Gender Roles and the Formation of Beliefs on Economic Inequality: Evidence from Rural India

Abstract

This paper studies how people form beliefs on inequality, and whether this process differs between men and women. I use data from rural Chhattisgarh, India, to revisit theories of belief formation through learning and motivated beliefs. I find that people's beliefs on the importance of effort in determining economic outcomes are not correlated with their *objective* income, contrary to what learning theories would expect. However, I find that the *subjective* assessment of household income is correlated with beliefs in meritocracy for men, but not for women. Furthermore, men's self-assessment of their household's economic situation is not correlated with its objective counterpart (income). For women, the two measures are strongly correlated. These findings can be interpreted from the perspective of "motivated beliefs". Both men and women want to believe in a "just world", in which effort is rewarded. The process of belief formation interacts with gender roles in society. Both, men and women, want to conform to the role prescribed to their gender by society. For men, the desire to be a succesful "breadwinner" requires them to adjust their perception of their household's economic situation if they want to believe in a "just world" and feel good about their own contribution, while for women, this is not the case.

"When individuals choose not only goods, but also how to process information, there is a bias: people tend to process information so that they feel good about themselves."

George Akerlof
The Economics of Illusion
Economics & Politics, 1989, 1

1 Introduction

In India, the share of income of the top 1% income earners is at its highest level since the 1920s according to a recent study by Chancel and Piketty (2017). At the same time, in a 2013/14 survey of household heads and spouses of household heads from 17 villages in rural Chhattisgarh, India, three quarters of respondents believe that effort is much more important than luck or family background in determining whether people get ahead. This paper uses the Chhattisgarhi data to study what explains individuals' perceptions of the importance of effort in determining inequality, and whether the process of belief formation differs between men and women. Its main contributions are twofold: First, it explicitly uses data on individuals' subjective assessment of their household's economic situation, which allows to directly test for motivated beliefs. Second, it differentiates between men and women, shows that the process of belief formation differs between them and offers an explanation related to gender roles. In addition, it adds empirical evidence from a developing country, India, to the literature on beliefs on inequality which has mostly focused on developed countries so far.

The literature has shown that personal and family experience matters for the formation of beliefs on the importance of effort (Di Tella et al. (2007), Giuliano and Spilimbergo (2014), Hennighausen (2015), Almås et al. (2016b), Cantoni et al. (2017), Roland and Yang (2017)), and highlighted the importance of distinguishing between objective and subjective inequality in society (Kuhn (2015), Kuhn (2016)). This paper connects these two arguments: It studies the relation between individuals' *own* economic situation and their beliefs on effort, while distinguishing between their *objective* and *subjective* situation. Furthermore, while the literature has noted different belief *outcomes* between men and women (Fisman and O'Neill (2009)), this study highlights that the *process* of belief formation itself can differ between the genders. This is of particular interest as men and women are exposed to the same macroeconomic environment and live in the same culture. Yet, their different roles may lead to differences in how they form their beliefs.

The importance of understanding the formation of beliefs on the role of effort is twofold. First, beliefs may affect individual outcomes by motivating people to exert effort. Second, beliefs on the return to effort are likely to affect preferences on redistribution, and thus voting and political outcomes. A large part of the literature on beliefs on the importance of effort is motivated by the observation that Americans have stronger beliefs in meritocracy and attribute a larger role to effort than Europeans, while redistribution tends to be higher in Europe than in the United States (Piketty (1995), Alesina and Glaeser (2004), Alesina and Angeletos (2005), Bénabou and Tirole (2006), Almås et al. (2016a)). Sheremeta et al. (2011) show that, when un-informed about the determinants of income, Spanish experiment participants associate poverty with bad luck more than Americans and accordingly make higher voluntary donations to others. When informed about how income is determined, both nationalities transfer the same amount. Cappelen et al. (2017) vary the importance of luck and merit in an experiment in which participants have to make redistribution decisions and show that "just a little bit of merit can make people significantly more inequality accepting". Alesina et al. (2018) show that beliefs about intergenerational mobility not only affect preferences on redistribution, but interact with political views in doing so.

A first explanation for the Chhattisgarhi respondents' optimistic assessment of meritocracy may be their own income (hypothesis 1). In a response to Chancel and Piketty's study, Aiyar (2017)

highlights that "while inequality certainly rose in the booming 2000s, 138m people were lifted above the poverty line between 2004 and 2012". Do respondents believe in meritocracy because they are doing relatively well themselves? Such an explanation would be in line with learning models of belief formation in which agents learn about the importance of effort through experimentation, such as Piketty (1995). In the Chhattisgarhi data, there is no evidence for such a process.

A second, closely related hypothesis is that people's beliefs are shaped by learning from subjective, not objective, experience (hypothesis 2). Studies such as Kuhn (2015) and Kuhn (2016) have shown that people hold erroneous ideas about inequality *in their country*, and that these misperceptions affect their beliefs on meritocracy. Hence, they may also hold distorted beliefs about *their own* economic situation, based on which they form beliefs on the importance of effort. The Chhattisgarhi data contains a number of questions about how people assess their household's economic situation, which allow me to test this hypothesis. I find that agents' subjective assessment is significantly correlated with beliefs on the importance of effort for men, but not for women.

Third, as neither learning from objective nor from subjective beliefs fully explains the patterns in the data, I turn to the literature on motivated beliefs. This literature assumes that beliefs are shaped "as much by [individuals'] own functional goals and psychological needs as by actual data" (Bénabou and Tirole, 2006). Motivated beliefs contribute to people's utility directly or indirectly, and people engage in costly dissonance-reduction behaviors to maintain beliefs despite contrary evidence.[1] To assess whether motivated beliefs are at play, I test whether people's self-assessed economic situation corresponds to objective measures of income (hypothesis 3). I find that this is the case for women, but not for men. This suggests that men suppress the objective signal (income) when assessing their household's economic situation.

Taken together, the results from hypotheses 1 to 3 can be interpreted from a motivated beliefs perspective. Both men and women have the desire to sustain "beliefs in a just world", as introduced by Bénabou and Tirole (2006). To do so, they suppress the signal of their household's objective situation when forming beliefs on inequality (H1). The difference between men and women in hypothesis 2 and 3 can be explained by gender roles. Men are viewed as the "breadwinner" of the household and have a desire to correspond to this role. In a truly "just world", the fact that a household is poor would imply that the breadwinner did not exert enough effort. Men want to believe that they are succesful breadwinners, which is why they suppress objective signals to correspond to this role. This dissonance reduction is necessary to enable them to feel good about themselves and believe in a "just world" at the same time. Women, on the other hand, feel less responsible for their household's overall economic outcome. They can detach their beliefs in a "just world" from their household's outcomes and thus do not need to suppress objective signals when assessing the latter. Overall, the results of this paper point towards a situation in which "motivated beliefs" about society, i.e. the desire to believe in a "just world", interact with social roles (which, in this case, differ between men and women).

These findings contribute to a more detailed understanding of belief formation on meritocracy and in particular, differences across genders. More generally, this paper highlights that it is not only important to distinguish between objective and subjective measures of economic variables in

[1] Bénabou and Tirole (2016) provide an excellent overview of this literature, and Bénabou (2015) develops a general theoretical framework.

empirical applications, but that there is a value in taking subjective measures seriously in order to better understand how people form beliefs on economic phenomena. Finally, the results show that social roles and identities (such as gender) can affect not only the outcome, but even the process of belief formation. As individuals take economic and political decisions of far-reaching consequences based on such beliefs, it is important to improve our understanding of these processes.

2 Theory

This section outlines the key features of the seminal models describing learned beliefs (Piketty, 1995) and motivated beliefs (Bénabou and Tirole, 2006) on the importance of effort in determining economic outcomes and presents the corresponding hypotheses to be tested in the empirical part.

2.1 Learned beliefs: Piketty (1995)

This section outlines a reduced version of the seminal model by Piketty (1995). The author assumes that individuals update their beliefs based on their family's mobility experience. While he examines the impact of beliefs on preferences for redistributive policies, I omit his modelling of taxes and keep only the element of his model that addresses income, effort and intergenerational mobility.

Individuals receive utility from income and disutility from effort.

$$U_{it} = y_{it} - C(e_{it}) \tag{1}$$

with cost of effort $C(e) = e^2/2a$, $a > 0$.

Income depends stochastically on effort and social origins. Income can be low (y_L) or high (y_H). The probability that an individual with low (high) income in period $t-1$ receives high income in period t is given by equation 2 (3).

$$pr(y_{it} = y_H | e_{it} = e, y_{it-1} = y_L) = \pi_L + \theta e \tag{2}$$

$$pr(y_{it} = y_H | e_{it} = e, y_{it-1} = y_H) = \pi_H + \theta e \tag{3}$$

Agents choose effort to maximize utility. As they do not know the true parameters π and θ, they act based on their beliefs $\hat{\pi}$ and $\hat{\theta}$.

$$U_{it} = y_{it} - \frac{e_{it}^2}{2\alpha} = y_H(\hat{\pi}_L + \hat{\theta}e) + y_L(1 - \hat{\pi}_L - \hat{\theta}e) - \frac{e_{it}^2}{2\alpha} \tag{4}$$

$$FOC : \frac{\delta U_{it}}{\delta e_{it}} = (y_H - y_L)\hat{\theta} - \frac{e_{it}}{\alpha} = 0 \tag{5}$$

$$e_{it} = (y_H - y_L)\hat{\theta}\alpha \tag{6}$$

A higher $\hat{\theta}$, i.e. a higher belief on the importance of effort for determining income, thus leads individuals to exert higher effort. Agents update their beliefs on the importance of social status and effort. In Piketty's model, this process takes into account the agent's dynasty's experience.

$$\mu_{it+1}(\pi_L, \pi_H, \theta) = \mu_{it}(\pi_L, \pi_H, \theta) \frac{\pi_L + \theta e(\theta(\mu_{it}))}{\sum_{supp(\mu_{it})} \pi'_L + \theta' e(\theta(\mu_{it})\mu_{it}(\pi'_L, \pi'_1, \theta')} \tag{7}$$

As a result, the outcome of the updating process for an otherwise identical individual will differ according to their family's income.

In section 6.1, I will test whether this prediction is visible in the data. In particular, I focus on the empirical counterpart of $\hat{\theta}$, people's belief in the importance of effort, and test whether it differs according to income. The main focus of this paper is on present income, for which the data contains more reliable measures, but it also controls for the impact of past income.

Hypothesis 1: Individuals' *objective* income affects their beliefs on the importance of effort in determining income

If hypothesis 1 is rejected, does this imply that individuals do not learn from their experience at all? Not quite; it may also be that they misinterpret their observations, and learn from what they believe to be their experience. The literature has shown that people hold distorted perceptions of inequality in the country they live in, and that these perceptions affect their beliefs on meritocracy (Kuhn 2015; 2016). A similar mechanism could be at work at the micro-level, i.e. with respect to how people assess their own economic situation.

Hypothesis 2: Individuals' *subjective* income affects their beliefs on the importance of effort in determining income

2.2 Motivated beliefs: Bénabou and Tirole (2006)

The literature on motivated beliefs, as summarized in a review by Bénabou and Tirole (2016), "emphasizes that beliefs often fulfill important psychological and functional needs of the individual" (Bénabou and Tirole, 2016). People may trade-off accuracy and desirability, as inaccurate beliefs may ultimately yield higher utility.[2]

In their seminal paper, Bénabou and Tirole (2006) develop a model in which agents derive utility from believing in a "just world", in which effort is rewarded. The reasons why this belief contributes to utility can be instrumental (believing in a just world helps people sustain their motivation to exert effort, which pays off in the long run) or affective (believing in a just world directly makes

[2]Well-known examples of motivated beliefs include overconfidence in one's abilities: a majority of individuals believe that they are above-average drivers. (Svenson, 1981)

people feel better). Like Piketty (1995), Bénabou and Tirole (2006) focus on a society in which individuals jointly decide on redistribution. Again, I omit the tax element of their model and concentrate only on equations related to belief formation.

Agents produce output according to

$$y_i = \begin{cases} 1 & \text{with probability } \pi_i - \theta e_i. \\ 0 & \text{with probability } 1 - (\pi_i - \theta e_i). \end{cases} \tag{8}$$

where, as in Piketty (1995) (equation 2), π reflects an agent's family background and e his or her effort. For a minority of advantaged agents, π is high, while for the majority of disadvantaged agents, π is low. The true value of θ, the importance of effort, is again unknown. If beliefs in effort have purely instrumental reasons, expected utility, abstracting from redistribution, is

$$U_{it} = E\left[y_i - \frac{e_i^2}{2\alpha\beta_t} \middle| \Omega_{it} \right] \tag{9}$$

where β_t is a time discount factor (imperfect willpower leads agents to make less effort in the present than overall desirable). In this setup, beliefs in the importance of effort are valuable, as they motivate the individual to exert more effort, which pays off in the long run.[3]

Ω_{it} is the agent's information set. It is based on a signal about the return of effort received by the agent. The signal can be either good or bad. Good signals are always recollected; bad signals are only recollected with probability $\lambda \leq 1$. Individuals can engage in dissonance reduction and alter the probability of recollecting signals at a cost $M(\lambda)$. Figure 1 (from Bénabou and Tirole (2006)) illustrates this mechanism. Investing in dissonance reduction can be worthwhile if the signal is at odds with the beliefs an agent would like to hold, and if the (direct or indirect) contribution of beliefs to utility exceeds the cost of suppressing the signal.

Bénabou and Tirole (2006) focus on society-wide outcomes. The optimal rate of recollection λ is identical for all agents and jointly determined with the tax rate. The model yields two different equilibria, one of realistic pessimism and high redistribution ("Western Europe") and one of beliefs in a "just world" and low redistribution ("United States"). This paper takes a more disaggregated perspective, highlighting differences between individuals in the same society. Nonetheless, the theoretical framework of Bénabou and Tirole (2006), and in particular the mechanism of selectively recollecting signals to uphold motivated beliefs, can inform the interpretation of the Chhattisgarhi data.

If hypothesis 1 is rejected, i.e. if individuals do not form their beliefs in response to their objective economic situation, this may imply that they suppress this objective information in order to be able to uphold beliefs in a "just world". However, one might argue that people simply do

[3] If beliefs in effort have affective reasons, an additional term capturing the direct utility from these beliefs is added to the utility function:

$$U_{it} = E\left[y_i - \frac{e_i^2}{2\alpha\beta_t} \middle| \Omega_{it} \right] + u(E[\theta|\Omega_{it}]) = E\left[y_i - \frac{e_i^2}{2\alpha\beta_t} + u(\theta(\mu_i)) \middle| \Omega_{it} \right] \tag{10}$$

As shown by the authors, this does not alter the main mechanisms and conclusions of the model.

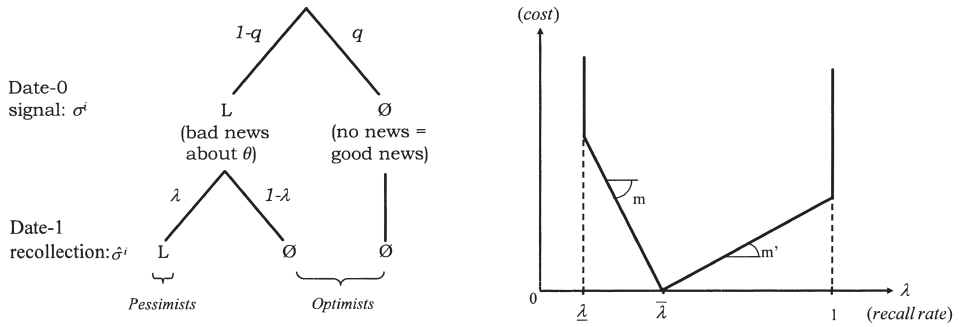

FIGURE IIIa
The Determination of Beliefs

FIGURE IIIb
The Awareness Technology

Figure 1: Source: Bénabou and Tirole (2006)

not consider their personal situation very informative for forming overall beliefs - after all, one's own experience is just a single observation. This concern makes it difficult to interpret a rejection of hypothesis 1 as evidence for the presence of "motivated beliefs". However, the existence of objective and subjective information allows to test whether motivated beliefs play *some* role in the belief formation process. In particular, I test whether individuals' subjective perception if their household is poor or rich is in line with their income (which can be considered the best objective measure of a household's economic situation). If this is *not* the case, we can conclude that agents are suppressing objective signals - most likely for a good ("motivated") reason.

Hypothesis 3: Individuals' self-assessed economic situation corresponds to their objective income.

3 Data and descriptive statistics

3.1 The dataset

I use data collected between October 2013 and September 2014 in the framework of the project "Savings Behaviour and the Introduction of Mobile Banking in India" in rural Chhattisgarh. The data consists of 519 observations of household heads and spouses of household heads from 17 villages in the districts of Dhamtari, Gariyabandh and Raipur. Respondents were interviewed in a baseline survey, several rounds of weekly financial diaries and an endline survey. The sample is not representative of the general population, but of unbanked households in recently banked villages. It was stratified to include 50% men and 50 % women.[4]

[4]Households were chosen on the criterion of not having a savings account in a cooperative, rural or commercial bank. For a detailed description of the dataset, see Somville and Vandewalle (forthcoming) (forthcoming).

3.2 Variables

This section explains the empirical counterparts of the core variables from the theoretical models that will be used in the empirics. They include beliefs on the importance of effort, as well as objective and subjective measures of poverty/income and effort at different points in time. Descriptive statistics on these variables are presented in section 5.3.

3.2.1 Beliefs on the importance of effort

Beliefs on the importance of effort are measured by a question in which respondents are asked whether and to what extent they consider that effort or luck and family background are more important in determining why people get ahead. This question asks respondents to weight different determinants of income and therefore closely reflects the relative weight of effort (θ) from Piketty (1995) and Bénabou and Tirole (2006). Very similarly worded questions have been used in the World Values Survey and the General Social Survey for the United States.

> ***Some people say that people get ahead by their own effort; others say that luck or one's family background are more important. Which do you think is most important?***
>
> 1. *Luck or family background are much more important;*
> 2. *Luck or family background are slightly more important;*
> 3. *Effort is slightly more important;*
> 4. *Effort is much more important.*

3.2.2 Economic situation - objective and subjective

The dataset offers the possibility to construct objective measures of a household's past and present economic situation based on income, expenditures and land ownership. Available measures include average weekly income and expenditures (based on the financial diaries) and hectars of land ownership. For the past, i.e. the economic situation of the household the respondent lived in as a child, parents' land ownership can be used as a proxy (past income and expenditures are not available). The measures are collected at the household level; however, as household size varies considerably, I use per capita values in my preferred regression specifications.[5]

In addition, the dataset also includes subjective poverty measures based on respondents' self-assessment. Respondents are asked about their current economic situation, and the situation of their family when they were a child. The measure is on a scale from 1 (Very poor) to 5 (Very rich).

[5] For present income, expenditures and land, per capita values can be constructed dividing by household size. For past land ownership, a per capita proxy is computed by assuming that the household size when the respondent was a child equals the number of the respondent's siblings plus three (the respondent plus two parents).

Present: Today, do you regard yourself as poor or rich?
Past: When you were a child, was your family poor or rich?

1. *Very poor;*
2. *Poor;*
3. *Neither poor nor rich;*
4. *Rich;*
5. *Very rich.*

Kuhn [2015; 2016] has demonstrated in a cross-country setting that perceptions of inequality in society do not always correspond to objective inequality measures, and that perceptions are more important determinants of beliefs on meritocracy than facts. This paper is the first to use objective and subjective measures of an agent's *own* income and mobility to test whether a similar mechanism is at work at the individual level.

The dataset also includes a section on networks, in which respondents are asked whether they know each one of the other respondents. If they do, they are asked to assess the person's wealth status in the present and past, using the same questions as above. This data will allow me to study whether people assess their own and others' economic situation according to the same criteria.

3.2.3 Effort

Effort plays an explicit role in both Piketty (1995) and Bénabou and Tirole (2006), which is why I control for it in the different belief formation regressions (section 6). It is available as a self-assessment variable for own current and past effort, on a scale between 1 (Very little effort) and 5 (A lot of effort). The best available proxy for objective effort in the data are hours worked last week and hours worked in an average week, as reported by respondents.

How much effort in terms of work do you personally make in the present?

1. *Very little effort;*
2. *Little effort;*
3. *Average effort;*
4. *Quite some effort;*
5. *A lot of effort.*

3.3 Descriptive statistics

3.3.1 General

Table 1 displays the summary statistics: Half of the respondents are male, and half or them are female, their average age is 44 years, half of them are literate, and they have on average 3 years of education. Most respondents are married (non-married includes widowers) and the average household size is 5.3. 43% of respondents live in a katcha, i.e. a dwelling made from non-durable materials such as mud. Villagers know, on average, 21 of the other villagers from the survey sample (which corresponds to two thirds of the 29 to 32 respondents per village). 4% of respondents are self-employed, 50% farm their own land, 27% work as agricultural wage laborers, 13% as wage laborers outside agriculture, 2% are salaried and 4% do not work.[6]

Less than 1% of respondents come from forward castes, 73 % come from other backward castes, 13% from scheduled castes and 13% from scheduled tribes.[7] The average belief on the importance of effort relative to luck and family background is 3.39 on a scale from 1 to 4. Average weekly household income and expenditures per capita are around 257 and 234 Rupees (which is equivalent to about 4.3 and 3.9 US dollars, respectively). Households own around 0.25 acres of land. This represents a notable decrease from the 0.57 acres owned by their parents' household when they were children, most likely a result of population growth. On a scale from 1 to 5, respondents assess their economic situation as, on average, 2.58 and their family's situation when they were a child as 2.46, both corresponding to a situation between poor and neither rich nor poor. On a scale between 1 (very little) and 5 (a lot), they assess their own effort as, on average, 3.7. Finally, respondents report having worked 24 hours during the last week.

Table 2 displays summary statistics by gender. The third column presents the p-value of the t-test of the hypothesis that the difference between men and women is zero (i.e., a p-value below 0.05 implies that the difference is statistically significant). On average, women in the sample are slightly younger than men, they are less likely to be literate and have considerably less education (less than two years, compared to 4.5 years for men). Women in the sample are less likely to be married, which is driven by the fact that there are more widows than widowers. Men and women differ in terms of the type of work they do and the number of hours worked during the last week. Differences in terms of household size, dwelling type, the number of villagers they know and their caste category are insignificant. The same is true for the main variables of interest of this paper: objective and subjective measures of current and past income[8]

[6] Out of those who do not work, most are elderly; one respondent is disabled and two are housewives.

[7] Recent work by Iversen et al. (2017) has shown that occupational mobility prospects are lower for scheduled tribes and scheduled castes than for forward castes. As caste affects many socio-economic aspects of life, it is a valid question whether the caste a respondent belongs to influences their perception of the importance of effort in determining income. Given the distribution of caste categories in the data and the small sample size, this paper however cannot study differences in belief formation between members of different caste categories.

[8] The insignificant but relatively large difference in average weekly expenditures per capita is partially driven by one male respondent who bought a tractor for 470,000 Rs. (approximately 8,000 USD) during the survey period.

Table 1: Summary statistics

	mean	sd	min	max
Male	0.50	0.50	0.00	1.00
Age	43.66	12.90	20.00	80.00
Education (years)	3.18	3.58	0.00	15.00
Literate	0.46	0.50	0.00	1.00
Married	0.88	0.33	0.00	1.00
HH size	5.29	2.41	1.00	16.00
Dwelling: Katcha	0.43	0.50	0.00	1.00
Villagers from sample known	21.31	7.29	2.00	31.00
Self-employed (non-agr.)	0.04	0.20	0.00	1.00
Agriculture (own land)	0.50	0.50	0.00	1.00
Wage labor (agr.)	0.27	0.44	0.00	1.00
Wage labor (non-agr)	0.13	0.34	0.00	1.00
Salaried	0.02	0.14	0.00	1.00
Not working	0.04	0.21	0.00	1.00
Forward Caste	0.01	0.09	0.00	1.00
Other Backward Caste	0.73	0.44	0.00	1.00
Scheduled Caste	0.13	0.33	0.00	1.00
Scheduled Tribe	0.13	0.34	0.00	1.00
Belief: Importance of effort (1-4)	3.39	1.07	1.00	4.00
Weekly income p.c. (Rs.)	256.95	261.69	0.00	3494.76
Weekly expenditures p.c. (Rs.)	233.80	242.28	23.89	3032.03
Land (acres) p.c.	0.25	0.33	0.00	3.05
Parents' land (acres) p.c.	0.57	0.81	0.00	7.78
Self-assessed income (1-5)	2.58	0.69	1.00	5.00
Self-ass. income as a child (1-5)	2.46	1.03	1.00	5.00
Self-assessed effort (1-5)	3.67	1.03	1.00	5.00
Hours worked last week	23.97	18.43	0.00	63.00
Observations	519			

Table 2: Summary statistics by gender

	Women	Men	p-value
Male	0.00	1.00	.
Age	41.67	45.66	.0004
Education (years)	1.87	4.49	.0000
Literate	0.28	0.63	.0000
Married	0.82	0.93	.0001
HH size	5.17	5.42	.2411
Dwelling: Katcha	0.41	0.45	.3558
Villagers from sample known	20.83	21.79	.1367
Self-employed (non-agr.)	0.02	0.07	.0086
Agriculture (own land)	0.47	0.53	.1250
Wage labor (agr.)	0.39	0.14	.0000
Wage labor (non-agr)	0.07	0.19	.0001
Salaried	0.01	0.03	.0547
Not working	0.04	0.05	.8241
Forward Caste	0.00	0.01	.3145
Other Backward Caste	0.75	0.72	.4722
Scheduled Caste	0.12	0.13	.6792
Scheduled Tribe	0.13	0.14	.7843
Belief: Importance of effort (1-4)	3.33	3.46	.1463
Weekly income p.c. (Rs.)	260.67	253.21	.7457
Weekly expenditures p.c. (Rs.)	217.11	250.54	.1161
Land (acres) p.c.	0.22	0.28	.0556
Parents' land (acres) p.c.	0.56	0.58	.7864
Self-assessed income (1-5)	2.55	2.60	.3865
Self-ass. income as a child (1-5)	2.47	2.46	.9137
Self-assessed effort (1-5)	3.64	3.71	.4277
Hours worked last week	22.02	25.92	.0158
Observations	260	259	

3.3.2 Main variables of interest

This section presents and discusses more detailed descriptive statistics about the central variables of the model: beliefs on the importance of effort, and objective and subjective poverty.

Beliefs on the importance of effort

More than 73% of respondents believe that effort is much more important than family background or luck in determining outcomes, and another 4% believe that it is slightly more important (figure 2). For women, this tendency is less pronounced than for men, but the differences between men and women are not statistically significant. The overall high beliefs in effort may seem puzzling in a country with high inequality such as India. They are however consistent with the low degree of redistribution in the country, as expected by different theoretical models that address the link between beliefs on inequality and preferences on redistribution (Bénabou and Tirole (2006), Alesina and Angeletos (2005), Piketty (1995)).

Objective and subjective economic situation

As shown in table 2, there is no significant difference between men and women in terms of three measures of the objective economic situation of the respondents' households: income, expenditures and land per capita. The same is true for the respondents' subjective economic situation (figure 3). The vast majority of respondents identifies as either "poor" or "neither poor nor rich". Women tend to identify as slightly poorer than men, but the differences are small. Only one man (and no woman) identifies as "very rich". I exclude this outlier from the regressions in section 5.[9]

But how do objective income and subjective assessment of men and women relate to each other? Tables 3 to 5 display households' total and per capita weekly income by self-assessed economic situation - table 3 for the full sample, table 4 for men and table 5 for women. Men who assess themselves as very poor or poor have, on average, higher total and per capita income than women in these categories. Men who assess themselves as neither poor nor rich, rich or very rich, however, have a lower income than women in the same category.

This is also illustrated graphically in figure 4.[10] For women, the income density curves of the different self-assessed income groups lie next to each other in the expected order (very poor closest to zero, followed by poor, neither poor nor rich, and rich). For men, on the contrary, the densities follow an unexpected pattern: all four distributions are much flatter and overlap more than those of the female group, implying that the self-assessment corresponds less neatly to objective income. Most surprisingly, the density of "rich" men peaks at a very low income (below 200 Rs. p.c.).

Overall, the descriptive evidence suggests that women's self-assessment is in line with their objective household income, while the men's self-assessment does not follow a clear pattern.

[9] Including this observation does not change the essence of the results.

[10] Note: Figure 4 excludes 12 outliers with weekly per capita income above 1000 Rs., for easier readability of the graph.

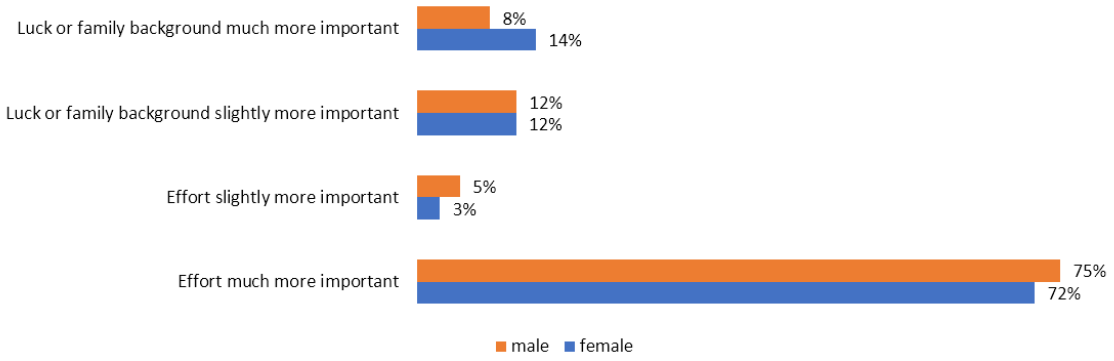

Figure 2: Beliefs on the importance of effort by gender

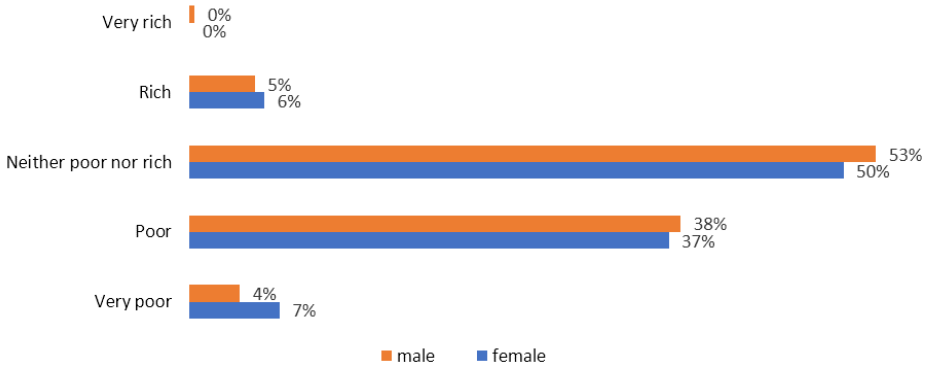

Figure 3: Self-assessed poverty by gender

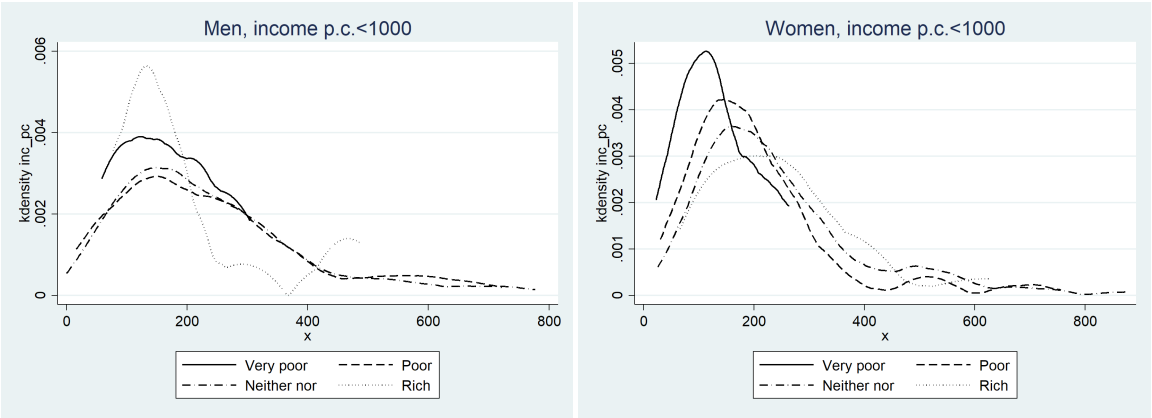

Figure 4: Income per capita by self-assessed economic situation

Table 3: Self-assessed versus objective income - present (all)

	Very poor	Poor	Neither rich nor poor	Rich or very rich
Weekly income (Rs.)	663.43	1016.07	1480.27	1620.89
Weekly income p.c. (Rs.)	147.91	221.89	291.52	277.27
Observations	28	194	268	29

Table 4: Self-assessed versus objective income - present (male)

	Very poor	Poor	Neither rich nor poor	Rich or very rich
Weekly income (Rs.)	908.61	1080.09	1435.15	1333.95
Weekly income p.c. (Rs.)	164.74	239.75	275.91	188.52
Observations	10	98	137	14

Table 5: Self-assessed versus objective income - present (female)

	Very poor	Poor	Neither rich nor poor	Rich or very rich
Weekly income (Rs.)	527.22	950.71	1527.46	1888.70
Weekly income p.c. (Rs.)	138.56	203.65	307.85	360.10
Observations	18	96	131	15

4 Empirics

4.1 Learned beliefs based on objective experience

4.1.1 Regression model

This section tests the first hypothesis, derived from learning models of belief foundation, such as Piketty (1995), presented in section 3.1.

Hypothesis 1: Individuals' *objective* income affects their beliefs on the importance of effort in determining income

To test this, I run the following OLS regression:

$$beliefs_i = \beta_1 \cdot asinh(income)_i + \beta_2 \cdot asinh(parentsland_i) + \delta \cdot controls_i + \epsilon_i \tag{11}$$

$beliefs_i$ is a variable capturing whether the respondent believes that effort is relatively more important than luck or family background, on a scale from 1 to 5 (see section 5.2.1). I use the asinh of per capita income of the household to capture the present, and parents' land in acres per capita to capture the past economic situation. Income reflects the household's current economic success better than land ownership (which is to a large extent determined by parents' wealth) or expenditures (which are influenced by saving and borrowing). For the past economic situation, land ownership is the best available proxy. I use per capita values, as household size and land ownership varies considerably.[11]

$controls_i$ is a vector of control variables including gender, age, education, dummies for different occupations (self-employed, agriculture on own land, agricultural wage labor and non-agricultural wage labor, with not working as a baseline), and village and caste category fixed effects. It also includes the objective and subjective measures of effort discussed in section 5.2.4. A person who believes that effort is crucial in determining income is expected to exert more effort and, thus, become richer. Including proxies for effort attenuate this channel of potential reverse causality between respondents' beliefs and their economic situation.

Standard errors are likely to be clustered at the village level in the data. As the number of clusters is not sufficient to correct for this problem through cluster-robust standard errors, I use bootstrapped standard errors. The OLS formulation of the model imposes that the distances between categories in the left-hand side variable are equal. However, there is no reason to believe that the "distance" between 2 and 3 (luck or family background is slightly more important and effort is slightly more important) is the same as between 3 and 4 (effort is slightly more important to effort is much more important). It is therefore possible that the assumptions of the linear regression model are violated, which could lead to bias (Long and Freese (2014)). This concern is discussed more in detail in section 6.4, which shows that the results are robust to alternative formulations using ordered logit and logit.

[11] Piketty (1995) distinguishes between four mobility categories. For hypothesis 1, it is not necessary to consider four subgroups, as the hypothesis only relates to current income. The specification with continuous variables is in line with the Bayesian learning set-up in Piketty (1995) when controlling for past income in the regression, as individuals are always expected to adjust their beliefs more upwards when y_t is high than when it is low.

4.1.2 Results

Table 6 displays the results from the baseline regression. Column 1 contains the results from the regression for the entire sample, without control variables. Columns 2a and 2b contain the results from one single regression in which the variables of interest are interacted with a dummy for male and female, again estimated without control variables. 2a presents the results for men, 2b for women. Column 3 presents results for the entire sample with the full set of control variables. Columns 4a and 4b contain results in which the variables of interest and all control variables are interacted with a male/female dummy. Columns 2b and 4b also report the p-value of the chi-squared test of the difference between the coefficients interacted with the male versus the female dummy.

Neither income nor parents' land are significant at the 5% level in any specification, neither for men nor for women. The chi-squared test indicates that there is no significant difference between men and women. Coefficients on control variables, caste and village fixed effects are almost all insignificant, except for subjective effort, which is positive and significant for the whole sample. When interacting all variables with gender dummies, some occupation, caste category and village dummies become significant for either men or women (not reported here).

The coefficient on present income is insignificant in all specifications, hence we fail to reject the null hypothesis of the regression that the coefficient is equal to zero. As discussed in section 3.1, the fact that individuals' beliefs are not correlated with their objective income does not necessarily imply that they do not learn from their personal experience at all. It is possible that they misinterpret the objective situation and learn from their subjective experience. This hypothesis is tested in the following section.

Table 6: Beliefs and objective income: continuous income and parents' land

	(1)	(2a)	(2b)	(3)	(4a)	(4b)
	All	Men	Women	All	Men	Women
Belief: Importance of effort (1-4)						
Asinh of weekly income p.c.	0.105	0.166	0.013	0.114	0.169	-0.025
	(0.062)	(0.091)	(0.096)	(0.065)	(0.090)	(0.117)
Asinh of parents' land p.c. (acres)	-0.016	-0.079	0.075	0.012	-0.082	0.105
	(0.096)	(0.133)	(0.138)	(0.102)	(0.138)	(0.159)
Constant	2.705***	3.218***	3.218***	1.563**	1.615	1.615
	(0.377)	(0.580)	(0.580)	(0.583)	(0.836)	(0.836)
Adjusted R^2	0.004		0.004	0.009		0.032
Observations	518		518	518		518
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income p.c. p			0.262			0.174
Asinh of parents' land p.c.			0.409			0.372

* p<0.05, ** p<0.01, *** p<0.001.

4.2 Learned beliefs based on subjective experience

4.2.1 Subjective experience

Kuhn [2015; 2016] has demonstrated in a cross-country setting that perceptions of inequality were more important determinants of beliefs on meritocracy than objective inequality measures. A similar mechanism could be at work at the microeconomic level: individuals may hold erroneous perceptions of their own economic situation, and infer beliefs from those perceptions instead of objective measures.

Hypothesis 2: Individuals' *subjective* income affects their beliefs on the importance of effort in determining income

To test this hypothesis, I replace the objective, income-based mobility measures from section 5.1 by subjective measures based on respondents' self-assessed economic situation (as described in section 4.2.2). inc_i^{subj} captures how respondents assess the economic situation of their household, and $parentsinc_i^{subj}$ that of the household the respondents lived in when they were a child, on a scale from 1-5.

$$beliefs_i = \beta_1 \cdot inc_i^{subj} + \beta_2 \cdot parentsinc_i^{subj} + \delta \cdot controls_i + \epsilon_i \tag{12}$$

Table 7 reports results from this regression. Individuals who assess their current economic situation more positively are more likely to believe in the importance of effort (columns 1 and 3). This coefficient is significant for men (columns 2a and 4a). For a man who assess himself as one step richer on a scale from 1-5, beliefs in effort increase by 0.266 on a scale from 1-4. The coefficient is not significant for women (columns 2b and 4b). However, the coefficient is positive, and the chi-squared test fails to reject the hypothesis that it is different for men and for women. There is no correlation between self-assessed income as a child and beliefs on the importance of effort. Again, most control variables are not signficantly correlated with the outcome, except self-assessed effort (not reported here).

If it were the case that people misperceive their own situation and form beliefs based on these misperceptions, we would expect the coefficient to be positive and significant for both men and women. It is difficult to outrighly reject this hypothesis, as the effect is insignificant for women, but not significantly different from the effect for men. Overall, the results however suggest that while subjective perceptions influence beliefs on the importance of effort, this is more so for men than for women.

Table 7: Beliefs and subjective income: self-ass. income (1-5)

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Belief: Importance of effort (1-4)						
Self-assessed income (1-5)	0.228**	0.334**	0.139	0.222**	0.276**	0.114
	(0.073)	(0.105)	(0.104)	(0.079)	(0.105)	(0.126)
Self-ass. income as a child (1-5)	-0.008	-0.018	0.003	0.015	0.022	0.008
	(0.050)	(0.067)	(0.071)	(0.052)	(0.067)	(0.080)
Constant	2.764***	2.966***	2.966***	1.859***	1.370*	1.370*
	(0.196)	(0.269)	(0.269)	(0.499)	(0.692)	(0.692)
Adjusted R^2	0.019		0.018	0.021		0.038
Observations	518		518	518		518
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Self-assessed income			0.196			0.356
Self-ass. income as a child			0.829			0.885

* p<0.05, ** p<0.01, *** p<0.001.

4.2.2 Subjective versus objective experience

As a robustness check to ensure that the previous results are not influenced by correlation between objective and subjective measures of respondents' past and present income situation, I include both of them in one regression.

$$beliefs_i = \beta_1 \cdot ln(income)_i + \beta_2 \cdot parentsland_i + \beta_3 \cdot inc_i^{subj} + \beta_4 \cdot parentsinc_i^{subj} + \delta \cdot controls_i + \epsilon_i \quad (13)$$

The results are reported in table 8. For all variables of interest, the coefficients and significance levels are very close to those found in the separate regressions (tables 6 and 7). All coefficients on objective current and past income and on subjective past income remain insignificant. Subjective present income remains significant for the full sample (columns 1 and 3) and men (columns 2a and 4a), but not for women (columns 2b and 4b).

Again, as for the previous regressions presented in this paper, almost all coefficients on socio-economic control variables and caste and village fixed effects are insignificant. The fact that these individual characteristics are not significantly correlated with beliefs on the importance of effort highlights the importance of self-assessed income (and, to a slightly lesser extent, objective income) in explaining men's beliefs.

Table 8: Beliefs and both objective and subjective income

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Belief: Importance of effort (1-4)						
Asinh of weekly income p.c.	0.079	0.155	-0.025	0.097	0.167*	-0.050
	(0.061)	(0.085)	(0.098)	(0.065)	(0.085)	(0.124)
Asinh of parents' land p.c. (acres)	-0.093	-0.213	0.063	-0.052	-0.180	0.111
	(0.114)	(0.139)	(0.187)	(0.118)	(0.149)	(0.206)
Self-assessed income (1-5)	0.216**	0.337**	0.146	0.208**	0.277**	0.126
	(0.074)	(0.106)	(0.107)	(0.081)	(0.107)	(0.132)
Self-ass. income as a child (1-5)	0.018	0.039	-0.014	0.030	0.063	-0.021
	(0.058)	(0.069)	(0.093)	(0.061)	(0.071)	(0.100)
Constant	2.302***	3.112***	3.112***	1.285*	1.591	1.591
	(0.396)	(0.589)	(0.589)	(0.612)	(0.848)	(0.848)
Adjusted R^2	0.019		0.022	0.021		0.041
Observations	518		518	518		518
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income p.c.			0.175			0.126
Asinh of parents' land p.c.			0.220			0.237
Self-assessed income			0.216			0.395
Self-ass. income as a child			0.648			0.468

* p<0.05, ** p<0.01, *** p<0.001.

Taken together, the results from sections 5.1 and 5.2 show that respondents' beliefs are not significantly correlated with objective income. I thus reject hypothesis 1 that individuals' objective income affects their beliefs on the importance of effort in determining income. For men, beliefs in the importance of effort are positively correlated with their subjective economic situation. For women, this coefficient is much smaller and not significant. While it is difficult to reject hypothesis 2 outright, as the difference between men and women is not significant, the fact that the coefficient is insignificant for women suggests that it is worthwhile to explore further explanations. The next section discusses how theories on motivated beliefs can contribute to understanding the differences between men and women.

4.3 Motivated beliefs

In motivated beliefs settings, individuals hold beliefs for affective or instrumental reasons. They can suppress signals about the true situation at a certain cost, and may decide to do so if it serves to support valuable beliefs (see section 3.2). Bénabou and Tirole (2016) discuss three strategies of dissonance-reduction to maintain motivated beliefs: strategic ignorance (avoid obtaining information), reality denial (distort existing information) and self-signaling (purposefully produce biased information).

In the current setting, individuals dispose of unbiased information about their own income. However, their beliefs on the importance of effort are not correlated with objective information. At the same time, they are positively correlated with their subjective perception of their household's economic situation, at least for men. This could mean that respondents are engaging in reality denial and suppressing the signal from their own household's financial situation in order to be able to maintain beliefs in a "just world" as in Bénabou and Tirole (2006). While this interpretation is plausible, it cannot be tested directly. As discussed in section 3.2, it might be that respondents simply prefer to use other information when forming their beliefs. However, it is possible to test whether some form of "reality denial" is taking place in this process. To do so, we should interpret the subjective self-assessment not as a signal but as a belief in itself which, just like beliefs on the importance of effort, may or may not be distorted. The best signal respondents should use to inform this belief is their objective income. If their perception of their own economic situation is not correlated with their objective income, it means that individuals are suppressing this signal, and that we are in a context of "motivated beliefs".

Hypothesis 3: Individuals' self-assessed economic situation corresponds to their objective income.

4.3.1 Econometric evidence

To assess this question econometrically, I regress individuals' self-assessed income on different objective measures (objective income, expenditures and land) for the entire sample and for men and women separately, both with and without control variables.

$$inc_i^{subj} = \beta_1 \cdot ln(income)_i + \beta_2 \cdot ln(expenditures)_i + \beta_3 \cdot ln(land)_i + \delta \cdot controls_i + \epsilon_i \quad (14)$$

Table 9 reports the results from this regression. Income is not significantly correlated with overall (columns 1 and 3) and male respondents' (columns 2a and 4a) self-assessed economic situation. However, it is strongly and positively correlated with women's self-assessment. It appears that women take account of the signal of objective income when assessing their own situation, while men do not. Here, the difference between men and women is statistically significant, as indicated by the p-value of the chi-square test. This pattern is robust to excluding expenditures and land from the regression (not reported here). The coefficient on average weekly expenditures is only positive and significant for men when including all control variables (column 4b). Land ownership is strongly and positively correlated with respondents' self-assessed economic situation across all specifications.

The results suggest that women take into account objective information on both land ownership and current income when assessing the economic situation of their household. Men only base their assessment on land ownership and, potentially, expenditures. This is particular interesting insofar as there is no well-developed market for land in the area of study, which implies that land ownership is mostly determined by family background (while income has a stronger "effort" component). The finding suggests that men, but not women, ignore the information derived from objective income when forming beliefs on their own economic situation, which is a form of "reality denial". It is unlikely that men, but not women, have incorrect information about their household's income. The

men in the sample are household heads and contribute the major part of the income, so if anything, they should have more precise information than women. Another argument against "reality denial" might be that men and women assess poverty based on different criteria. To verify whether this can explain the results, the next section tests whether men and women assess other people's economic situation differently.

Table 9: Self-assessed income and objective economic measures (income, expenditures and land)

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Self-assessed income (1-5)						
Asinh of weekly income p.c.	0.064	-0.048	0.231***	0.043	-0.077	0.215**
	(0.039)	(0.047)	(0.065)	(0.046)	(0.066)	(0.073)
Asinh of weekly expenditures p.c.	0.040	0.089	-0.055	0.037	0.138*	-0.135
	(0.050)	(0.061)	(0.085)	(0.052)	(0.069)	(0.089)
Asinh of land p.c. (acres)	0.709***	0.646***	0.787***	0.595***	0.598***	0.551**
	(0.095)	(0.127)	(0.148)	(0.112)	(0.147)	(0.182)
Constant	1.788***	1.329**	1.329**	1.074**	0.926	0.926
	(0.290)	(0.418)	(0.418)	(0.386)	(0.622)	(0.622)
Adjusted R^2	0.100		0.115	0.183		0.199
Observations	518		518	518		518
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income			0.001			0.005
Asinh of weekly expenditures			0.168			0.013
Asinh of land p.c.			0.475			0.830

* p<0.05, ** p<0.01, *** p<0.001.

4.3.2 Robustness check: Assessing other villagers' economic situation

It is possible that men and women generally assess poverty according to different criteria. To verify whether this is driving the results from section 6.3.2, I leverage the information on how each respondent i assesses the economic situation of fellow villagers j they know. I regress this assessment on objective measures of the assessed person j's situation (income, expenditures and land ownership) and control for both the assessing and the assessed person's socio-economic characteristics. I run the following regression:

$$inc_{j,i}^{subj} = \beta_1 \cdot ln(income)_j + \beta_2 \cdot ln(expenditures)_j + \beta_3 \cdot ln(land)_j + \delta \cdot controls_j + \zeta \cdot controls_i + \epsilon_i \quad (15)$$

Each observation corresponds to a directional pair of villagers, the assessing (i) and the assessed (j). Only pairs for which i reports that he knows j are observed. My unit of interest is i, as I am interested in how people assess others. Each assessing respondent should thus receive equal weight

in the regression, regardless of how many other villagers from the sample he knows (as shown in section 4.3.1, this varies between 2 and 31, with a mean of 21). I weigh each observation by $1/n$, where n is the number of villagers i knows.[12]

Results are reported in table 10. Coefficients for the whole sample (columns 1 and 3), men (2a and 4a) and women (2b and 4b) resemble each other. Both land and expenditures per capita are positively correlated with how people assess other villagers' economic situation. The coefficient on land is significantly higher than when people assess their own situation. Who owns which land is public knowledge within the village, and thus likely to be a crucial determinant of how people assess each other. Expenditures are significant in all specifications as well, while income is not - most probably because expenditures, while not perfectly observable, are much more visible to others than income.

Most importantly, the results of the chi-squared test of difference between coefficients for men and for women suggest that there is no fundamental difference in how men and women assess other people's economic situation. Therefore, the fact that men and women assess their own economic situation differently is likely to be related to other reasons, such as their self-image or role in the family/society.

Table 10: Assessment of other villagers' income and objective measures

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Assessment of other villager's income (1-5)						
Asinh income p.c., other villager	-0.000	0.003	-0.003	-0.017	-0.016	-0.023
	(0.014)	(0.016)	(0.022)	(0.014)	(0.016)	(0.022)
Asinh expenditures p.c., other villager	0.085***	0.067***	0.105***	0.071***	0.057**	0.080***
	(0.015)	(0.020)	(0.022)	(0.015)	(0.020)	(0.022)
Asinh land p.c., other villager	0.762***	0.794***	0.730***	0.673***	0.721***	0.643***
	(0.034)	(0.046)	(0.049)	(0.036)	(0.046)	(0.050)
Constant	1.878***	1.790***	1.790***	1.630***	1.424***	1.424***
	(0.090)	(0.139)	(0.139)	(0.150)	(0.218)	(0.218)
Adjusted R^2	0.097		0.097	0.167		0.180
Observations	10677		10677	10677		10677
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh income p.c., other villager			0.819			0.791
Asinh expenditures p.c., other villager			0.199			0.449
Asinh land p.c., other villager			0.343			0.214

* p<0.05, ** p<0.01, *** p<0.001.

[12]Results without weights are similar and do not affect the interpretation (not reported here).

5 Discussion: Motivated beliefs and gender roles

The theory of motivated beliefs, in combination with gender roles, can offer an explanation for the patterns observed in the data. Suppose that men, but not women, are viewed in society as the "breadwinners" of the family. This assumption is likely to hold in India, where female labor force participation is very low and appears to be driven by economic necessity.[13] Corresponding to the breadwinner role increases men's, but not women's, utility, as it is prescribed to their social category (akin to what is, for example, suggested in the economic model of identity proposed by Akerlof and Kranton (2000)). A succesful "breadwinner" ensures that his family is doing well. It thus increases a man's utility more than a woman's utility to believe that his family's economic situation is good. If suppressing information is equally costly for men and women, men are then more likely to suppress objective information on their household's economic situation, as the benefit from this reality denial is higher for them than for women. Put otherwise, it makes women feel less bad to know that they are poor, as it is not their role to make sure the household is rich. Such a mechanism could explain why women's self-assessment of their household's economic situation is in line with objective income, while men's is not. Men maintain the "motivated belief" that their household is doing well (see hypothesis 3).

Suppose further that both men and women have the desire to believe in a "just world" (as in Bénabou and Tirole (2006)). This belief increases their utility, such that they may choose to suppress contradicting information even if that is costly. Both men and women willfully ignore the information of their own household income to maintain beliefs in a "just world", which is why objective income and beliefs are not correlated (see hypothesis 1). For men, the relevant outcome (household income) is primarily a result of their *personal* action (due to their role as a breadwinner). If their personal action and its results were at odds with their beliefs on meritocracy, this would cause a dissonance. Put otherwise, if a man believes that the world is fair and that his own household is poor, he must conclude that he failed in his role as a breadwinner. For men, the positive self-assessment of their household's situation serves both affective reasons (reinforce the identity as a succesful breadwinner) and functional reasons (supporting beliefs in a "just world"). Men adjust their perceptions about their household's financial situation such as to be in line with the belief in a "just world" (which explains the positive correlation between subjective income and beliefs on effort, see hypothesis 2), at the expense of denying the reality of the objective income situation (which is uncorrelated with their subjective perception, see hypothesis 3).

Women also want to believe in a "just world", but for them, it is less costly than for men to do so despite believing that their household is poor. Keeping up the belief that their household is doing well despite objective evidence to the contrary would be less beneficial for women. It would serve functional reasons (supporting the belief in a "just world"), but not affective reasons. As, according to gender roles, ensuring household income is not the responsibility of women, they can keep up beliefs in the importance of effort despite being poor without feeling as if they failed in their role to provide for their family. This can explain why men's beliefs on the importance of effort are correlated with subjective experience, but women's are not (see hypothesis 2). Engaging in the costly "reality denial" of suppressing the information of objective income when forming beliefs on their family's economic situation would not be worthwhile for women, which is why their

[13] For example, Klasen and Pieters (2015) show that, in urban India, "rising male incomes and education have reduced female labor force participation".

self-assessment is in line with reality (see hypothesis 3).

6 Methodological robustness checks

6.1 Ordered logit

As highlighted in section 6.1.1, the assumptions of OLS may be violated in all the regressions presented here, as "distance" in the left-hand side variables cannot be assumed to be constant between categories. In such a set-up, the ordinal logit model can be an appropriate alternative to OLS. Appendix 1 reports the results of ordinal logit models for all the regressions presented in this paper. Overall, while significance levels are lower in some cases, results from the ordered logit estimations are in line with the OLS results.

The ordinal logit model relies on the parallel regression assumption, meaning that model coefficients should be identical for each separate equation when splitting the model into binary regressions. In other words, the impact of any regressor should be of the same magnitude for a change from category 1 to 2 than for a change from cateogory 2 to 3. The parallel regression assumption can be tested using Wald tests, likelihood ratio tests or score tests. (Long and Freese (2014)). They compare an ordered logit model with a generalized ordered logit model, on which the parallel regression assumption is relaxed. In the current set-up, it is not possible to compute the generalized ordered logit model for the regressions with control variables, as for some observations, outcomes are perfectly predicted. Therefore, I only conduct the tests for the regressions without control variables. The test results are inconclusive. In some instances, different tests (I use Wolfe Gould, Brant, score, likelihood ratio and Wald test) yield different results. The Brant test also allows to test the parallel regressions assumption separately for each regressor. In most regressions, the violation of the parallel regression assumption does not stem from the main variable of interest. The results from these tests are equally reported in appendix 1.

6.2 Logit

When the parallel regressions assumption is violated, an appropriate alternative for estimating a regression with an ordinal left-hand side variabel is the generalized ordered logit model. It resembles the ordered logit, but does not impose constant coefficients on different one-step changes in the outcome. (Long and Freese (2014)) As mentioned above, this model does not converge in the current set-up. As an alternative robustness check, I partition outcome variables into two categories and estimate a simple logit model for all regressions instead. An additional advantage of the logit model is that it helps address concerns which may arise from the fact that responses for the outcome variables of interest (both beliefs on inequality and self-assessed economic situation) are concentrated in one or two categories (see section 4.3.3). Results are reported in appendix 2 and are, again, overall in line with the OLS results. Therefore, I conclude that, while OLS assumptions and the parallel regressions assumption may be violated in some of the regressions presented here, the overall results are reasonably robust.

7 Conclusion

This paper has revisited different theories on how people form beliefs on inequality, using data from rural Chhatthisgarh, India. There was no evidence that respondents adjust their beliefs in response to their objective income, as suggested by "learning" theories. However, for men, but not women, beliefs on the relative importance of effort in determining whether people get ahead were correlated with the self-assessed, i.e. subjective, economic situation of their household. Furthermore, there was no correlation between the self-assessed situation and objective income for men, but a clear and significant correlation for women. These findings point towards a situation of "motivated beliefs". Furthermore, they demonstrate that the formation of beliefs on economic phenomena can interact with social factors such as gender roles and identity.

If men want to believe in a "just world", such as proposed (for all agents) in the seminal model of Bénabou and Tirole (2006), and if they want to correspond to the image of a succesful "breadwinner", they need to maintain the belief that their household is doing well in order to avoid cognitive dissonance. Women, on the other hand, are not seen as responsible for household income by society. Hence, they do not need to believe that their household is doing well economically in order to be able to feel good about their own contribution and believe in a "just world" at the same time. This combination of identity economics and motivated beliefs can explain the patterns observed in the data.

These findings contribute to a more detailed understanding of belief formation on meritocracy and in particular, differences across genders. This paper is the first to point out that gender can affect not only the *outcome*, but also the *process* of belief formation. This is of particular interest as men and women are exposed to the same macroeconomic environment and live in the same culture. Yet, their different roles may lead to differences in how they form beliefs. This also implies that processes of belief formation on economic phenomena may change with the evolution of gender roles. If society assigns successively more "breadwinning" responsibility to women, their belief formation process may become more similar to that of men, and vice versa. Furthermore, this paper asserts that individuals may not only hold erroneous perceptions of the distribution of income in society, but also of their own economic situation. While their self-assessed income may not be in line with objective measures, it still needs to be taken seriously in order to understand why people hold certain beliefs. To better understand people's beliefs on economic phenomena, which ultimately affect their economic and political decisions, it is therefore important to account for both people's psychological desire to feel good about themselves and differences according to social roles and identities.

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A Appendix

A.1 Ordered logit results

Table 11: Beliefs and objective income: continuous income and parents' land

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Belief: Importance of effort (1-4)						
Asinh of weekly income p.c.	0.235	0.364	0.049	0.276	0.384	-0.000
	(0.129)	(0.223)	(0.217)	(0.144)	(0.279)	(0.320)
Asinh of parents' land p.c. (acres)	0.019	-0.067	0.160	0.040	-0.130	0.203
	(0.208)	(0.291)	(0.317)	(0.268)	(0.498)	(0.511)
cut1						
Constant	-0.572	-1.611	-1.611	1.891	1.622	1.622
	(0.752)	(1.261)	(1.261)	(1.327)	(2.177)	(2.177)
cut2						
Constant	0.283	-0.753	-0.753	2.789*	2.584	2.584
	(0.759)	(1.275)	(1.275)	(1.329)	(2.172)	(2.172)
cut3						
Constant	0.493	-0.543	-0.543	3.014*	2.832	2.832
	(0.753)	(1.262)	(1.262)	(1.322)	(2.155)	(2.155)
Pseudo R^2	0.005		0.007	0.049		0.104
Observations	518		518	518		518
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income p.c.			0.362			0.391
Asinh of parents' land p.c.			0.570			0.609
p-values from Brant test of parallel regression assumption						
Full model	0.007		0.994			
Asinh of weekly income p.c.	0.910	0.993	0.707			
Asinh of parents' land p.c.	0.001	-999.000	0.627			

* p<0.05, ** p<0.01, *** p<0.001.

Table 12: Beliefs and subjective income: self-ass. income (1-5)

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Belief: Importance of effort (1-4)						
Self-assessed income (1-5)	0.483***	0.739***	0.279	0.469**	0.646	0.203
	(0.142)	(0.224)	(0.211)	(0.182)	(0.333)	(0.346)
Self-ass. income as a child (1-5)	-0.016	-0.031	0.011	0.054	0.168	0.026
	(0.116)	(0.147)	(0.162)	(0.142)	(0.293)	(0.252)
cut1						
Constant	-0.808*	-1.250*	-1.250*	1.062	1.849	1.849
	(0.386)	(0.504)	(0.504)	(1.143)	(1.706)	(1.706)
cut2						
Constant	0.054	-0.387	-0.387	1.966	2.817	2.817
	(0.356)	(0.490)	(0.490)	(1.134)	(1.687)	(1.687)
cut3						
Constant	0.264	-0.176	-0.176	2.192	3.065	3.065
	(0.357)	(0.484)	(0.484)	(1.138)	(1.691)	(1.691)
Pseudo R^2	0.014		0.016	0.054		0.108
Observations	518		518	518		518
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Self-assessed income			0.167			0.418
Self-ass. income as a child			0.833			0.653
p-values from Brant test of parallel regression assumption						
Full model	0.082		0.071			
Self-assessed income	0.032	0.044	0.293			
Self-ass. income as a child	0.935	0.388	0.250			

* p<0.05, ** p<0.01, *** p<0.001.

Table 13: Beliefs and both objective and subjective income

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Belief: Importance of effort (1-4)						
Asinh of weekly income p.c.	0.182	0.351	-0.027	0.254	0.419	-0.047
	(0.130)	(0.213)	(0.220)	(0.153)	(0.291)	(0.336)
Asinh of parents' land p.c. (acres)	-0.138	-0.387	0.132	-0.108	-0.413	0.219
	(0.273)	(0.345)	(0.463)	(0.321)	(0.556)	(0.778)
Self-assessed income (1-5)	0.455**	0.758***	0.288	0.442*	0.676	0.224
	(0.150)	(0.230)	(0.218)	(0.192)	(0.359)	(0.379)
Self-ass. income as a child (1-5)	0.024	0.077	-0.025	0.085	0.262	-0.032
	(0.151)	(0.168)	(0.231)	(0.176)	(0.322)	(0.360)
cut1						
Constant	0.229	-1.427	-1.427	2.603	1.634	1.634
	(0.801)	(1.219)	(1.219)	(1.469)	(2.144)	(2.144)
cut2						
Constant	1.094	-0.556	-0.556	3.512*	2.611	2.611
	(0.801)	(1.239)	(1.239)	(1.472)	(2.144)	(2.144)
cut3						
Constant	1.305	-0.344	-0.344	3.740*	2.862	2.862
	(0.793)	(1.225)	(1.225)	(1.467)	(2.125)	(2.125)
Pseudo R^2	0.016		0.023	0.058		0.114
Observations	518		518	518		518
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income p.c.			0.257			0.299
Asinh of parents' land p.c.			0.322			0.458
Self-assessed income (1-5)			0.165			0.443
Self-ass. income as a child			0.691			0.481
p-values from Brant test of parallel regression assumption						
Full model	0.003		0.693			
Asinh of weekly income p.c.	0.722	0.986	0.552			
Asinh of parents' land p.c.	0.008	0.000	0.983			
Self-assessed income (1-5)	0.032	0.061	0.241			
Self-ass. income as a child	0.404	0.253	0.430			

* p<0.05, ** p<0.01, *** p<0.001.

Table 14: Self-assessed income and objective economic measures (income, expenditures and land)

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Self-assessed income (1-5)						
Asinh of weekly income p.c.	0.179	-0.152	0.703***	0.135	-0.283	0.806*
	(0.127)	(0.155)	(0.190)	(0.187)	(0.244)	(0.315)
Asinh of weekly expenditures p.c.	0.146	0.272	-0.121	0.138	0.481	-0.474
	(0.164)	(0.205)	(0.269)	(0.202)	(0.255)	(0.372)
Asinh of land p.c. (acres)	2.244***	2.107***	2.518***	2.134***	2.327***	2.131**
	(0.270)	(0.412)	(0.525)	(0.451)	(0.654)	(0.802)
cut1						
Constant	-0.578	1.003	1.003	1.671	2.220	2.220
	(1.030)	(1.369)	(1.369)	(1.426)	(2.292)	(2.292)
cut2						
Constant	2.129*	3.744**	3.744**	4.671**	5.408*	5.408*
	(0.964)	(1.320)	(1.320)	(1.423)	(2.279)	(2.279)
cut3						
Constant	5.599***	7.273***	7.273***	8.448***	9.435***	9.435***
	(1.043)	(1.370)	(1.370)	(1.518)	(2.323)	(2.323)
Pseudo R^2	0.056		0.067	0.130		0.173
Observations	518		518	518		518
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income p.c.			0.001			0.005
Asinh of weekly expenditures p.c.			0.198			0.029
Asinh of land p.c.			0.590			0.855
p-values from Brant test of parallel regression assumption						
Full model	0.049		0.036			
Asinh of weekly income p.c.	0.200	0.296	0.163			
Asinh of weekly expenditures p.c.	0.926	0.121	0.060			
Asinh of land p.c.	0.016	0.152	0.032			

* p<0.05, ** p<0.01, *** p<0.001.

A.2 Logit results

Table 15: Beliefs and objective income: continuous income and parents' land

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Belief: Effort much more important (dummy)						
Asinh of weekly income p.c.	0.238	0.350	0.075	0.307	0.474	0.072
	(0.131)	(0.205)	(0.191)	(0.157)	(0.344)	(0.267)
Asinh of parents' land p.c. (acres)	0.059	-0.014	0.180	0.079	0.021	0.176
	(0.223)	(0.320)	(0.321)	(0.271)	(0.497)	(0.447)
Constant	-0.497	0.415	0.415	-3.155*	-2.722	-2.722
	(0.785)	(1.153)	(1.153)	(1.495)	(3.139)	(3.139)
Pseudo R^2	0.007		0.009	0.076		0.152
Observations	518		518	514		499
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income p.c.			0.335			0.334
Asinh of parents' land p.c.			0.661			0.836

* p<0.05, ** p<0.01, *** p<0.001.

Table 16: Beliefs and subjective income: self-ass. income (1-5)

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Belief: Effort much more important (dummy)						
Self-assessed income (1-5)	0.472**	0.748**	0.257	0.464*	0.636	0.226
	(0.157)	(0.268)	(0.207)	(0.196)	(0.417)	(0.315)
Self-ass. income as a child (1-5)	-0.016	-0.062	0.029	0.032	0.055	0.041
	(0.109)	(0.163)	(0.146)	(0.117)	(0.239)	(0.134)
Constant	-0.201	0.224	0.224	-2.117	-2.632	-2.632
	(0.389)	(0.513)	(0.513)	(1.232)	(2.878)	(2.878)
Pseudo R^2	0.018		0.022	0.081		0.153
Observations	518		518	514		499
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Self-assessed income			0.161			0.329
Self-ass. income as a child			0.665			0.958

* p<0.05, ** p<0.01, *** p<0.001.

Table 17: Beliefs and both objective and subjective income

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Belief: Effort much more important (dummy)						
Asinh of weekly income p.c.	0.185	0.332	0.010	0.285	0.504	0.031
	(0.130)	(0.195)	(0.195)	(0.160)	(0.375)	(0.294)
Asinh of parents' land p.c. (acres)	-0.060	-0.223	0.131	-0.027	-0.125	0.135
	(0.257)	(0.385)	(0.381)	(0.313)	(0.653)	(0.584)
Self-assessed income (1-5)	0.438**	0.744**	0.254	0.434*	0.666	0.223
	(0.161)	(0.274)	(0.214)	(0.202)	(0.436)	(0.350)
Self-ass. income as a child (1-5)	0.004	0.000	-0.003	0.045	0.083	0.009
	(0.125)	(0.192)	(0.172)	(0.135)	(0.310)	(0.178)
Constant	-1.234	0.195	0.195	-3.819*	-2.800	-2.800
	(0.814)	(1.207)	(1.207)	(1.556)	(3.185)	(3.185)
Pseudo R^2	0.021		0.029	0.087		0.163
Observations	518		518	514		499
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income p.c.			0.250			0.290
Asinh of parents' land p.c.			0.504			0.793
Self-assessed income			0.172			0.321
Self-ass. income as a child			0.989			0.851

* p<0.05, ** p<0.01, *** p<0.001.

Table 18: Self-assessed income and objective economic measures (income, expenditures and land)

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Self-assessed income (dummy)						
Asinh of weekly income p.c.	0.204	-0.063	0.645*	0.122	-0.249	0.865*
	(0.162)	(0.202)	(0.257)	(0.206)	(0.325)	(0.412)
Asinh of weekly expenditures p.c.	0.123	0.112	0.099	0.098	0.223	-0.166
	(0.173)	(0.230)	(0.284)	(0.229)	(0.417)	(0.388)
Asinh of land p.c. (acres)	2.862***	2.453**	3.450***	2.762***	3.165*	3.162*
	(0.557)	(0.752)	(0.897)	(0.700)	(1.356)	(1.591)
Constant	-2.210*	-4.766**	-4.766**	-4.330*	-6.308	-6.308
	(1.079)	(1.583)	(1.583)	(1.757)	(4.252)	(4.252)
Pseudo R^2	0.085		0.097	0.177		0.239
Observations	518		518	518		517
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh of weekly income p.c.			0.044			0.029
Asinh of weekly expenditures p.c.			0.970			0.506
Asinh of land p.c. (acres)			0.393			0.999

* p<0.05, ** p<0.01, *** p<0.001.

Table 19: Assessment of other villagers' income and objective measures

	(1) All	(2a) Men	(2b) Women	(3) All	(4a) Men	(4b) Women
Other villager assessed as rich (dummy)						
Asinh income p.c., other villager	-0.004	0.005	-0.012	-0.052	-0.084	-0.025
	(0.030)	(0.041)	(0.043)	(0.033)	(0.048)	(0.046)
Asinh expenditures p.c., other villager	0.151***	0.119*	0.181***	0.069	0.058	0.083
	(0.035)	(0.046)	(0.053)	(0.039)	(0.050)	(0.059)
Asinh land p.c., other villager	1.154***	1.268***	1.045***	1.526***	1.583***	1.520***
	(0.096)	(0.136)	(0.136)	(0.114)	(0.150)	(0.157)
Constant	-0.056	-0.167	-0.167	1.704***	1.570**	1.570**
	(0.201)	(0.296)	(0.296)	(0.348)	(0.491)	(0.491)
Pseudo R^2	0.021		0.021	0.093		0.106
Observations	15316		15316	15316		15316
Controls	×	×	×	✓	✓	✓
p-values from χ^2 test of difference between coefficients for men and women						
Asinh income p.c., other villager			0.781			0.370
Asinh expenditures p.c., other villager			0.374			0.743
Asinh land p.c., other villager			0.247			0.758

* p<0.05, ** p<0.01, *** p<0.001.