Keeping Up with the Vaishyas:
Caste and Relative Standing

Fredrik Carlsson[a]
Gautam Gupta[b]
Olof Johansson-Stenman[c]

Abstract
We investigate the importance of relative income within the Indian Caste system, using a choice experiment. We find that slightly more than half of the marginal utility of income comes from some kind of relative income effects, on average, which is comparable to the results from previous studies in other countries. Belonging to a low caste and having a low family income are associated with higher concern for relative income. Moreover, an increase in the mean income of the caste to which the individual belongs, everything else held constant, reduces utility for the individual. Thus, the negative welfare effect of reduced relative income compared to the average own caste income dominates the positive welfare effect of increased relative income of the own caste relative to other castes.

Key words: Caste, India, relative income, positionality, status, questionnaire-experimental methods, random utility models, choice experiments

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[a] Department of Economics, Göteborg University, Box 640, SE-40530 Göteborg, Sweden. Tel: + 46 31 7734174, e-mail: Fredrik.Carlsson@economics.gu.se
[b] Department of Economics, Jadavpur University, Kolkata-700 032, India. E-mail: gautamju@yahoo.com
[c] Department of Economics, Göteborg University, Box 640, SE-40530 Göteborg, Sweden. Tel: + 46 31 7732538, e-mail: olof.johansson@economics.gu.se

1. Introduction

People care about relative income. Despite the non-appearance in conventional economics textbooks, this was considered an obvious fact to many of the founding fathers of modern economics including Adam Smith, John Stuart Mill, Karl Marx, Alfred Marshall, Thorstein Veblen, Arthur Pigou, and John Maynard Keynes. There is now again a growing interest in economics related to status and relative income and consumption; see e.g. Frank (1999, 2005), Hopkins and Kornienko (2004), Luttmer (2004) and Alonso-Carrera et al. (2005). A subfield in this new literature, to which this paper belongs, is concerned with measuring the degree to which relative income matters. There are two main classes of methods to do that: Subjective happiness or satisfaction studies and survey-based choice experimental methods based on hypothetical choices; this paper uses the latter one, drawing on Johansson-Stenman et al. (2002), Alpizar et al. (2005) and Carlsson et al. (2005).[1] The results in these studies indicate that relative income on average is about as important as absolute income, on the margin. However, one may question the possibility to generalize these findings to non-western, less individualistic countries where groups may be relatively more important. India is a good candidate for such a test, since the Indian society is still largely organized around a particular set of very important groups: castes. Another advantage from a methodological point of view is that caste belonging is hereditary and cannot be changed.

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[1] Both of these methods are controversial and have their inherent strengths and problems. In the general economics literature, there is no sign of an emerging consensus or even convergence regarding the importance of relative income. This is remarkable given that the question whether aggregate well-being increases with aggregate income, or whether relative income is most important, constitute one of the most fundamental one in economics. In the light of this, we believe that both classes of methods should be seen as complementary.

In addition, India is the third biggest economy in the world and constitutes some 20% of the world population.

The investigation of the importance of relative income both within and between castes in India is the main empirical task of this paper, and to do that we use a survey-based choice experimental method where Indian students make repeated choices between imagined societies on behalf of a likewise imagined grandchild. The design of the experiment uses the same basic set-ups as the ones in Johansson-Stenman et al. (2002) and Alpizar et al. (2005), with some important modifications and extensions; in particular, the set-up makes between and within-group comparisons possible.

Our first main result is that on average between half and two third of the respondents' marginal utility of income comes from relative income effects, which is thus comparable to the results from earlier studies based on similar methodologies in other, western, countries. Furthermore, we investigate if an increase in the average income of the subgroup to which an individual belongs, when the individual's own income is held fixed, increase or decrease the individual's utility. The answer is not straightforward, since people may both derive utility from having a high relative income within the group and from belonging to a subgroup with higher average income and status. Our second main result is that the former effect tends to dominate the latter, i.e. people's utility tends to decrease with increased average income of the caste to which they belong.

Using hypothetical choices in a questionnaire setting is of course not without problems, as discussed for example by Bertrand and Mullainathan (2001), and we cannot rule out that people might exaggerate their preferences in one way or the other, which will be discussed subsequently. However, we nevertheless argue, following Kahneman and

Tversky (1979, p. 265), that choices between large hypothetical incomes can reveal useful information when participants have no particular reason to disguise their true preferences.[2]

The remainder of this paper is organized as follows. Section 2 presents the basic model where different kinds of relative incomes are arguments in the utility function, while Section 3 describes the survey-based experiment. Section 4 presents descriptive results followed by econometric analysis in Section 5. Section 6 discusses possible biases and the extent to which we should believe the empirical results, whereas Section 7 provides some concluding remarks.

2. Modeling Positionality in a Caste Society

The caste system in India is over 3000 years old. A caste is a group belonging that has a specific rank in the society. Traditionally there were four castes: Brahmins (priests, academicians, scientists and physicians), Kshatriyas (warriors and kings), Vaishyas (traders and businessmen) and Shudras (agricultural workers and manual laborers). In the ancient times, caste membership was profession based. However, as there were little alternative opportunities to learn a profession except from one's parents or relatives, the caste system

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[2]One may suggest laboratory experiments with actual money as an alternative to our setup. The asymmetric inequality aversion found by Fehr and Schmidt (1999) can for example be interpreted as reflecting concern for relative payoff. Nevertheless, it is difficult to generalize findings from two (or few) person experiments with relatively small pay-offs to a social setting such as the one we are interested in, particularly when it comes to quantifying the degree to which relative income matters for well-being. It is for example not difficult to imagine an individual who prefers a payoff increase for his co-player in an experiment *ceteris paribus*, even though his well-being depends strongly on his relative income in society.

became hereditary. In the middle ages, the caste system degenerated into many sub-castes. The present system is extremely complex, hierarchical and closed. Every Hindu belongs to a caste, and the belonging is hereditary. That a caste system can exist even if it is disadvantageous to the individual has been ascribed to social customs and social sanctions (e.g. Akerlof, 1976, 1980) and preference falsification (Kuran, 1995).

However, after the independence of India in 1947 the new constitution banned the practice of untouchability and made it a punishable offence. The constitution also encouraged movement away from the caste system and any discrimination based on caste. At the same time special treatments (especially with regard to educational and employment opportunities) were accorded to the so-called Scheduled Castes (SC), which mainly included the Untouchables. Later similar affirmative actions were initiated for the Scheduled Tribes (ST), which constitute the indigenous people of India, as well as for Other Backward Classes (OBC). All of these groups are often considered to be depressed socially and politically, and they remain quite closed in social relations, marriage and rituals.[3]

Despite the secular constitution, caste is still very present and important in the Indian society (see e.g. Bayly 1999) in terms of disparity/inequality (Desphande, 2000), for how people respond to opportunities (Hoff and Pandey, 2004), and fertility (Borooah,

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[3] It may be mentioned that present affirmative action laws (reservation laws as they are called in India) allow non Hindus to also belong to Scheduled Caste (SC) and Other Backward Classes (OBC) categories provided they can prove that they had converted to other religion after 1947. Likewise, membership of SC, OBC and ST categories cannot be gained or lost through marriage. See Sowell (2004) for a critical examination of the affirmative actions around world, including the case of India.

2004). Moreover, the caste system may also have profound effects on other customs, such as dowry payments (Anderson, 2003) and fuel collection (Köhlin and Parks, 2001).

Given the current states of nature, it appears reasonable that the position of the caste in the society and the position of the individual within a specific caste are important issues for an individual. Hence, we model utility for an individual i to depend (presumable positively) on i's (absolute) income y_i, on i's relative income compared to the average income level in the society, r_{is}, on i's relative income compared to the average income level in the caste to which i belongs, r_{ic}, and finally on the average income level in the caste relative to the average income level in the society, r_{cs}. Thus we can write

$$U_i = u_i(y_i, r_{ic}, r_{is}, r_{cs}) \equiv u_i(y_i, y_i / y_{caste}, y_i / y_{society}, y_{caste} / y_{society}), \tag{1}$$

where it appears reasonable to suspect that $\dfrac{\partial u_i}{\partial y_i} > 0, \dfrac{\partial u_i}{\partial r_{is}} > 0, \dfrac{\partial u_i}{\partial r_{ic}} > 0, \dfrac{\partial u_i}{\partial r_{cs}} > 0$, and where y_{caste} and $y_{society}$ are the average income levels in the caste/group to which the individual belongs and in the society, respectively.

We will analyze two aspects of this model in this paper: First, we will attempt to quantify the degree to which relative income matters on the margin, compared to absolute income. This is done by estimating the *marginal degree of positionality* (Alpizar et al., 2005), i.e. the relative extent to which the utility increase of one additional dollar is due to the corresponding relative income increase. In previous studies this parameter has been quantified based on a model where only one aspect of relative income matters, that is, personal income relative to average income in society. Here we extend this concept to instead reflect the relative degree to which an additional dollar (or rupee) gives utility

through increased relative income of any kind, and hence not only related to the mean income of the society. We can then formally define the marginal degree of positionality for individual *i* as:

$$\gamma_i = \frac{\dfrac{\partial u_i}{\partial r_{ic}}\dfrac{\partial r_{ic}}{\partial y_i} + \dfrac{\partial u_i}{\partial r_{is}}\dfrac{\partial r_{is}}{\partial y_i}}{\dfrac{\partial u_i}{\partial y_i} + \dfrac{\partial u_i}{\partial r_{ic}}\dfrac{\partial r_{ic}}{\partial y_i} + \dfrac{\partial u_i}{\partial r_{is}}\dfrac{\partial r_{is}}{\partial y_i}} \tag{2}$$

If $\gamma = 0$, then relative income does not matter at all at the margin, as in conventional economic theory. On the other extreme, if $\gamma = 1$, the utility effect of an income increase is solely due to the fact that their relative income (compared to other people of their own caste and other people in the society, respectively) has increased and not at all due to the increase in absolute income.[4]

Note that it is not possible to estimate γ from conventional revealed behavior analysis, since the individual can in general not choose the surroundings in terms of average income in the society or the average income of his or her caste. This is the main

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[4] It is theoretically possible that the marginal degree of positionality in special cases is either negative or larger than one. The first case would occur if a person, to a sufficient degree, gets a decreased utility of an improved relative position in either the society or in their caste; i.e. either $\dfrac{\partial u_i}{\partial r_{ic}} < 0$ or $\dfrac{\partial u_i}{\partial r_{is}} < 0$. In this model, this is equivalent to a situation where people's utilities, to a sufficient degree, increase if either the average income in society, or the average caste income, increase. The second case would for example occur if a proportional income increase for all in a society implies that utility decreases. This can be justified by some kind of "small-is-beautiful-perception," or a perception that a simple life makes us all happier for example through some kind of Rousseau-inspired back-to-nature ideal.

advantage of using a choice-experimental methodology, since it also enables us to vary these characteristics.

The second question we will analyze is whether an increase in the caste average income, to which the individual belongs, is good or bad for the individual, i.e. whether the individual utility increases or decreases with the caste average income. Based on the utility function in (1) we have:

$$\frac{dU_i}{dy_{caste}} = \frac{\partial u_i}{\partial r_{ic}}\frac{\partial r_{ic}}{\partial y_{caste}} + \frac{\partial u_i}{\partial r_{cs}}\frac{\partial r_{cs}}{\partial y_{caste}} = -y_i\frac{\partial u_i}{\partial r_{ic}}\frac{1}{y_{caste}^2} + \frac{\partial u_i}{\partial r_{cs}}\frac{1}{y_{society}} \tag{3}$$

The first term reflects that the individual's relative income compared to the caste average income has decreased. This effect has a negative impact on utility. The second term reflects that the caste's relative income compared to the average income in society has increased. This effect has a positive impact on utility. *A priori*, it is hence impossible to say which term that will dominate. This is therefore tested in the choice experiment where people choose between different imagined societies on behalf of their imagined offspring.

In the empirical analysis we will work with two explicit utility functions, a linear and a log-linear. The linear utility function is given as:

$$u_i = \alpha_{i1}y_i + \alpha_{i2}y_{i,caste} + \alpha_{i3}y_{society} \tag{4}$$

By combining (2) and (4), it is easy to verify that *i*'s marginal degree of positionality is given by $\gamma_i = -\frac{\alpha_{i2} + \alpha_{i3}}{\alpha_{i1}}$. Furthermore, the expression in equation (3) - whether an increase

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in the mean income of the individual's caste is good or bad for the individual - is directly given by the sign of α_{i2}. The second log-linear model is given as follows:[5]

$$\ln u_i = \beta_{i1} \ln y_i + \beta_{i2} \ln y_{i,caste} + \beta_{i3} \ln y_{society} \tag{5}$$

where again i's marginal degree of positionality is given by $\gamma_i = -\dfrac{\beta_{i2} + \beta_{i3}}{\beta_{i1}}$, and where the

sign of β_{i2} determines whether an increase in the mean income of individual i's caste is good or bad for individual i. Our two parameterized utility functions are of course highly simplified. However, given the complexity of the task and the associated cognitive burden for the individuals, and the still quite limited data obtained, we refrain from elaborating on richer and more complicated functional forms.

3. The Survey and the Choice Experiment

Students from Jadavpur University, Calcutta University, Kalyani University and Viswa Bharati University participated in the experiment. The first two universities are located in Kolkata city and the other two in rural areas in West Bengal. The reason we chose these universities was to have a appropriate mix with respect to Caste, religious belonging and family income. Participation was voluntary. The time for conducting each session varied between 20 and 30 minutes, and the students were given information both verbally and in

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[5] Note that both utility functions are purely ordinal, implying that any monotonic transformation of (4) and (5) are equally valid utility functions, and that no cardinal information is hence identifiable. This implies, for example, that the relative importance of the different components in the general utility function (1) cannot be identified with these empirical models.

printed form. From previous experiments and several pre-tests we had learnt that it is difficult but important to present the information in a clear and understandable way. The experiment consisted of three parts (i) a general introduction, (ii) the relative income experiment and (iii) questions regarding the respondent's socio-economic status.

In each choice situation, the respondents make a choice between two societies, *A* and *B*, described by their own income, the caste average income and the average income in the society.[6] In the construction of the scenarios we followed Johansson-Stenman et al. (2002) and Alpizar et al. (2005) by instructing the respondents to consider the well-being of an imagined relative living two generations from now when making their choices. This framing was used in order to help the respondents to liberate themselves from their current circumstances. Moreover, it seems more natural to choose what is best for an imagined relative than a complete stranger. The respondents were frequently reminded that they should *not* choose what they considered the overall best society, but the society that would be the best for their grandchild. The students were told that the societies were identical in all respects, except the issue being analyzed. It was also stressed that prices of goods were the same in all societies. The exact wordings of the instructions are provided in appendix. An example of a question in the experiment is given in the figure below (the full instructions are given in the Appendix).

Figure 1 about here

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[6] Respondents that are not Hindus were asked to imagine the caste question as reflecting their religious group, i.e. either Muslim or Christian.

Each respondent were asked to make nine of these choices, where the grandchild's own income, the caste average income and the society average income were varied independently. In order to reduce the respondent's cognitive burden we did not present the questions randomly, as is often done in choice experiments (see e.g. Louviere et al. 2000), but in a specific sequence, for the respondent to follow a more logical order. In the first set consisting of three questions we always let the average caste income equal the average income in the society. In the next set of three questions we let instead the grandchild's income equal the society's mean income, and in the last set of three questions we let the grandchild's income equal the caste's mean income. There were two versions of the experiment where the only difference between them was the level of the grandchild's income, since we wanted to test if the degree to which relative concerns are important vary with the income level or not. In version 1 (Normal) the grandchild's income is of a similar order of magnitude as the mean income in the society, while in version 2 (High) the grandchild's income is generally considerably higher than the mean income in the society. Within each of the three sets of questions Society *A* remains the same, while in society *B* the grandchild's income decreases.

4. Descriptive Results

In total 498 students participated in the experiments. The descriptive statistics of the respondents are presented in Table 1.

   Table 1 about here

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Since this is a sample consisting of university students we have, for natural reasons, that most respondents are quite young and that a relatively large fraction comes from wealthy families. In the analysis we group the castes and tribes that are enjoying the affirmative action as one group called Low caste. Low caste respondents are slightly under represented in our sample, but note that without the affirmative actions in higher education it is very likely that the share of low caste respondents would have been much lower. The societies and the response frequencies of the normal scale experiment are presented in Table 2 below.[7]

Table 2 about here

From the first set of questions we can see that a substantial fraction of respondents is willing to pay a non-negligible premium for having an income above rather than below the average income levels in society and in the caste to which the individual belongs. From the next set of questions, and question 4 in particular, it is clear that the majority consider an increase of the caste average income to be bad *ceteris paribus*. Hence, it seems that on average the negative utility effect from their reduced relative income within their caste dominates the positive utility effect from the fact that the average income of their own caste compared to the average income in society has increased. This finding can be compared to Stutzer (2005) who found that people's self-reported happiness on average depends

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[7] We consider a response inconsistent if in any of the three question sets the respondent first chooses society *B* and then switches to society *A*, since such behaviour is inconsistent with our theoretical model. In the normal scale experiment 8.8% of the respondents were inconsistent in this sense and in the high scale experiment 9.9% of the respondents were inconsistent. These respondents are dropped from the analysis.

negatively on the mean income in the area in which they live.[8] The societies and the response frequencies of the high scale societies are presented in Table 3 below, indicating a pattern which is largely similar as for the normal scale.

Table 3 about here

5. Econometric analysis

We can not directly observe the respondents' marginal degree of positionality, not even based on their questionnaire-experimental choices. However, from their choices it is possible to estimate the parameters of an assumed utility function and derive the sample-average of the marginal degree of positionality. In order to do this we apply a random utility model (McFadden 1974), where we introduce an additive non-observable error term into the utility function. Assuming a linear utility function we then have that the utility for individual i is

$$v_i = \alpha_{i1} y_i + \alpha_{i2} y_{i,caste} + \alpha_{i3} y_{society} + \varepsilon_i, \tag{6}$$

where ε_i is an error term, reflecting choice errors and preference heterogeneity. Applying this to the experiment we then have that the probability that an individual chooses society B can be expressed as

$$P[B] = P\left[\alpha_{i1} y_i^A + \alpha_{i2} y_{i,caste}^A + \alpha_{i3} y_{society}^A + \varepsilon_i^A < \alpha_{i1} y_i^B + \alpha_{i2} y_{i,caste}^B + \alpha_{i3} y_{society}^B + \varepsilon_i^B\right] \tag{7}$$

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[8] Although the comparison is not perfectly straightforward, since the degree of endogeneity of the reference group is much higher for neighbors and since one may expect that the living area may contribute less to an individual's identity and social status than does caste belonging, the results are nevertheless compatible.

$$= P\left[\alpha_{i1}(y_i^A - y_i^B) + \alpha_{i2}(y_{i,caste}^A - y_{i,caste}^B) + \alpha_{i3}(y_{society}^A - y_{society}^B) < \eta_i\right],$$

where $\eta_i = \varepsilon_i^B - \varepsilon_i^A$. If we assume that the error terms are standard normally distributed, the parameters in the expression above can be estimated with a binary probit model. However, in the expressions above individual heterogeneity is only captured by the error term. In order to account for observed heterogeneity we include a number of socio-economic characteristics that are interacted with the grandchild's caste average income and the society average income. In that case the probability that an individual chooses society B can be expressed as

$$P[B] = P\left[\begin{array}{c} \alpha_{i1}(y_i^A - y_i^B) + \alpha_{i2}(y_{i,caste}^A - y_{i,caste}^B) + \alpha_{i3}(y_{society}^A - y_{society}^B) + \\ \beta x_i(y_{i,caste}^A - y_{i,caste}^B) + \delta x_i(y_{society}^A - y_{society}^B) < \eta_i \end{array}\right] \qquad (8)$$

Where x_i is a vector of socio-economic characteristics of individual i and β and δ are the corresponding parameter vectors.

The estimated marginal degree of positionality for individual i is given by

$$\gamma_i = -\frac{\alpha_{2i} + \alpha_{3i} + \beta x_i + \delta x_i}{\alpha_{1i}} \qquad (9)$$

which clearly reduces to $\gamma_i = -\dfrac{\alpha_{2i} + \alpha_{3i}}{\alpha_{1i}}$ in a model without socio-economic characteristics. Similar expressions are straightforward to derive for the log-linear utility function. In order to account for unobserved heterogeneity in a more flexible way we estimate the model as a random parameter model, where we assume that the two parameters for the grandchild's caste average income and the society average income are randomly normally distributed; see e.g. Train (2003) for a detailed description of random parameter

models. This means that we estimate a mean and a standard deviation for the randomly distributed parameters. Since we observe the respondents over several choice situations the data can be seen as a panel data. Therefore in the random parameter model it is assumed that the randomly distributed parameters are constant across the choice situation for each respondent.

Tables 4 reports the results of the estimations for the linear and the log-linear utility functions, respectively. The models are estimated with simulated maximum likelihood using Halton draws with 200 replications.[9] For all models we calculate the sample mean degree of marginal positionality and for the socio-economic characteristics we also calculate the net marginal effect on the mean marginal degree of positionality.[10]

Table 4 about here

Most of the parameters of the interaction variables are significant and the standard deviations of the random parameters are highly significant even when we include the socio-economic characteristics, suggesting that we are successful in capturing both observed and unobserved heterogeneity. The estimated mean marginal degree of positionality does not differ much across the models, and varies between 0.51 and 0.66.[11] This implies that if

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[9] See Train (2003) for details on simulated maximum likelihood and Halton draws.

[10] Since each socio-economic characteristic is interacted with both society and caste income, the marginal degree of positionality depends on both interaction terms. This in turn means that that the marginal effect on the marginal degree of positionality also depends on both interaction terms.

[11] The results of basic binary probit models are also very similar, and available upon request. Furthermore, the inclusion of the socio-economic characteristics does not affect the estimate of the mean degree of positionality in any substantial way.

income increases marginally, more than half of the associated utility increase comes from the increase in relative income. Crude comparisons with samples from other countries suggest that Indian students care about relative income to about the same degree as students in Sweden (Johansson-Stenman et al., 2002), Costa Rica (Alpizar et al., 2005) and the US (Solnick and Hemenway, 1998, 2004), as well as a representative sample of adults in Sweden (Carlsson et al., 2005).

From the estimated interaction parameters we can also calculate the total effect on the estimated marginal degree of positionality; this is reported in the column *Net marginal effects*.[12] We find that the degree of marginal positionality decreases with family income, and also that people who are members of a low caste, or are not members of any caste, have a higher degree of positionality than others. This seems to suggest that relative income is particularly important for people with low status. We also find that being a Muslim or belonging to any other religion (mainly Christianity) implies a lower degree of positionality. Females have a slightly (but significantly) lower degree of positionality than men, which is consistent with the evolutionary arguments presented in Frank (1999, pp. 134-35), but which contradicts the empirical findings in Alpizar et al. (2005) and Johansson-Stenman et al. (2002). All net marginal effects associated with the interaction variables have the same sign for both functional forms, except for the dummy variable indicating the high scale version of the experiment.[13]

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[12] For all discrete variables the parameters reflect the difference in degree of positionality when the variable is equal to one and when it is equal to zero.

[13] It is not surprising that this parameter is more sensitive to the functional form, and we can hence not provide any conclusion regarding the impact of scale.

The negative sign of the parameter of the mean caste income is consistent with the descriptive results discussed. Thus, an increase in the own caste's mean income has a negative net effect on utility, on average. The statistical significance and size of most of the interaction variables suggest that there is a substantial heterogeneity in these preferences among the respondents. For example, the coefficient for the interaction variable between female and caste average income is positive and significant in all models. This indicates that females, all else equal, have a less negative utility effect than men from an increased own mean caste income. This is also true for all the caste and religious variables, implying that Hindus that are members of a general caste (which constitutes the base case) to a larger extent dislikes increases in their own caste income, whereas Muslims are the least negative towards income increases for their own group. A possible reason why Muslims and Low Caste people to a lesser extent dislike increase in their caste/group income is related to the low status of these groups, if one assumes diminishing returns in between-caste (or group) status.

An interesting feature of the random parameter model that only recently has been explored is the possibility of estimating individual-level parameters from the estimated parameter distribution, based on Bayes Theorem (Train, 2003). Given that we can estimate where in the parameter distribution an individual is, we can also estimate a marginal degree of positionality for each individual, and hence also the distribution of preferences with respect to specific variables, such as the average income of the own caste. Thus, that the estimated parameter for the mean caste income variable is negative does not imply that *all* individuals would be affected negatively by an increase of their mean caste income. Indeed, the individual-level estimates (not shown here) of this coefficient reveal that 21% has a

positive coefficient for the linear utility function, with a corresponding figure of 13% for the log-linear utility function.

6. Can We Trust the Results?

The results in this paper rely on data from hypothetical choices made by students, which is, as mentioned, not without problems; see e.g. Bertrand and Mullainathan (2001). In this case, we have basically asked about people's perception of the importance of relative income of different kinds. However, just as we as researchers do not know the right answer to this question, one may doubt whether or not students are able to express their preferences. Indeed, the perception of experts vary widely in the whole spectrum from the conventional textbook economics position that only absolute income matters to the other extreme that only relative income matters (e.g. Easterlin, 1995). Moreover, results from earlier studies, such as Johansson-Stenman et al. (2002) and Alpizar et al. (2005), seem to indicate an overrepresentation of extreme responses, i.e. responses with either a very small (or negative) or a very large degree of positionality. The results here, based on individual-level parameters that are estimated from the estimated parameter distribution, show a similar pattern at both tails of the distribution.[14] It appears reasonable that at least parts of these extreme responses remains from students choosing to apply cognitively easier strategies when responding to the questions (see e.g. Payne et al. 1993). For example, in the first set of questions it is possible that some students initially decided that absolute income is more important than relative income, and then answered consistently with this without

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[14] Detailed results are available upon request from the authors.

trying to make tradeoffs in each case. Similarly, it is possible that some may have concluded that it is relative income that matters, and then answered correspondingly.

Nevertheless, it is less clear if and how such strategies would affect our estimated *mean* marginal degree of positionality, or the observation that within-caste relative income appears to be more important than between-caste relative income. Indeed, an important reason behind the efficiency of markets is based on the fact that people's average judgment is much more accurate than a single individual's judgment. This is not to say that there are no systematic biases, however. A possible positive bias with respect of the overall degree of positionality is that some respondents may have underappreciated the fact that all prices were held constant, even thought hey were explicitly and clearly told so. Similarly, a potential reason for a negative bias is that many people may feel that they *should* not care much about relative income and consumption, since they may think that it is an unfavorable trait of character to worry about issues such as relative income and status; cf. Johansson-Stenman and Martinsson (2005). Answering on behalf of a future family member might then imply a systematic bias downwards of the estimated positionality, if they think that their grandchild would not care much either.

7. Conclusions

This paper has investigated the importance of relative income both within and between castes in India, by using a survey-based choice-experimental method where Indian students made repeated choices between imagined societies. We have two main results: *i*. On average slightly more than half of people's marginal utility of income comes from relative

income effects, i.e. the utility gain from the relative income increase compared to others' incomes, rather then the absolute income increase. This is comparable to the results from earlier studies in western countries. Thus, we find no support for the idea that large concerns for relative income primarily reflect a western and/or rich country phenomenon. *ii*. An increase in the mean income of the caste to which the individual belongs, everything else held constant, reduces utility. Thus, the negative welfare effect of reduced relative income compared to the average own caste income dominates the positive welfare effect of increased relative income of the caste to which the individual belongs relative to other castes. As far as we know, this is the first paper that has tried to quantify such within and between group effects in any society.[15] We also found that a low family income and belonging to a low caste are associated with stronger overall relative concerns, as measured by the marginal degree of positionality.

Finally, it goes without saying that one should be hesitant and very careful when making policy conclusions based on our quantitative estimates. This said, we nevertheless encourage future work on measuring the importance of relative income concerns in general, and within and between specific subgroups in particular, both in India and elsewhere, based on a variety of methodologies and samples.

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[15] However, see Knell (1999) and Falk and Knell (2004) regarding both theoretical aspects of relative income effects with respect to group belonging and regarding how people to some extent may choose their reference group.

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Appendix

Part 1
Please start at the top and go down. Please do not skip or omit any information in the text

- Consider that in the future you have a grandchild. Imagine that you have the power to place him or her in any society of your choice.

In the following questions you will be faced with two alternative societies, A and B. You will be given
  i)   The Income of your Grandchild in that society
  ii)   The Average income in that society
  iii)   The average income of your grandchild's caste in that society. If you are not a Hindu and therefore do not belong to a Caste, please think of this as your community in terms of your religious belonging.

- Societies A and B are identical in terms of culture, religion and language pattern and your grandchild could fit into any one that you choose.

- People in Societies A and B face the same prices for essential and other commodities (you can imagine them to be today's prices in Kolkata). The quality of government services such as health care, education or public transport are the same in A and B. You may assume that the Government Policy regarding reservation in education and employment will remain the same.

- You have no knowledge of your grandchild's education, skills, abilities or interests, but they remain the same irrespective of whether he or she lives in Society A or B.

In each question below, you are required to make a choice between Society A or B. It is important that you focus your answer on what is in the best interest of your grandchild. Do not consider what is best for others or which society is the better on the whole. There is no "correct" response to these questions and we ask you to reflect on the choices carefully. If you change your mind along the way, you may of course change your earlier responses.

Example

This is not a real question in the study. It is an example to make you familiar with the type of questions that you will face.
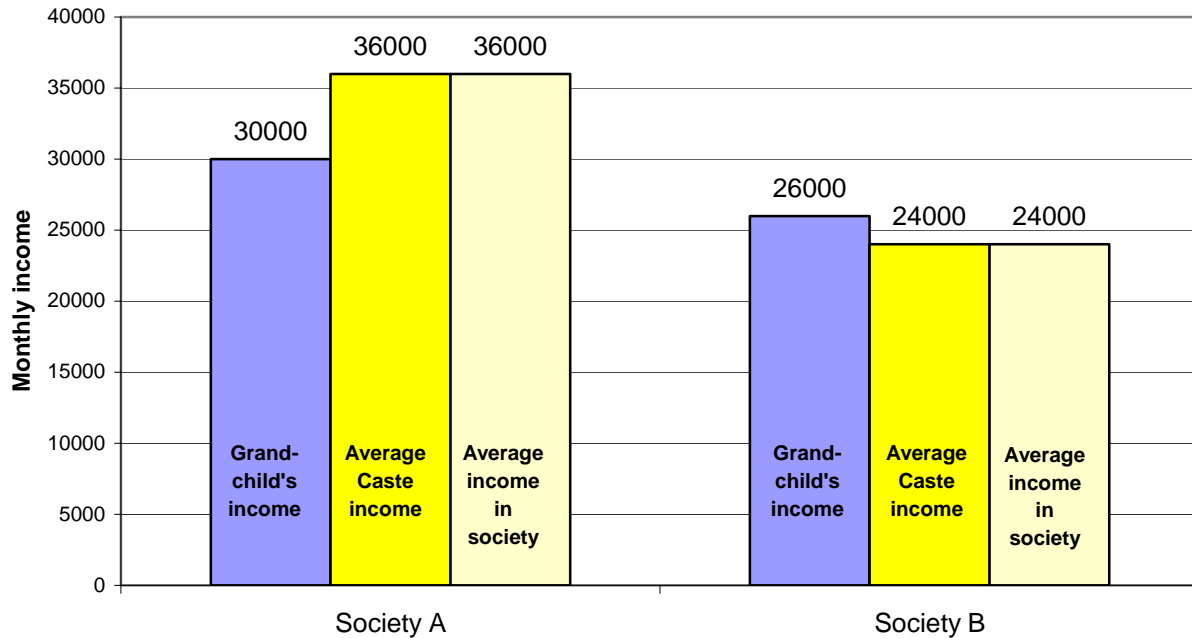
In society B, your grandchild earns less income than in Society A, but this income is higher than the caste and society average in society B, while in society A your grandchild's income is lower than the caste and society average income.

Again, please **make your choices solely based upon what you think is in the best interests of your grandchild,** where you think he or she will be most happy and content. Please do not choose a society that you think is good for others or one that you think is a better society as a whole.
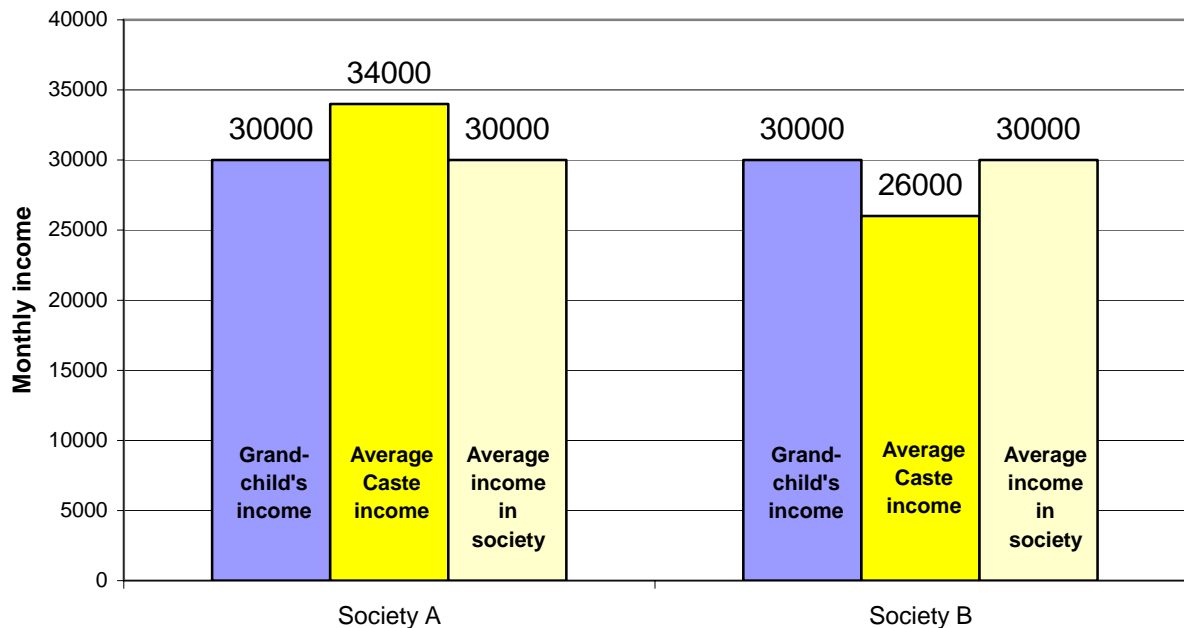
Part 2

Again, you will be faced with the same choices between Society A and Society B. Again, please make your choices solely based upon what you think is in the best interests of your grandchild, where you think he or she will be most happy and content.

In this set of questions your grandchild's income is always the same as the average income in the society. However, your grandchild's caste average income can be higher or lower than the average income in society. Furthermore, the caste average income can be higher or lower than your grandchild's income.

Remember: People in all societies described below face the same prices for all commodities (you can imagine them to be today's prices in Kolkata).

Example

In society A, the caste average income is higher than both the grandchild's income and the average income in society. In society B, the caste average income is lower than your grandchild's income and the average income in society.

Part 3

Again, you will be faced with the same choices between Society A and Society B. Again, please make your choices solely based upon what you think is in the best interests of your grandchild, where you think he or she will be most happy and content.

In this set of questions your grandchild's income is always the same as the caste average income. However, the average income in the society can be higher or lower than the caste average income. Furthermore, the average income in society can be higher or lower than your grandchild's income.

Remember: People in all societies described below face the same prices for all commodities (you can imagine them to be today's prices in Kolkata).
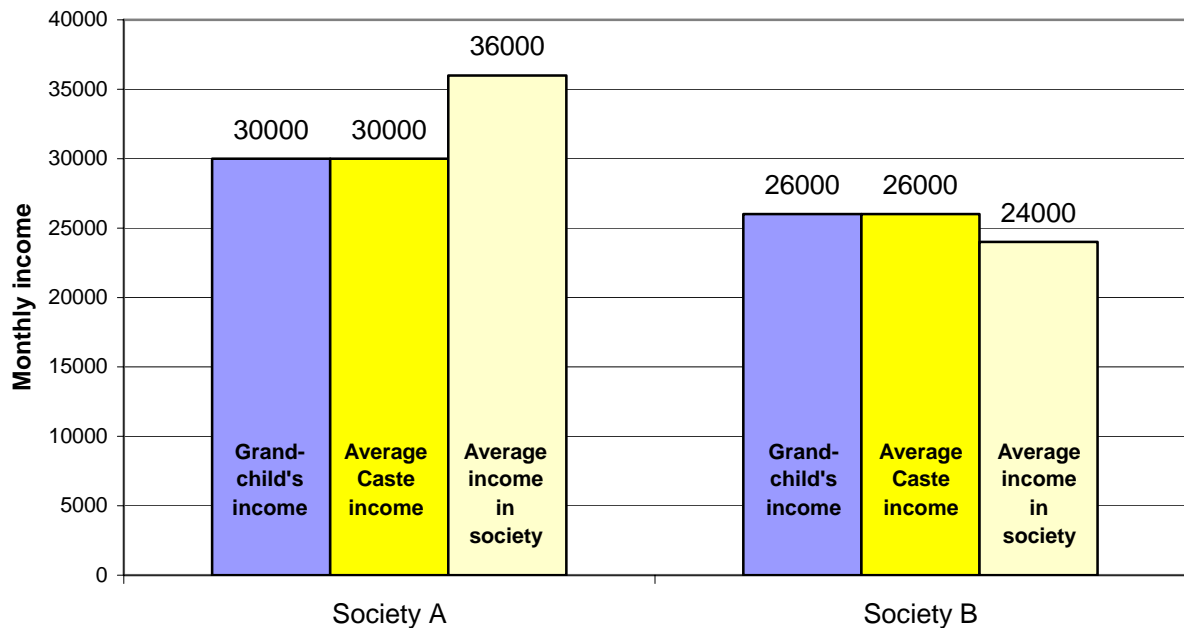
Example

In society A, the average income in society is higher than both the grandchild's income and the average caste income. In society B, the average income in society is lower than your grandchild's income and the average caste income.

Figure 1. Example of question/choice set.

Make your choice based upon what you think is in the best interests of your grandchild

Your Grandchild earns less in society B than in A. If only absolute income matters, society A is preferred. Depending on how important relative income (compared to others), society B may be preferable
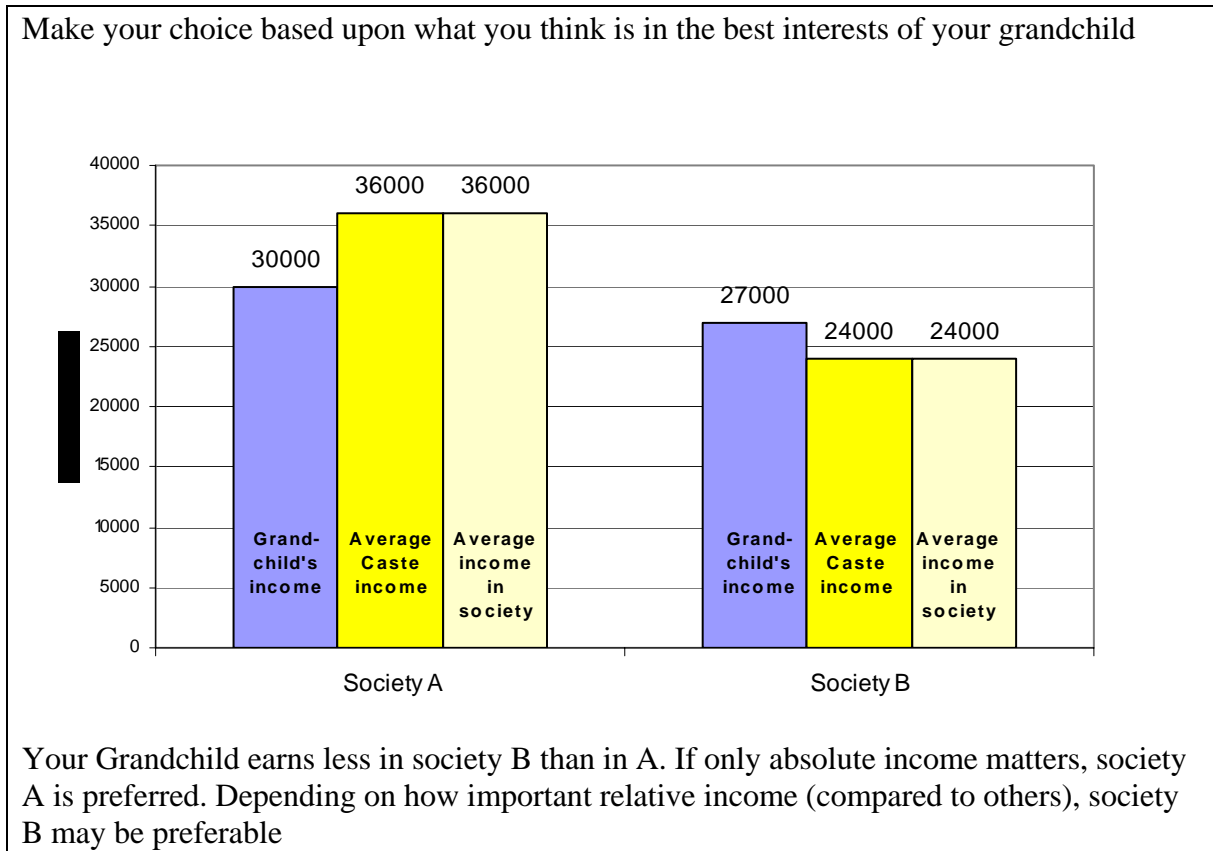
Table 1. Descriptive statistics and variable descriptions.

Variable	Description	Mean	Stdv.
Female	= 1 if respondent is female	0.483	0.500
Income	Household income, 10000 rupies	1.732	1.037
High scale version	= 1 if high income questionnaire version	0.203	0.402
Caste			
General	= 1 if general caste	0.791	0.407
Low caste	= 1 if scheduled caste, scheduled tribe or other backward castes (OBC)	0.157	0.363
No caste	= 1 if not a member of a cast	0.053	0.224
Religion			
Hindu	= 1 if Hindu	0.880	0.325
Muslim	= 1 if Muslim	0.051	0.220
Other, not religious	= 1 if other religion (mainly Christian) or stated not religious	0.069	0.254

Table 2. Societies and response frequencies in the normal scale experiment

Question		Own income	Caste average income	Average income in society	Share of responses choosing each society
		Question set 1			
Question 1	Society A	30000	36000	36000	0.28
	Society B	27000	24000	24000	0.72
Question 2	Society A	30000	36000	36000	0.48
	Society B	24500	24000	24000	0.52
Question 3	Society A	30000	36000	36000	0.74
	Society B	22000	24000	24000	0.26
		Question set 2			
Question 4	Society A	30000	36000	30000	0.23
	Society B	30000	24000	30000	0.77
Question 5	Society A	30000	36000	30000	0.56
	Society B	27000	24000	27000	0.44
Question 6	Society A	30000	24000	30000	0.95
	Society B	27000	36000	27000	0.05
		Question set 3			
Question 7	Society A	30000	30000	36000	0.27
	Society B	27000	27000	24000	0.73
Question 8	Society A	30000	30000	36000	0.43
	Society B	24500	24500	24000	0.57
Question 9	Society A	30000	30000	36000	0.66
	Society B	22000	22000	24000	0.34

Table 3. Societies and response frequencies high scale experiment

Question		Own income	Caste average income	Average income in society	Share of responses choosing each society
			Question set 1		
Question 1	Society A	60000	36000	36000	0.52
	Society B	54000	24000	24000	0.48
Question 2	Society A	60000	36000	36000	0.70
	Society B	49000	24000	24000	0.30
Question 3	Society A	60000	36000	36000	0.91
	Society B	44000	24000	24000	0.09
			Question set 2		
Question 4	Society A	60000	36000	30000	0.20
	Society B	60000	24000	30000	0.80
Question 5	Society A	60000	36000	30000	0.42
	Society B	54000	24000	27000	0.58
Question 6	Society A	60000	24000	30000	0.97
	Society B	54000	36000	27000	0.03
			Question set 3		
Question 7	Society A	60000	60000	36000	0.55
	Society B	54000	54000	24000	0.45
Question 8	Society A	60000	60000	36000	0.70
	Society B	49000	49000	24000	0.30
Question 9	Society A	60000	60000	36000	0.92
	Society B	44000	44000	24000	0.08

Table 4. Estimated random utility models, linear utility function, p-values in parentheses.

Attributes	Linear utility function			Log-linear utility function		
	Coeff	*Coeff stdv*		*Coeff*	*Coeff stdv*	
Own income	3.19 (0.000)			10.65 (0.000)		
Society income	-1.33 (0.000)	1.22 (0.000)		-4.90 (0.000)	3.86 (0.000)	
Caste income	-0.74 (0.000)	0.57 (0.000)		-2.35 (0.000)	1.77 (0.000)	
Interaction terms	*Society income (δ)*	*Caste income (β)*	*Net marginal effect on positionality*	*Society income (δ)*	*Caste income (β)*	*Net marginal effect on positionality*
High scale version	-0.09 (0.130)	-0.13 (0.001)	0.07 (0.000)	3.41 (0.000)	-0.69 (0.000)	-0.25 (0.000)
Income	0.18 (0.000)	0.03 (0.150)	-0.07 (0.000)	0.59 (0.000)	0.09 (0.195)	-0.06 (0.000)
Female	-0.06 (0.199)	0.17 (0.000)	-0.03 (0.006)	-0.28 (0.080)	0.52 (0.000)	-0.02 (0.032)
Low caste	-0.41 (0.000)	0.18 (0.001)	0.07 (0.000)	-1.27 (0.000)	0.51 (0.005)	0.07 (0.000)
No caste	-0.80 (0.000)	0.19 (0.051)	0.19 (0.000)	-2.45 (0.000)	0.58 (0.091)	0.17 (0.000)
Muslim	0.05 (0.683)	0.39 (0.000)	-0.14 (0.000)	-0.09 (0.792)	1.25 (0.000)	-0.11 (0.000)
Other religion	0.33 (0.004)	0.23 (0.013)	-0.18 (0.000)	1.01 (0.007)	0.70 (0.032)	-0.16 (0.000)
Pseudo R^2	0.19			0.22		
	Mean	*Standard error*		*Mean*	*Standard error*	
Mean degree of marginal positionality	0.66	0.01		0.66	0.01	