequate availability of data (i.e. this yields too many reference groups with tiny numbers of households). As an alternative, I assume a households' reference group includes members of the same caste/religion living in the same district.[2]

This alternative definition of reference group, however, has a serious limitation. This is par-

[2]For the purpose of constructing the reference groups based on district and caste/religious affiliation, I combine the Upper Caste Brahmins and Upper Caste Non-Brahmins as well as Sikhs/Jains and Christians given that Upper Caste Brahmins and Christians had only few observations.

ticularly due to the fact that the geographical area that districts typically represent are possibly too large for households to form comparator groups based upon. In other words, households may identify more with people of their own caste and religion group, but it is impossible for them to be influenced by other households who live in different villages as it is unlikely that they ever socially interact. Nevertheless, it would be interesting to check the sensitivity of my results obtained under this alternate definition of reference group.

From Table SA6, I find that results of regressions, when reference groups are defined based on caste/religion and district, are very similar to that obtained in my baseline analysis. The coefficients of visible inequality turns out to be negative and statistically significant when visible inequality is measured either by log of standard deviation, by coefficient of variation or by Gini index. To get a sense of economic significance, I calculate the impact of a one standard deviation change in reference group visible inequality on conspicuous consumption based on the results reported in column (1). I find that, one standard deviation fall in the level of reference group visible inequality as measured by the log of standard deviation of conspicuous consumption causes household spending on conspicuous goods to increase by approximately 16%. Overall, the results indicate that changing the definition of reference groups does not cause estimates of the effect of reference group visible inequality on household conspicuous consumption to differ significantly.

Investigating Omitted Variable Bias. A potential concern about my baseline econometric model is that there might be some omitted group level factors (that vary across villages within districts) influencing household conspicuous consumption. A prime example of such a factor is group level income. Given that prior studies (e.g. Charles et al., 2009) document a positive relationship between mean group income and conspicuous spending of households, not controlling for group mean income may bias my estimates of visible inequality. To address this concern, I re-estimate my basic estimating equation but now controlling for group level income. Specifically, I estimate the following two different versions of my baseline econometric model:

$$\begin{aligned}\ln(Conspicuous\ Consumption)_{ig} &= \alpha + \beta(Visible\ Inequality)_{-ig} + \gamma \ln(Permanent\ Income)_{ig} \\ &\quad + \theta \ln(Mean\ Permanent\ Income)_{-ig} + \mathbf{X}'_{ig}\lambda + \xi_{ig}, \qquad (1) \\ i &= 1, 2, ...N_g;\ g = 1, 2, ..., G.\end{aligned}$$

$$\begin{aligned}\ln(Conspicuous\ Consumption)_{ig} &= \alpha + \beta(Visible\ Inequality)_{-ig} + \gamma \ln(Permanent\ Income)_{ig} \\ &\quad + \phi \ln(Median\ Permanent\ Income)_{-ig} + \mathbf{X}'_{ig}\lambda + \xi_{ig}, \qquad (2) \\ i &= 1, 2, ...N_g;\ g = 1, 2, ..., G.\end{aligned}$$

where permanent income as before is proxied by total consumption expenditure as in Charles et al. (2009). Note that I control for mean and median group permanent income and not reported income since, as noted in the main paper, it is only the permanent component of reported income that affects consumption expenditure. Thus, any effect of group level income should operate only through permanent income.

Table SA7 report the regression results of these alternate specifications. Reassuringly, I find that inclusion of group mean and median permanent income does not significantly change the estimated coefficient of visible inequality compared to the results from my preferred specification. Moreover, the coefficients of mean and median group permanent income themselves are statistically insignificant implying that these variables do not affect household conspicuous consumption, once group visible inequality is controlled for. This suggests that my baseline results do not suffer from bias due to omission of group level income variables.

Local Density. This paper, based on Hopkins and Kornienko (2009) argues that a fall in within reference group visible inequality causes household conspicuous consumption to increase owing to greater status competition. Now, greater status competition essentially means a greater density of the conspicuous consumption distribution (since, denser is the distribution, easier it becomes for an individual to surpass her neighbors and greater is his/her returns from investing in conspic-

uous goods). Thus, a way to verify whether households increase their spending on conspicuous consumption owing to greater status competition is to examine the link between density of conspicuous consumption distribution and household conspicuous consumption. To do this, I closely follow a novel approach developed by Chai and Kaus (2013). Specifically, I create a measure of 'local density' of conspicuous consumption distribution which is the share of households within a social group that have similar conspicuous consumption expenditure (within a bandwidth b of conspicuous consumption) to a given household ($Local\ Density\_b$). After creating this measure, I use this, first, as an alternate index of visible inequality, and second, as a covariate in addition to my baseline measure of visible inequality. Needless to say that my measure of local density of conspicuous consumption is endogenous and hence is instrumented by local density of income.

Table SA8 reports the results of regressions based on this approach. I use two alternative bandwidths - 5% and 10%. Results reported in columns (1) and (2) show that an increase in local density causes households to spend more on conspicuous consumption. This is in consonance with the prediction of the status competition hypothesis. However, when I control for visible inequality (as measured by natural log of standard deviation of conspicuous consumption) in columns (3) and (4), the coefficient of local density continues to be positive but is no longer significant. Moreover, the coefficient of visible inequality, in line with my baseline results turns out to be negative and significant. This implies that my index of local density was actually picking up the effect of visible inequality (and also that my baseline model does not suffer from omitted variable bias). This is not very surprising, since both local density and visible inequality are likely to be capturing the same effect in my model. This is because my baseline measure of visible inequality is very localized given that my reference groups are fairly small.

Sensitivity Analysis of Instrumental Variables. One criticism that is often levelled against the instruments used for model identification is that they might not satisfy the exclusion restriction. In the present case this concern is not valid for the instruments used for total consumption expenditure (which proxies permanent income) because income can only affect conspicuous consumption through total consumption since conspicuous consumption is a part of total consumption. However, it might be worthwhile to check the sensitivity of my baseline results when a small direct impact of the instruments, which are used to instrument reference group visible inequality, are allowed for. In

other words, it might be useful to check whether my baseline regression results are sensitive when I treat these instruments as only *plausibly exogenous*.

To do so, I follow the method proposed in Conley et al. (2012). To fix ideas, suppose that the true model is given by

$$Y = X\Psi_1 + Z\Psi_2 + \varepsilon \tag{3}$$

$$X = \Psi_3 Z + \eta \tag{4}$$

where Y denotes the $N \times 1$ vector of outcomes which is $\ln(Conspicuous\ Consumption)$, X denotes $N \times 2$ of matrix of endogenous variables which are $Visible\ Inequality$ and $\ln(Permanent\ Income)$ with parameter of interest Ψ_1, Z is an $N \times r$ matrix of instruments with $r \geq 2$, Ψ_3 is the matrix of first stage coefficients and Ψ_2 is the parameter measuring the plausibility of the exclusion restriction. Notice that I omit other covariates and district fixed effects purely for notational convenience. Further, note that, as per the baseline specification, I have five instruments for two endogenous variables. However, now I use only two of the five instruments, one for each endogenous variable implying that $r = 2$. Specifically, I instrument $\ln(Permanent\ Income)$ by $\ln(Income)$ and $Visible\ Inequality$ by $Income\ Inequality$. I reduce the set of the instruments purely due to computational purposes. As such, in this modified set up, the set of *plausibly exogenous* variables that I have to deal with consists only of $Income\ Inequality$ (since, $Income$ is exogenous as argued above).

A valid instrument requires $\Psi_2 \equiv 0$. Conley et al. (2012) seek to construct a valid confidence interval for Ψ_1 even when this requirement does not hold. Their approach is referred to as the Union of Confidence Intervals (UCI) with Ψ_2 support assumption approach. The approach assumes that $\Psi_2 \in \Gamma$, where Γ is the bounded support of Ψ_2. If the true value of Ψ_2 was the value $\widetilde{\Psi}_2 \in \Gamma$, then one could subtract $\widetilde{\Psi}_2 Z$ from both sides of the Equation (3) and estimate

$$\widetilde{Y} = Y - Z\widetilde{\Psi}_2 = X\Psi_1 + \varepsilon \tag{5}$$

and obtain an estimate of Ψ_1 via two stage least squares (TSLS) using Z as instruments. Moreover,

one could construct a symmetric $(1-\alpha)\%$ confidence interval, $CI_N(1-\alpha, \widetilde{\Psi}_2)$, based on the asymptotic variance of the TSLS estimator. However, in reality, the true value of Ψ_2 is unknown. Consequently, one can estimate Ψ_1 for all values within the support Γ via TSLS regressions of $\widetilde{Y}$ on X and construct the union of resulting confidence intervals $\cup_{\widetilde{\Psi}_2 \in \Gamma} CI_N(1-\alpha, \widetilde{\Psi}_2)$.

Since we know that $\widetilde{\Psi}_2 \in \Gamma$ and that the intervals $CI_N(1-\alpha, \widetilde{\Psi}_2)$ were all constructed such that $Pr\{\Psi_1 \in CI_N(1-\alpha, \widetilde{\Psi}_2)\} \rightarrow (1-\alpha)$ when $\Psi_2 = \widetilde{\Psi}_2$, it follows that asymptotically $Pr\{\Psi_1 \in \cup_{\widetilde{\Psi}_2 \in \Gamma} CI_N(1-\alpha, \widetilde{\Psi}_2)\} \geq 1-\alpha$. That is, $\cup_{\widetilde{\Psi}_2 \in \Gamma} CI_N(1-\alpha, \widetilde{\Psi}_2)$ will cover the true parameter value of Ψ_1 with at least probability $(1-\alpha)$ asymptotically.

To implement the UCI approach, one has to start with making some assumption about the interval for Γ. Since it is not easy to think of channels through which income inequality may have impact on conspicuous spending other than through visible inequality, I assume that Ψ_2 close to zero. Moreover, since the direction of the effect (if any) is not clear a priori, I use a symmetric support centred at zero: $\Gamma = \{-\delta, \delta\}$ for different values of δ.

The results are shown in Figure SA1. The figure shows how large the exclusion restriction violation would need to be in order to invalidate my baseline form results. Panel A (B) is basedon the regression without (with) district fixed effect. I find that without district fixed effects, if the exclusion restriction violation is small (i.e. $\delta \leq 0.05$), then the true value of the coefficient of visible inequality is indeed negative. This is in consonant with my baseline results. The confidence intervals include the zero value only if the direct impact of income inequality is sufficiently high. When district fixed effects are added, the size of the the exclusion violation required to invalidate my baseline results falls only slightly. Therefore, even if $\Psi_2 \neq 0$, as long as the exclusion restriction violation is small enough, the baseline results remains - at least qualitatively - unchanged.

This exercise, therefore, increases my confidence in the set of instruments used in estimating the baseline econometric model.

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Table SA1. Definition of Conspicuous Consumption Expenditure

Expenditure Category	Khamis et al. (2012)	Charles et al. (2009)	Heffetz (2011)	Friehe and Mechtel (2014)
Personal Transport Equipment (includes bicycle, scooter, car etc.)	✓	✓	✓	✓
Footwear	✓	✓		✓
Vacations	✓			✓
Furnitures and Fixtures (includes bedstead, almirah, suitcase, carpet, paintings, etc.)	✓		✓	✓
Social Functions (marriage, funerals, gifts, etc.)	✓			
Repairs and Maintenance (of residential buildings, bathroom equipments etc.)	✓			
House rent and other rents (including expense on rented household appliances, furnitures etc.)	✓	✓		
Entertainment (includes cinema, picnic, sports-club fees and video cassettes)	✓	✓		
Clothing and Bedding	✓		✓	✓
Jewelry	✓		✓	✓
Recreation goods (includes TV, radio, taperecorder, musical instruments)	✓		✓	✓
Personal goods (includes clock, watch, PC, telephone, mobile etc.)	✓			✓
Paan, tobacco and other intoxicants			✓	
Services (domestic servants etc.)			✓	
Food at restaurants			✓	✓
Telephone, cable and internet				✓
Personal care (includes spectacles, umbrella, torch, lighter etc.)		✓		✓

Notes: The dependent variable, ln(Conspicuous Consumption), in the baseline analysis is defined following Khamis et al. (2012)'s definition. Other definitions are used to check robustness of baseline results.

Table SA2. Estimated Impact of Visible Inequality on Household Conspicuous Consumption: OLS Approach

Variables	[1]	[2]	[3]	[4]
ln σ(Conspicuous Consumption)	0.0687***	0.0614***	-0.0194	-0.0237
	(0.0257)	(0.0234)	(0.0204)	(0.0212)
ln(Permanent Income)	1.342***	1.378***	1.453***	1.509***
	(0.0385)	(0.0486)	(0.0328)	(0.0443)
Demographic Controls	NO	YES	NO	YES
District Fixed Effects	NO	NO	YES	YES
Observations	23,471	23,471	23,471	23,471
Adjusted R-squared	0.478	0.295	0.459	0.313

Notes: The dependent variable is ln(Conspicuous Consumption). For definition of variables and full list of demographic controls, see note below Table 2 and main text. Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. All regressions include a constant. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table SA3. IV First Stage Results (corresponding to Table 2)

	Dependent Variable							
	Specification [1]		Specification [2]		Specification [3]		Specification [4]	
Variables	ln(Permanent Income)	ln σ(Conspicuous Consumption)	ln(Permanent Income)	ln σ(Conspicuous Consumption)	ln(Permanent Income)	ln σ(Conspicuous Consumption)	ln(Permanent Income))	ln σ(Conspicuous Consumption)
ln(Income)	**0.330*** **	0.00334	**0.146*** **	-0.0560	**0.317*** **	0.00164	**0.143*** **	-0.0167
	(0.0175)	(0.0290)	**(0.0113)**	(0.0344)	**(0.0158)**	(0.0105)	**(0.00885)**	(0.0123)
Zero Income	**3.308*** **	0.221	**1.529*** **	-0.419	**3.115*** **	0.146	**1.486*** **	-0.0368
	(0.187)	(0.285)	(0.104)	(0.324)	**(0.153)**	(0.142)	**(0.0988)**	(0.150)
ln σ(Income)	0.124***	**0.658*** **	0.0635***	**0.606*** **	0.0185*	**0.462*** **	0.00757	**0.458*** **
	(0.0319)	**(0.0602)**	(0.0164)	**(0.0449)**	(0.0106)	**(0.0609)**	(0.00756)	**(0.0602)**
σ (Literate)	-0.304***	**-0.0864**	-0.100*	**0.0184**	-0.222***	**-0.437***	-0.0593*	**-0.390**
	(0.0986)	**(0.425)**	(0.0525)	**(0.382)**	(0.0516)	**(0.237)**	(0.0346)	**(0.231)**
σ (Education)	0.0453***	**0.155*** **	0.00767	**0.122*** **	0.0287***	**0.150*** **	0.00880*	**0.143*** **
	(0.0119)	(0.0357)	(0.00723)	(0.0370)	(0.00747)	**(0.0295)**	(0.00444)	**(0.0298)**
Demographic Controls	NO	NO	YES	YES	NO	NO	YES	YES
District Fixed Effects	NO	NO	NO	NO	YES	YES	YES	YES
Observations	23,471	23,471	23,471	23,471	23,471	23,471	23,471	23,471
Adjusted R-squared	0.279	0.184	0.609	0.222	0.226	0.120	0.537	0.124

Notes: Estimation via OLS. Results correspond to different specifications reported in Table 2 (main text). For each specification in Table 2, there are two endogenous variables, ln(Permanent Income)(proxied by ln(Total Consumption Expenditure)) and ln σ(Conspicuous Consumption) which are instrumented. Hence, there are two first stage regressions corresponding to each specification. The dependent variables in each of the above specification are these endogenous variables (given in the column-headings). ln σ(Conspicuous Consumption) denotes natural log of standard deviation of conspicuous consumption expenditure of households at the village level leaving out the focal household. Zero Income is a dummy takes a value 1 if households have zero income. ln σ(Income) denotes natural log of standard deviation of income of households at the reference group level leaving out the focal household. σ(Literate) denotes standard deviation of Literate (dummy variable that takes value 1 if HH is literate) of household head at the reference group level leaving out the focal household. σ(Education) denotes standard deviation of years of education of household head at the reference group level leaving out the focal household. For the full list of demographic controls, see note below Table 2 (main text). Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. All regressions include a constant. *** p < 0.01, ** p < 0.05, * p < 0.10.

Table SA4. Robustness of Estimated Impact of Visible Inequality on Household Conspicuous Consumption: Alternate Definitions of Conspicuous Consumption

	Definition of Conspicuous Consumption		
Variables	Charles et al. (2009)	Heffetz (2011)	Friehe and Mechtel (2014)
ln σ(Conspicuous Consumption)	-0.071***	-0.123***	-0.043**
	(0.024)	(0.037)	(0.020)
ln (Permanent Income)	1.583***	1.747***	1.926***
	(0.09)	(0.076)	(0.09)
Observations	23,469	23,470	23,471
Adjusted R-squared	0.251	0.226	0.310
Hansen J statistic	3.263	3.319	4.834
	[p=0.353]	[p=0.345]	[p=0.184]
Kleibergen-Paap rk LM statistic	16.520	16.850	16.820
	[p=0.002]	[p=0.002]	[p=0.002]
Angrist Pischke F statistic			
ln σ(Conspicuous Consumption)	82.780	49.060	106.070
ln (Permanent Income)	87.330	88.240	87.210

Notes: Estimation via two-step GMM. The dependent variable is ln(Conspicuous Consumption). See Appendix Table 1 for a complete list of goods included in the conspicuous consumption basket as per each definition. ln σ(Conspicuous Consumption) and ln(Permanent Income) are endogenous. All specifications include demographic controls and district fixed effects. For definition of variables, full list of demographic controls and first stage instruments, see note below Table 2 and main text. Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. All regressions include a constant. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table SA5. Robustness of Estimated Impact of Visible Inequality on Household Conspicuous Consumption: Alternate Measures of Visible Inequality

Variables	[1]	[2]
Gini (Conspicuous Consumption)	-0.471**	
	(0.221)	
CV(Conspicuous Consumption)		-0.141*
		(0.076)
ln(Permanent Income)	1.802***	1.820***
	(0.071)	(0.067)
Observations	23,471	23,401
R-squared	0.467	0.464
Adjusted R-squared	0.460	0.456
Hansen J statistic	0.331	3.803
	[p=0.565]	[p=0.149]
Kleibergen-Paap rk LM statistic	16.020	14.590
	[p=0.000]	[p=0.002]
Angrist Pischke F statistic		
Gini (Conspicuous Consumption)	21.660	
CV(Conspicuous Consumption)		9.860
ln(Permanent Income)	158.090	105.610

Notes: Estimation via two-step GMM. The dependent variable is ln(Conspicuous Consumption). Specification [1] uses Gini(Conspicuous Consumption) and specification [2] uses CV(Conspicuous Consumption) as the measure of visible inequality. Gini(Conspicuous Consumption) is defined as the Gini coefficient of conspicuous expenditure of households at the village level leaving out the focal household, and CV(Conspicuous Consumption) is defined as the coefficient of variation of conspicuous expenditure of households at the village level leaving out the focal household. CV(Conspicuous Consumption), Gini(Conspicuous Consumption) and ln(Permanent Income) are endogenous. CV(Conspicuous Consumption) is instrumented by CV(Income), Gini(Conspicuous Consumption) is instrumented by Gini(Income). All specifications include demographic controls and district fixed effects. For full list of demographic variables, and instruments for ln(Permanent Income), see note below Table 2 and main text. All regressions include a constant. Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table SA6. Robustness of Estimated Impact of Visible Inequality on Household Conspicuous Consumption: Alternate Definition of Reference Group

Variables	[1]	[2]	[3]
ln σ(Conspicuous Consumption)	-0.130***		
	(0.048)		
CV (Conspicuous Consumption)		-0.165*	
		(0.089)	
Gini (Conspicuous Consumption)			-0.717**
			(0.318)
ln(Permanent Income)	1.802***	1.790***	1.799***
	(0.073)	(0.071)	(0.073)
Observations	23,308	23,309	23,309
Adjusted R-squared	0.452	0.451	0.454
Hansen J statistic	0.379	0.373	0.384
	[p=0.538]	[p=0.541]	[p=0.536]
Kleibergen-Paap rk LM statistic	16.200	6.170	16.120
	[p=0.000]	[p=0.045]	[p=0.000]
Angrist Pischke F statistic			
ln σ(Conspicuous Consumption)	19.080		
CV (Conspicuous Consumption)		7.810	
Gini(Conspicuous Consumption)			13.950
ln(Permanent Income)	164.350	166.310	165.950

Notes: Estimation via two-step GMM. The dependent variable is ln(Conspicuous Consumption). Reference group of a household includes other households of the household's district of residence having same caste/religious affiliation. ln σ(Conspicuous Consumption) denotes natural log of standard deviation of conspicuous consumption expenditure of households at the village level leaving out the focal household. CV(Conspicuous Consumption) is defined as the coefficient of variation of conspicuous expenditure of households at the village (reference group) level leaving out the focal household and Gini(Conspicuous Consumption) is defined as the Gini coefficient of conspicuous expenditure of households at the village (reference group) level leaving out the focal household. ln σ(Conspicuous Consumption), CV(Conspicuous Consumption), Gini(Conspicuous Consumption) and ln(Permanent Income)are endogenous. CV(Conspicuous Consumption) and Gini(Conspicuous Consumption) are instrumented by CV(Income) and Gini(Income respectively). All specifications include demographic controls and district fixed effects. For full list of demographic controls and first stage instruments for ln(Permanent Income), see note below Table 2 (main text). All regressions include a constant. Heteroskedasticity robust standard errors are reported in parentheses clustered at state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Table SA7. Robustness of Estimated Impact of Visible Inequality on Household Conspicuous Consumption: Additional Group-Level Income Controls

Variables	[1]	[2]
ln σ(Conspicuous Consumption)	-0.095*	-0.094**
	(0.054)	(0.037)
ln(Permanent Income)	1.812***	1.812***
	(0.065)	(0.069)
ln Mean(Permanent Income)	0.078	
	(0.135)	
ln Median(Permanent Income)		0.051
		(0.108)
Observations	23,471	23,471
Adjusted R-squared	0.298	0.297
Hansen J statistic	3.941	0.421
	[p=0.558]	[p=0.810]
Kleibergen-Paap rk LM statistic	15.97	15.86
	[p=0.014]	[p=0.001]
Angrist Pischke F-statistics		
ln σ(Conspicuous Consumption)	3.95	13.5
ln(Permanent Income)	63.78	116.66
ln Mean(Permanent Income)	20.56	
ln Median(Permanent Income)		91.01

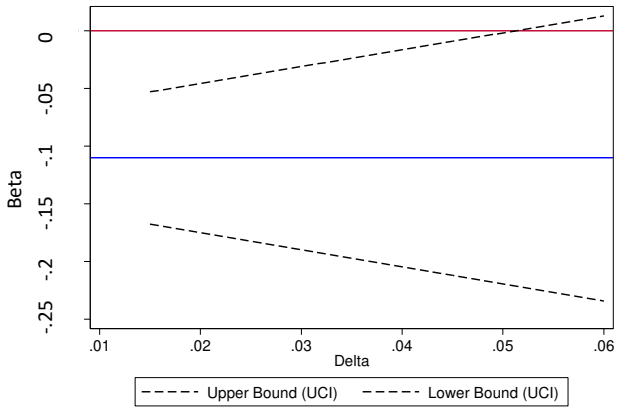
Notes: Estimation via two-step GMM. The dependent variable is ln(Conspicuous Consumption). ln σ(Conspicuous Consumption), ln(Permanent Income), ln Mean(Permanent Income) and ln Median(Permanent Income) are endogenous. First stage instruments include ln(Income), Zero Income, ln σ(Income), ln σ(Literate), ln σ(Years of Education), ln Mean(Literate), ln Mean(Years of Education) and ln Median(Income). ln σ(.), ln Mean(.) and ln Median(.) are measured at the village level leaving out the focal individual. All specifications include demographic controls and district fixed effects. For complete list of demographic controls, see note below Table 2 (main text). All regressions include a constant. Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Table SA8. Robustness of Estimated Impact of Visible Inequality on Household Conspicuous Consumption: 'Local Density' Approach

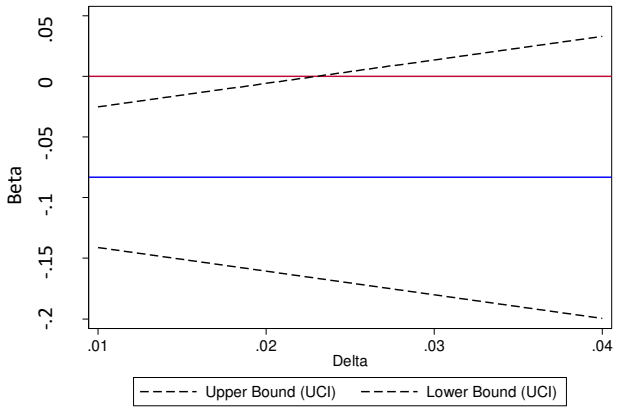
Variables	[1]	[2]	[3]	[4]
Local Density_5%	4.448*		3.329	
	(2.371)		(2.499)	
Local Density_10%		2.359*		1.974
		(1.286)		(1.282)
ln σ(Conspicuous Consumption)			-0.0609*	-0.0580**
			(0.0335)	(0.0275)
ln(Permanent Income)	1.835***	1.840***	1.813***	1.819***
	(0.0885)	(0.0857)	(0.0794)	(0.0808)
Observations	23,471	23,471	23,471	23,471
Adjusted R-squared	0.226	0.265	0.254	0.274
Hansen J statistic	0.158	0.156	1.266	1.450
	[p=0.691]	[p=0.692]	[p=0.737]	[p=0.694]
Kleibergen-Paap rk LM statistic	8.940	11.25	9.312	13.24
	[p=0.011]	[p=0.003]	[p=0.054]	[p=0.010]
Angrist Pischke F-statistics				
Local Density_5%	11.09		5.82	
Local Density_10%		11.55		11.64
ln σ(Conspicuous Consumption)			51.03	63.79
ln(Permanent Income)	158.72	162.14	89.60	89.60

Notes: Estimation via two-step GMM. The dependent variable is ln(Conspicuous Consumption). ln σ(Conspicuous Consumption) denotes natural log of standard deviation of conspicuous consumption expenditure of households at the village level leaving out the focal household. Local Density_5% (10%) is measured as the proportion of households within a village having conspicuous expenditure with 5%(10%) bandwidth of the focal household's own conspicuous expenditure. Local Density_5%, Local Density_10%, ln σ(Conspicuous Consumption) and ln(Permanent Income) are endogenous. Local Density_5% and Local Density_10% are instrumented by local densities calculated for the respective bandwidths based on Income. All specifications include demographic controls and district fixed effects. For full list of demographic controls and first stage instruments for ln(Permanent Income) and ln σ(Conspicuous Consumption), see note below Table 2 (main text). Heteroscedasticity robust standard errors are reported in parentheses clustered at state level. All regressions include a constant. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$

Figure SA1. Sensitivity Analysis of Instruments: UCI Approach (Conley et al., 2012)



(A)



(B)

Notes:

1. Figures show how large the exclusion restriction violation would need to be in order to invalidate the baseline form results.
2. (A) – Excluding district fixed effects, and (B) – Including district fixed effects.
3. The dashed lines plot the union of confidence intervals. Blue line denotes the actual two stage least square estimates.
4. Beta denotes coefficient of visible inequality, Delta represents possible values of coefficient of income inequality had it been a part of the second stage.
4. Figures produced using the 'plausexog' code in Stata.