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Carole Treibich

Aix-Marseille University (Aix-Marseille School of Economics), CNRS, & EHESS

PRELIMINARY DRAFT

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Abstract

Using an original dataset collected among motorcyclists in New Delhi (2011), this paper compares three different survey measures of risk attitudes: self-assessment, hypothetical lotteries and income prospect choices. While previous research on risk aversion measurement methods in developing countries mainly looked at specific groups such as rural farmers or students, the dataset I use covers a large and heterogeneous urban population. I first show that all measurements are positively and highly correlated with one another, this being even more the case within methodologies and within domains. Subsequently, I investigate the predictive power of these different individual risk-aversion measurements on occupation choices and health decisions. Most of my elicited risk preferences appear to predict risky health behaviors well. Puzzling results are found with the lotteries and may be interpreted either as evidence of risk-compensation between domains or as an incapacity to capture the desired characteristic. Finally, thanks to information on religious beliefs and practices, I am able to verify that cultural background does not impact on the relationship between risk preferences and risky conducts. Overall, this analysis highlights that elicitation of risk-aversion measurements through surveys in a developing country like India thus appears possible.

Key words: Risk aversion measurement, India, Survey design, Risky conducts

1 Introduction

Preferences toward risk are a key concept used in economics to explain individual decision-making. In the context of low income countries, an individual's risk aversion is often mentioned as a possible explanation for the lack of entrepreneurship or the technological innovation delays maintaining individuals in poverty and impeding growth and development (Cardenas and Carpenter, 2008). However, standard household surveys, such as the World Bank's Living Standard Measurement Surveys, do not ask questions about risk aversion and hence cannot be used to analyze the effect of risk preferences on various economic outcomes. In addition, risk attitude measurement is a difficult challenge which is still being debated in the literature. The various existing methodologies include Likert scales (Dohmen et al., 2011); lotteries (Holt and Laury, 2002); prospect choices on lifetime income (Barsky et al., 1997); domain-specific risk-taking scales[1] (Weber et al., 2002); scores based on the item response theory (Arrondel et al., 2004); or actual risk-taking behaviors (e.g. smoking, seat-belt use). One key aspect of this debate is whether each individual has a single unique preference toward risk or whether his or her risk aversion varies depending on the domain considered. Dohmen et al. (2011), Barseghyan et al. (2011) and Einav et al. (2012) provided evidence against the hypothesis of stable risk preferences across contexts. Furthermore, based on evidence from safety literature, Wilde (1998) documented the fact that individuals do not try to minimize risk but rather target a certain level of risk and adapt their behaviors accordingly. Some compensation may thus appear with respect to the risk individuals are willing to take in different domains. The degree of substitution between domains, the role of risk perceptions, but also the formulation of questions makes the measurement of risk-aversion and the study of its influence on risky behaviors quite complex.

Along with this growing literature on the measurement of risk preferences, empirical research has compared many of these risk aversion methods, both in developed and developing countries (see Binswanger, 1980; Dohmen et al., 2011; Anderson and Mellor, 2008; Ding et al., 2010; Hardeweg et al., 2013). This strand of research aims at investigating which measure, if any, best predicts individual risk behavior. Moreover, it also studies whether questions easily implementable in a survey are indeed able to capture individuals' preferences toward risk. Charness et al. (2013) surveyed the literature and classified risk-aversion measurement methods according to their complexity. They highlighted that while more complex methods may be able to provide a more precise estimation of the risk aversion parameter, they fail in predicting risky conduct. Finally, the cultural con-

[1] Such scales measure both risk attitudes and perceived riskiness.

text may modify the impact of the elicited risk aversion parameters on risky decisions. In particular, religious beliefs like fate, particularly widespread in developing countries, may change the influence of risk aversion on risky conducts. Therefore, a measurement method which has been proven to predict behaviors in one country may not be appropriate in another context. It is therefore interesting to replicate the comparison of risk aversion variables obtained with various methodologies in different regions of the world.

In this paper, I aim to contribute to the debate on risk aversion measurement through the use of an original dataset collected among motorcyclists in Delhi in the year 2011. While other studies implemented in developing countries focused on particular subgroups of the population (mainly farmers and students, see Charness and Viceisza (2012) for a review), I can rely on a more heterogeneous sample of individuals. Methodologies widely used in the literature (self-assessment of risk aversion, hypothetical lotteries and income choice prospects) are included in the survey. I first explore to what extent the information collected differs across methodologies and domains. To do so, I look at the share of risk-averse individuals in each measurement type and at correlations between the different risk aversion variables. It seems that lotteries differ substantially from the other measurement methods regarding the information they actually capture. In a second step, I study the socio-demographic determinants of individuals risk aversion and test whether they are the same as the ones mentioned in the literature. Subsequently, I investigate whether the different survey measurements are appropriate in the Indian context. More precisely, I study whether the various risk preference parameters are good predictors of work sector choices and risky health behaviors, even after controlling for cultural characteristics such as religious beliefs. I find that self-reported risk aversion predicts well the choice to work in the private sector and risky behaviors in health matters. Results found when using the hypothetical lotteries can either be interpreted as evidence for a risk-compensating effect across domains or as proof that such a methodology is not adequate in the Indian context (potentially because of the absence of financial incentives). As for the measurement method based on income prospect choices, this is associated with smoking and drinking behaviors but not with occupational decisions.

The remainder of the paper is organized as follows. Section 2 presents some conceptual considerations on risk-aversion measurements. Section 3 introduces the data and presents the various methodologies used to measure risk preferences. In Section 4, I report the empirical results regarding accuracy of risk aversion measurements in the Indian context and information consistency across survey methods. Section 5 concludes.

2 Conceptual considerations

Preference toward risk corresponds to an individual-specific characteristic which plays a role in the agents decision-making process under uncertainty. This parameter is usually assumed to be exogenous, i.e. innate and immutable. If a person can choose between two different situations which are identical regarding their expected outcomes but which differ with respect to the probability of the realization of the final state, a risk-averse individual will derive more utility from the behavior without uncertainty. In an expected utility framework, such a definition is reflected in the concavity of his utility function. Applied research aims at capturing this individual characteristic with the aim of predicting whether a person would engage in risky conduct or not.

A wide range of methods have been used in the empirical literature to proxy or elicit individual risk preferences and study their impact on individual decisions (Anderson and Mellor, 2008; Charness et al., 2013). Hereinafter I describe some of these methodologies.

In the Holt and Laury (2002) setting, agents have to choose between two lottery options which differ in the gap between their two possible outcomes. In this setting, risk aversion is seen as the willingness to avoid a high variation in the outcomes. The lottery option at which the individual switches from the high to the low variance option enables the authors to compute intervals for the risk-aversion parameter. However, the comparison of two lotteries may be quite complicated for certain populations. Instead, in Hardeweg et al. (2013), Thai farmers had to choose between different safe monetary amounts and a fixed lottery. Such a simplified method has been implemented in studies in both developed as well as developing countries (see Dohmen et al., 2010; De Palma et al., 2011; Guiso et al., 2013; Vieider et al., 2014).

As for Barsky et al. (1997), they used three yes/no questions from the Health and Retirement Study where interviewees were offered job opportunities leading to different lifetime outcomes. Individuals were then classified into four risk-aversion groups without any functional form assumption. However, the non-monetary value of the individuals current job may have biased the results obtained through this methodology.

Self-reported willingness to take risk is extremely easy to introduce in a survey. This has been done in the German Socio-Economic Panel considering general daily life and specific domains such as career, health, finance, or leisure. However, the scale proposed to respondents, as well as the broad definition of domains, have been called into question when comparing two individuals who may interpret the possible answers differently or refer to different situations. In order to counteract this issue, summated rating scales

have been developed. Arrondel et al. (2004), for instance, asked in the PATER survey up to 50 questions in domains such as consumption, finance, labor, health or family matters. This method certainly permits a better measure of the global level of individual risk aversion but requires more time to be collected. Furthermore, items must be adapted to the local context, implying an important upstream testing phase.

Finally, Weber et al. (2002); Blais and Weber (2006) elaborated a risk-taking scale (DOSPERT) to assess both conventional and perceived risk attitudes through scales ranging from 1 to 7 in five specific domains; their argument being that both the willingness to take risk and the perception of a risky situation are important when predicting risky conduct. However, this last method mixes the inconveniencies of the two previous methodologies as it requires asking many questions and inter-individual comparison is subject to biases.

As described above, risk preference elicitation techniques differ in the number of questions to be asked, the complexity of these questions and in the incentives that can be provided to ensure that honest replies are obtained.[2]

But do all these methods lead to the same information? Or, is one measurement method able to capture an individuals risk preferences better than others? Does the cultural and economic context alter the predictive power of such indicators? Some of these questions have been investigated in the literature. Indeed, researchers have discussed the relevance of experimental vs. survey measurements, as well as the effectiveness of complex vs. simple measurement methods.

Collecting evidence regarding the accuracy and the performance of each method is crucial and of particular interest for survey designers. While survey questions are often more easily extendable to large samples such as national household surveys, incentivized lottery experiments can only be implemented at a reduced scale.

Anderson and Mellor (2008) investigated the relationship between risk preferences, elicited through lotteries, and five health behaviors. They argued, without however relying on a comparison of data, that a survey or hypothetical questions are likely to be biased or noisy unlike an "experimental" lottery where one out of ten of the choices were realized.[3] In another paper, again using U.S. data, the same authors compared the infor-

[2]It is common in experimental literature implementing lotteries, to draw randomly one of the questions and pay the respondents according to the results of the lottery and the choice they previously expressed.

[3]Wölbert and Riedl (2013), using monetary incentives, actually found that lotteries were not correlated with non-financial risky behaviors.

mation provided by lotteries and that obtained through hypothetical gamble questions on inheritance and job choices.[4] Anderson and Mellor (2009) showed that the different techniques did not provide the same individual risk level. Binswanger (1980) measured attitudes towards risks in rural India using both surveys and questions to elicit certainty equivalents and experimental gambling with real payoffs. He highlighted inconsistencies between the two methodologies used and argued that the interview method was the one subject to bias. Yet, in their review of the literature on risk aversion measurements, Charness et al. (2013) discussed the differences in the degree of complexity of existing elicitation techniques. These authors stressed that while the multiple price list method (Holt and Laury, 2002; Binswanger, 1980) allows the precise elicitation of the risk aversion parameter, it seems to have a relatively limited capacity to predict risky conduct. The opposite results are obtained with the self-assessed measurements. For instance, Ding et al. (2010) interviewed Chinese students and elicited their risk preferences via an incentivized lottery and self-assessment risk, asking a general question and questions in five domains. The lottery questions had virtually no predictive power for the risky behaviors the authors selected, whereas the general risk attitude variable gave the best prediction score. Based on Dohmen et al. (2011)'s analysis of a German sample, Hardeweg et al. (2013) tested the validity of a simple survey item on risk attitude by comparing it to a related field experiment. Using a sample of 900 Thai farmers, they compared three different measurement methods: a survey item based on a Likert scale, lottery questions and a hypothetical investment question. Results indicated that the self-reported measurement method predicted risky conducts such as the purchase of lottery tickets or self-employment better than the two other measurements. The authors thus argued in favor of the use of simple survey measurements which simultaneously provide useful information on risk attitude and are easily implementable on a large scale.

In this paper, I focus on elicitation techniques which are straightforward in their implementation in surveys and which do not require any financial reward to participants. I take advantage of an original dataset collected among motorcyclists in New Delhi in 2011. While previous research on risk aversion measurement methods in developing countries mainly looked at specific groups such as rural farmers or students (see Hardeweg et al., 2013; Ding et al., 2010; Vieider et al., 2014; Charness and Viceisza, 2012), the dataset I use covers a large and heterogeneous urban population. I explore whether the different risk aversion measurement methods provide the same type of information on

[4]The hypothetical gamble questions are similar to the questions used by Barsky et al. (1997).

individuals and whether they are able to predict risky behaviors in different domains. Thanks to information on religious beliefs and practices, I am also able to verify that cultural background does not impact on the relationship between risk preferences and risky conducts. To summarize, this analysis provides additional evidence on the capacity of simple survey measurements to capture individual risk preferences in general and in a developing country in particular.

3 Data

3.1 General presentation of the survey

I take advantage of an original survey on the road habits of 902 motorcyclists which was implemented in Delhi in 2011.[5] Besides socio-demographic characteristics, information regarding their occupation and different risky health behaviors (smoking, drinking) was collected. We also attempted to measure individual risk-aversion using simple techniques already developed in the literature. Further details on the measurement of individuals risk attitudes are presented below.

3.2 Measurements of risk aversion

Several methodologies to measure risk aversion have been included in the survey. In order to be able to compare the different risk-aversion variables, I restrict my sample to individuals who answered all risk-aversion questions. I base my analysis on three elicitation methods (self-reported risk aversion, hypothetical lotteries and income prospect choices) as they are more commonly used in the literature and missing observations for some alternative methods[6] considerably reduce the number of respondents for whom I have complete information.

Respondents were first asked to self-assess their risk-aversion in general and in four specific domains (on the road, in sport or leisure, in health, and in finance). They were offered a scale ranging from 0 "I am not ready to take risks at all" to 7 "I am fully ready to take risks". I refer to these measurements as the self-reported risk aversion (SRRA)

[5]The following sampling design was adopted: (i) New Delhi was divided into five zones, (ii) in each zone, ten polling booths were randomly drawn, (iii) the locations of these polling booths represented the starting points from which every fifth household was selected for the interview. Around each polling booth, 30 households were interrogated. In total 1,502 households were interviewed. In 545 households at least one member had traveled by motorbike in the past four weeks. Up to three drivers or passengers per household could answer the survey.

[6]The willingness to invest in a risky business, to pay for a lottery ticket or to take a product which may be beneficial or detrimental to the respondent's health was also measured in the survey.

variables. In addition to domain-specific variables, I compute the average of the five SRRA variables. In a second step, interviewees were offered a choice between a fixed lottery, where they had a fifty percent chance of winning either 12,000 INR[7] or nothing, and a safe amount, starting at 0 and increasing by 500 INR up to 9,500 INR. The variable used in the analysis is the number of times the individual opted for the safe amount. The lottery questions were based on Holt and Laury (2002) but simplified as in Hardeweg et al. (2013). No financial incentives were provided along with the lottery questions. There are two reasons for this: first, the objective here was to compare elicitation measurements implementable in large surveys, where experimental design is hardly feasible, and second, monetary incentives would have substantially increased the budget necessary to collect our data. Finally, following Barsky et al. (1997), I asked questions regarding prospective income choices. These were organized in a two-step procedure which lead to the creation of four different risk-aversion groups.

A detailed presentation of the wording used in the questionnaire and the variables subsequently built for the analysis can be found in the Appendices.

4 Empirical Analysis

The purpose of the empirical analysis is to study whether risk preferences elicited through non-incentivized and simple methods are able to predict risky behaviors in a low income context.

As previously mentioned, I consider in my analysis only the individuals who gave answers in all three risk-aversion measurement methods. This leads to a restricted sample of 675 observations. A comparison between the characteristics of individuals who gave answers in all three risk aversion measurement methods and the full sample can be found in the Appendices (Table 10).

Table 1 displays the socio-demographic information of my sample. 70% of the respondents are men, they are on average 36 years old. 20% of them are illiterate or only completed primary education, while 47% received some tertiary education. 30% of the interviewed individuals belong to families earning less than 10,000 INR per month.[8]

[Insert Table 1 here]

[7] 12,000 INR corresponds to 220 EUR or 1,310 EUR in PPP 2011.
[8] 10,000 INR corresponds to 183 EUR in 2011 or 1,092 EUR in PPP 2011.

A "good" measure of risk aversion should be in line with the economic theory and predict risky conducts. In addition, according to the empirical evidence, elicited parameters are expected to be associated with some individual socio-demographic characteristics, such as gender, age, level of education or income. I investigate whether each risk attitude variable included in the survey satisfies these criteria. Furthermore, I compare the predictive power of the three different survey methodologies and explore the existence of domain-specific risk aversion. Different cases, which are described below, may be found in the data.

Case 1 : Risk aversion is not domain-specific

The levels of individual risk aversion defined in different domains are similar and, regardless of its domain, the risk aversion measurement is positively correlated with the fact that the individual engages in a risky behavior.

Case 2 : Risk aversion is (partly) domain-specific

A risk aversion measurement defined in a given domain does not predict a risky behavior adopted in another domain or does not predict it as well as a risk aversion measurement defined in the same domain as the risky conduct.

Case 3 : Evidence of risk compensation across domains

A risk aversion measurement defined over a specific domain is negatively correlated with the risk taken in another domain.

Case 4 : Risk aversion is noise

One or several risk aversion measurements defined over the same domain do not predict the risky behavior in that domain.

I start by studying whether the different risk aversion measurements elicited in the survey provide similar information regarding the level of risk aversion of each respondent. I then investigate in which way the risk parameters are associated with specific risky behaviors related either to finance matters or health issues. With these findings, this analysis will be able to shed some additional light on the context-specificity of risk aversion and the relevance of the different survey methodologies.

4.1 Do survey measurement methods capture the same information on individuals?

Initial evidence that risk aversion differs across domains and methods will be obtained if I find that the different measurements are not highly positively correlated with one another.

Table 2 presents the distribution of the risk aversion measurements. Given the proposed ladder for the self-assessment of risk preferences, one can define as risk averse any individual who has a score above 4, i.e. in the middle of the scale (cf. Ding et al., 2010). As for the lottery question, the neutrality point corresponds to choosing the safe choice from 6,000 or 6,500 INR upwards.[9] A risk-averse person is therefore someone who chose the safe amount at least nine times. By looking at the median, we note that most of the respondents are risk-averse and this for almost all measurements.[10] There is some heterogeneity across measurements though. While at least 75% of individuals are categorized as being risk averse with the lotteries, they are less than 50% so when looking at their self-assessment of risk aversion in finance, in sport or with the income choice measure. Among the SRRA questions, the highest share of risk-averse individuals is obtained with the general question and the one related to health.

[Insert Table 2 here]

To further investigate the consistency of my different risk-aversion measurement methods, I look at the pairwise correlations. From Table 3, we note that all the risk aversion measurement methods are positively and highly correlated with one another, with the notable exception of the correlation between SRRA in finance and risk preferences derived from lotteries. Moreover, correlation coefficients between lotteries and other variables are quite small in magnitude (less than 0.10) and only two of them are significant (SRRA in sport and income prospect choices). SRRA measurements are more correlated with each other[11] than with the measurements based on the other methodologies. The income choice measurement is more correlated with the SRRA in finance, while the risk aversion level derived from lottery questions is more correlated with the income choice measure.

[9] Indeed, the expected gain of the lottery is 6,000 INR. A risk-neutral agent is thus indifferent between playing a lottery with a 6,000 INR expected gain and being guaranteed of getting 6,000 INR. Therefore he may opt for the safe amount at 6,000 INR or still choose the lottery at that point but switch to the safe amount the next time, i.e. for a safe amount of 6,500 INR.

[10] While a risk aversion tendency is always found in developed countries, Vieider et al. (2014) pointed out that this is not the case in developing regions.

[11] Dohmen et al. (2011) also compared self-reported risk aversion in different domains. They found that risk attitudes were not perfectly correlated across contexts and that the pairwise correlation coefficients were around 0.5, which is similar to the results I obtain.

In addition, I perform Pearson Chi^2 tests.[12] I find that all p-values are inferior to 0.001. Nevertheless, the Pearson Chi^2 statistics are much lower when the lottery question is one of the two measurements considered.

These results thus reveal a higher correlation within methods and domains. However, the use of a different scale across methodologies may partly explain the greater correlation found across self-reported risk-aversion measurements. We can thus invalidate *Case 1*.

[Insert Table 3 here]

4.2 Are the personal characteristics of respondents related with risk attitudes?

To further investigate the accuracy of my different survey measurement methods in the Indian context, I investigate whether gender, age, education and income are correlated with the individuals level of risk aversion. Indeed, numerous studies, though mainly conducted in developed countries, found that men as well as younger, more educated and wealthier individuals[13] are less risk averse (see Outreville, 2013, for a recent review). Here I therefore tease out the correlations between socio-demographic characteristics and risk attitudes for the case of India and assess whether these fit the evidence found for other countries.

Again I consider the restricted sample of respondents for which I have answers for all three methodologies of risk aversion measurement: self-assessment, hypothetical lotteries and job income choices. As dependent variables, I consider each of my risk aversion measurement methods. I run ordered logit estimations for the self-reported risk aversion measurements in different domains and the job income choices (8 and 4 ordered values respectively). As for the average of SRRA measurements, I perform an ordinary least square regression. Finally, given that I consider the number of safe choices made in the series of lottery questions, I use a negative binomial model for this particular risk attitude measurement.[14] Table 4 shows the coefficients obtained with the different specifications used. Similar results are found when using ordinary least square estimations. Results vary from one dependent variable to the other. A gender effect (males being less risk averse) is found with SRRA on the road and in finance. Using a sample of rural farmers in Senegal,

[12]The Pearson Chi^2 test is a test of independence between two variables. In my case, rejecting the null hypothesis means that the two different risk aversion measurement methods are not independent.

[13]For instance, Tanaka et al. (2010) showed the existence of a negative relation between income and risk aversion in the Vietnamese context.

[14]The Pearson goodness-of-fit test results indicate that the distribution of the number of safe choices significantly differs from a Poisson distribution, according to the p-value of 0.000.

Charness and Viceisza (2012) found that women were more risk-tolerant when considering their declared willingness to take a risk in general, and thus invalidated this measure for developing countries. However, I do not find such inconsistency with this Indian sample. An age effect (older individuals being more risk averse) is found for SRRA in general, on the road, in sport as well as with lotteries. An education effect (more highly educated individuals being less risk averse) is detected for SRRA in sport, in health, in finance and for income prospect choices. Finally, the income gradient (wealthier individuals being less risk averse) appears only for job income choices. Income and the two other risk aversion measurements in finance are not significantly correlated, even if these coefficients are negative. It is interesting to note that the average SRRA measurement is significantly correlated with gender, age and level of education.

Overall, the same relationships between socio-demographic characteristics and risk attitudes as the ones already presented in the literature on developed countries are found with this sample.

[Insert Table 4 here]

4.3 Do survey measurements predict the risky conduct adopted by respondents?

In this survey, respondents were asked about both the sector in which they work and their conduct relative to different health behaviors. Looking at Table 5, we see that 23% and 11% of individuals work in the private and public sectors respectively, 20% state they are self-employed and 44% inactive.[15] Moreover, 13% of the interviewees smoke and 16.5% drink alcohol. These various decisions appear, in the literature, to be linked to individuals risk preferences. In particular, Dohmen et al. (2011) showed that smoking habits were associated with a higher willingness to take risks. Bonin et al. (2007) found that individuals who are more risk-averse, are more likely to work in occupations with low earning variation risks.[16] Cramer et al. (2002) highlighted that self-employment is considered a more risky occupation than being an employee and that there is a negative relationship between risk aversion and entrepreneurship. However, in the specific context of India, where public jobs are scarce, occupation may not be exclusively the result of an individual's choice.

[Insert Table 5 here]

[15] Only 34% of the inactive respondents are men. 75% of them are between 15 and 25 years old.
[16] Both studies used self-assessed risk aversion from the German Socio-Economic Panel data.

I look at the predictive power of my different risk aversion variables for measuring the probability of an individual being self-employed and of working in the private or the public sectors, as well as of the probability of smoking and drinking. Table 6 reports the results of probit estimations for the different measurements of risk attitudes. Socio-demographic controls are always included in the regressions and robust standard errors are considered.

When looking at the choice of employment sectors, self-reported risk aversion on the road, in sport, in finance and the average of the different SRRA variables, are significantly and negatively correlated with working in the private sector. For instance, a marginal change in the self-assessed risk attitudes in finance decreases by 2.4% the probability of working in the private sector (marginal effects are not reported in Table 6). No significant relationship between the public sector and risk aversion is found for any of the risk attitudes considered, except for the SRRA in health. In this latter case, a more risk-averse individual is less likely to work in the public sector, which contradicts previous research on occupational choice. Nonetheless, when restricting the sample to individuals who contribute to the household income,[17] this coefficient is no longer significant and I find that SRRA in finance and sport are positively correlated with the probability of working in the public sector (cf. Table 7). Finally, the average of the SRRA measurements is positively and significantly correlated with being self-employed. Similar results are found with SRRA in health and finance when restricting the sample to income contributors. In other words, the more risk-averse individuals are the more likely they are to work in the public sector or be self-employed. The unexpected positive relationship between self-employment and risk attitudes might be refined when taking into account the Indian context where opportunities to get a safe job in the public sector are scarce and the informal sector represents an important share of the labor market. Under these circumstances, private sector work and self-employment are not necessarily the result of the preferred choice by less risk-averse individuals. I note that neither lottery questions nor income choice prospects appear to be associated with occupational choices in the expected way. Moreover, the preference toward risk based on the lotteries are positively correlated with the probability of working in the private sector. In relation to *Case 4*, one is inclined to conclude that lottery questions are not able to capture the preferences toward risk. Nevertheless, in the case of occupational choices, a reverse causality issue may appear. More precisely, once revenues are secured through a safe public or formal

[17] I.e. 56% of respondents, which corresponds to a sample of 372 persons.

sector job with a monthly salary, individuals may be more willing to take risks in finance and in hypothetical lotteries (see *Case 3*).

In order to further explore the issue of better job opportunities mentioned above, I introduce interaction terms between risk aversion and both education and caste. Indeed, one would expect that more highly educated individuals would have more job alternatives and consequently that their occupational choice is more likely to result from a preference. As for individuals belonging to a high caste, they are likely to have more opportunities, even if the effect of caste may be balanced by the existence of national positive discrimination schemes. When introducing these interaction terms in the self-employment regressions, the coefficient of risk aversion becomes negative for all measures and is significant for the income prospect choice variable. The level of education seems to reduce the effect of risk aversion on the probability of being self-employed. Individuals belonging to a scheduled caste or tribe are less likely to be working in the public sector. However, the magnitude of this effect is lowered by the individuals level of risk aversion. The more risk-averse a low caste person is, the more likely he is to work in the public sector. This result may reflect the amount of effort these persons may actually put to take advantage of the positive discrimination policy implemented by the State (cf. Table 8 in the Appendices).

Regarding health behaviors, all the SRRA measurements as well as the job income choice variable are highly and negatively correlated with the probability of smoking or drinking. For instance, a marginal change in the average individual's self-reported risk aversion decreases by respectively 3.8% and 2.9% the probability of smoking and drinking. Notably, the risk-aversion variable derived from the lottery questions is unexpectedly positively correlated with the probability of engaging in any of the risky health behaviors considered. Again, a first interpretation of these results could be that in the context of India, this methodology is not appropriate to measure individuals' preferences toward risk, as such a measurement is not able to predict risky behaviors while other risk measurements in finance are (see *Case 4*).[18] Nevertheless, if one starts from the premise that lottery questions are the gold standard, such results may invalidate other elicitation methods and reflect a risk compensation effect across domains (see *Case 3*). In other words, individuals who already take risks with their health by smoking or drinking may be less willing to play with their money. In any case, this observation being made, when

[18] I acknowledge that the irrelevance of the lottery measurement might come from the absence of incentives provided to respondents. Nonetheless, the budget constraints usually faced by large-scale survey designers and the purpose of this study to derive achievable recommendations justify the choice we made to only include hypothetical lotteries in the questionnaire.

looking at descriptive statistics, the discrepancy between the information provided by the lotteries and that provided by the other risk attitude variables is confirmed.

Additionally, it is interesting to study whether one particular risk aversion measurement method has better predictive powers than others. This kind of analysis will allow me to make conclusions about the existence of domain-specificity in risk preferences (see *Case 2*). The Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), Pseudo R^2 and the Log-likelihood are reported in Table 6. All these statistics provide information regarding the quality of each statistical model and enable me to compare the predictive power of different risk aversion measurement methods on a given dependent variable.[19] More precisely, the lowest AIC, BIC and Log likelihood values and the highest Pseudo R^2 indicate the best model. When considering labor choices, self-assessed risk aversion in finance is the variable which seems to be the most relevant. Job income choice measurement, SRRA on the road and the average of the five SRRA variables are the measurements with the highest power of explanation of risky health behaviors. Similarly to Ding et al. (2010), I find that SRRA in health and in sport perform quite well for cigarette and alcohol consumption respectively. Nevertheless, unlike them I do not find that SRRA in general is the best predictor. The average score of self-reported risk aversion in general and in the four specific domains introduced in the survey is actually among the two SRRA measurements with the lowest AIC, BIC and Log likelihood scores and the highest Pseudo R^2 for all risky health behaviors. Finally, lotteries seem also to be quite a good predictor of smoking behaviors, even if the found relationship contradicts the results obtained using other measurements of risk aversion in finance and seem to reflect some risk compensation effect.

To summarize, on the one hand, echoing results found in Germany (Dohmen et al., 2011) but also in China or Thailand (Ding et al., 2010; Hardeweg et al., 2013), self-reported risk aversion in different domains, in particular the average score, appears to provide appropriate information on individual risk aversion as it is good at predicting risky conduct. On the other hand, in this specific context, hypothetical lottery questions may not capture a parameter correlated with the risky behaviors adopted by individuals. There may be several explanations for this finding, ranging from respondents limited understanding of the questions, to differences in cultural norms (20% of the respondents said they prefer the zero amount to the lottery[20]). However, I acknowledge that an alter-

[19] This comparison can be made if the sample of respondents does not vary and there is a fixed set of controls.

[20] Nonetheless, similar findings are reported by De Palma et al, 2001.

native explanation may be put forward: such results would be also found if individuals decided to compensate the risk they take in a certain domain by adopting safer conduct in another area or if they were more willing to take a risk in finance if their financial situation was secure. In these cases, I would conclude that lotteries actually capture the risk preferences of individuals and some context-specificity well and that our data can detect risk compensation effects. Finally, while SRRA in finance is more strongly related to labor decisions, results found with risky health behaviors do not really allow me to make any conclusions on the existence of context-specificity (see *Case 2*) as SRRA on the road and in sport provides better explanations, than SRRA in health, for smoking and drinking habits.

[Insert Table 6 here]

[Insert Table 7 here]

[Insert Table 8 here]

4.4 Do cultural specificities bias the influence of risk aversion?

Religion definitively punctuates the daily life of Indians. For instance, in my sample, 87% of the respondents believe their life is in God's hands and 73% pray daily. These religious beliefs and practices may either prevent individuals from engaging in prevention activities or compel them to adopt safe conducts. However, these individual characteristics would bias my previous estimates if, and only if, they were correlated with risk aversion. In order to check the existence of a potential omitted variable bias, I look at the pairwise correlation coefficients between the religious variables and the risk aversion parameters. No significant correlations are found. Furthermore, I include religious beliefs and practices in the set of explanatory variables of individuals preference toward risk. Believing that one's life is in the hands of God reduces only the self-reported risk aversion parameters, while praying every day is significantly negatively correlated only with the self-reported risk aversion in the health domain and with the income choice prospect measurements. When including religious beliefs and practices in the regressions, similar results are found regarding the relationship between the various risk attitudes and the different risky decisions, with the exception of the income choice variable which, in this context, is negatively and significantly correlated with working in the private sector. Moreover, individuals who pray daily are more likely to work in the private sector and less likely to work in the public sector. Respondents who believe in fate are more likely to

evolve in a private firm. As for a belief in fate and praying, these are positively correlated with risky health behaviors. In other words, individuals who believe that their life is in the hands of God or who prey on a daily basis are more likely to smoke and drink. Despite differences in religious practices between India and developed countries, the relationship between individual risk aversion and risky conducts found previously remains (cf. Table 9).

[Insert Table 9 here]

5 Conclusion

In this paper, I am interested in the elicitation of individual risk-aversion through surveys in general and in the context of India in particular. More precisely, I study whether simple survey risk-aversion parameters as measured in developed countries are appropriate when investigating risky conducts by a population with a different cultural background.

For this purpose, I take advantage of an original dataset implemented among motorcyclists in Delhi in 2011. I compare three different survey measurements of risk attitudes (self-reported risk aversion, hypothetical lotteries and income prospect choices). I first show that all measurements are positively and highly correlated with one another but that this is even more the case within methodologies and within domains. In a second step, I detect the gender, age and education effects on the level of risk-aversion, confirming the results found in surveys conducted in developed countries.

Subsequently, I investigate the predictive power of these different individual risk-aversion measurements on occupation and health decisions. Most of my elicited risk preferences appear to predict risky health behaviors well. This is particularly the case of the average of SRRA variables. Regarding labor decisions, when restricting the results to the sample of income contributors, SRRA in finance is shown to be the variable with the strongest effect. The unexpected positive relationship observed between self-reported risk-aversion measurements and entrepreneurship may be specific to the Indian context where public job opportunities are scarce and occupation may not always reflect an individual's preference. As for the lottery questions, the results are puzzling and may be interpreted either as evidence of risk compensation between domains or as an incapacity to capture the desired characteristic. Finally, while religious practices and beliefs increase the likelihood of engaging in risky health behaviors, they do not modify the influence of risk preferences on an individual's conduct. The elicitation of risk-aversion measurements

through surveys in developing countries thus appears possible.

6 Appendices

Appendix A. Risk aversion measures

Self reported risk aversion

Based on the methodology used in particular in the German Socio-Economic Panel (G-SOEP), risk aversion in general and in four domains (on the road, in sport or leisure, in health and in finance) have been assessed using an 8 level scale.[21] The formulation used in the questionnaire was the following: "People behave differently in different situations. On a risk scale going from 0 (not at all ready to take risk) to 7 (fully ready to take risk), how would you describe yourself [in each domain]?"

To build my risk-aversion measurements, I inverse the scale so that the lowest value corresponds to a risk lover and the highest value to the most risk-averse individuals.

The following variables were created:

- ⋆ `srra_[domain]_8`: can take 8 different values, increasing with risk aversion.
- ⋆ `srra_score_8`: is the average of the level of risk aversion in each domain, $\frac{\sum_{i=1}^{5} \texttt{srra\_[domain]\_8}}{5}$.

Lottery questions

I adapted the Holt and Laury (2002) procedure in order to derive an individuals constant relative risk-aversion parameter. Holt and Laury (2002) captured individual risk preferences through differences in volatility; more precisely, they offered 10 choices between two lotteries which differed in the level of gain, with the safe choice being the lottery with the smallest difference outcomes. The complexity of a such task, in particular for individuals with low math skills, have been raised by Dohmen et al. (2010), Hardeweg et al. (2013) or Vieider et al. (2014). Specifically, the previous procedure has been simplified through the use of a set of 20 choices between an increasing safe amount and a fixed lottery instead of the comparison of two lotteries.. By choosing the lottery, the individual had a 50% chance of winning 12,000 INR and a 50% chance of receiving nothing. The safe amount was increased by 500 INR from 0 to 9,500 INR. The point at which subjects switch from the lottery option to the safe choice can be used to classify them according to their degree of risk aversion. 27 individuals provided inconsistent answers. More precisely,

[21] In the literature (Dohmen et al., 2011; Ding et al., 2010, for instance), a scale going from 0 to 10 is most commonly used.

they switched from a safe amount to lottery. I thus exclude these observations from the analysis.

The following variable was created:

⋆ `safe_choice`: can take 21 different values, indicates the number of times the person has chosen the safe amount.

Income prospect choices

This measure is based on the hypothetical income prospect choices developed by Barsky et al. (1997). All respondents answer to a first 'yes/no' question. According to their response, a second question is asked by the interviewer.

(qA) *"Would you take the opportunity of a 50 percent chance of doubling your income and a 50 percent chance of reducing your income by one third?"*

(qB) if answer to (qA) is 'yes': *"Would you take the opportunity of a 50 percent chance of doubling your income and a 50 percent chance of reducing your income by one half?"*

(qC) if answer to (qA) is 'no': *"Would you take the opportunity of a 50 percent chance of doubling your income and a 50 percent chance of reducing your income by one fifth?"*

I create the following variable:

⋆ `ra_gamble_4`: 4 categories, increasing with risk aversion, takes value 1 if the individual would gamble on his income despite a risk of reducing his income by one half; 2 if he agrees to take the job opportunity if the risk of reducing his income is of one third but not of one half; 3 if the risk of reducing his income is of one fifth but not of one third; 4 if he won't take the job opportunity even for a risk of one fifth only.

Appendix B. Comparing individuals from restricted and full samples

[Insert Table 10 here]

When comparing individuals who answered to all three risk-aversion measurement methods and those who did not, it appears that the former are more likely to be men,

educated but also to belong to a low caste. No significant difference is detected regarding income.

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Tables

Table 1: Socio-demographic characteristics of respondents

	observations	%/mean
Male (=1)	*674*	69.73
Age (in years)	*675*	36.06
Education level	*666*	
3 category variable†		2.26
Illiterate or primary education		20.42
Secondary education		32.88
Tertiary education		46.70
Household monthly income	*675*	
Less than 10,000 INR		31.41
Between 10,000 and 20,000 INR		34.07
More than 20,000 INR		17.63
Did not answered		16.89
Religious beliefs and practices		
Believes his life is in God's hands (=1)	*672*	87.50
Prays daily (=1)	*671*	72.72

Table 2: Descriptive statistics of our risk-aversion measures

	Observations	Mean	Standard Deviation	Median	perc. 25^{th}†	Min	Max
Self reported risk aversion							
in general	*675*	5.15	1.77	6	4	0	7
on the road	*675*	5.00	1.95	5	2	0	7
in sport or leisure	*675*	4.18	2.37	4	4	0	7
in health	*675*	5.13	2.24	6	4	0	7
in finance	*675*	4.47	2.22	4	3	0	7
average*	*675*	4.79	1.55	4.8	3.6	0	7
Lottery questions	*675*	13.31	5.34	13	9	0	20
Income prospect choices	*675*	2.47	1.32	2	1	1	4

Notes: ∗ 'average' is the average of the five SRRA measurements. † 'perc. 25^{th}' stands for the 25^{th} percentile. In the case of SRRA in general, less than 25% of individuals report a risk aversion lower than 4.

Table 3: Pairwise correlation between our risk-aversion measures

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
Self-reported risk aversion								
in general	(1)	1.000						
on the road	(2)	0.585***	1.000					
in sport or leisure	(3)	0.222***	0.343***	1.000				
in health	(4)	0.246***	0.347***	0.548***	1.000			
in finance	(5)	0.332***	0.499***	0.631***	0.408***	1.000		
average*	(6)	0.610***	0.733***	0.782***	0.718***	0.799***	1.000	
Lottery questions	(7)	0.018	0.013	0.085**	0.036	0.025	0.051	1.000
Income prospect choices	(8)	0.174***	0.261***	0.316***	0.243***	0.329***	0.367***	0.175***

Notes: Pairwise correlation coefficients are computed over the restricted sample of 675 observations.
∗ 'average' is the average of the five SRRA measurements.
***, ** and * stands for 1%, 5% and 10% significance respectively.

Table 4: Determinants of risk aversion measures

	Self-reported risk aversion						**Lottery questions**	**Income prospect choices**
	in general	on the road	in sport	in health	in finance	average*		
Specification	ordered logit	ordered logit	ordered logit	ordered logit	ordered ologit	ols	negative binomial	ordered logit
Male (=1)	-0.208	-0.369***	-0.198	0.055	-0.322**	-0.291**	-0.055	-0.176
	(0.145)	(0.139)	(0.164)	(0.155)	(0.150)	(0.123)	(0.035)	(0.161)
Age (in years)	0.017***	0.016***	0.020***	0.008	0.006	0.014***	0.003***	0.008
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)	(0.001)	(0.005)
Education level (3 groups)	-0.102	-0.170	-0.296***	-0.212**	-0.171*	-0.194**	-0.006	-0.374***
	(0.107)	(0.104)	(0.096)	(0.096)	(0.102)	(0.081)	(0.021)	(0.100)
Household monthly income, *ref:* Less than 10,000 INR								
From 10,000 to 20,000 INR	-0.197	-0.050	-0.162	-0.087	-0.145	-0.157	-0.018	-0.325*
	(0.190)	(0.177)	(0.180)	(0.171)	(0.181)	(0.153)	(0.041)	(0.184)
More than 20,000 INR	-0.353	-0.048	-0.029	-0.222	-0.070	-0.158	0.041	-0.073
	(0.216)	(0.227)	(0.216)	(0.234)	(0.225)	(0.188)	(0.047)	(0.224)
Pseudo R^2/R^2	0.015	0.011	0.016	0.011	0.014	0.072	0.003	0.020
Observations	*665*	*665*	*665*	*665*	*665*	*665*	*665*	*665*

Notes: Robust standard errors are reported in parentheses. ***, ** and * stands for 1%, 5% and 10% significance respectively.
* 'average' is the average of the five SRRA measurements.

Table 5: Risky behaviors adopted by respondents

	Sector of work choices		
	Private sector	Public sector	Self-employment
Mean (%)	23.41	11.26	19.56
Std. dev.	42.37	31.63	39.69
Observations	*675*	*675*	*675*

	Health risky behaviors		
	Smoking	Drinking	Smoking or/and drinking
Mean (%)	12.93	11.88	16.51
Std. dev.	33.58	32.38	37.16
Observations	*673*	*648*	*648*

Table 6: Influence of risk aversion on risky behaviors

	Self-reported risk aversion						**Lottery questions**	**Income prospect choices**
	in general	on the road	in sport	in health	in finance	average*		
Probability of working in the private sector†, *observations = 665*								
Coefficient	-0.008	-0.060**	-0.070***	-0.023	-0.095***	-0.102**	0.020*	-0.073
Robust SE	(0.032)	(0.029)	(0.027)	(0.027)	(0.027)	(0.041)	(0.011)	(0.045)
Log-likelihood	-309.31	-307.28	-305.64	-308.95	-302.84	-305.72	-307.82	-308.05
Pseudo R^2	0.146	0.152	0.156	0.147	0.164	0.156	0.150	0.150
AIC	634.62	630.55	627.29	633.91	621.67	627.43	631.65	632.10
BIC	670.62	666.55	663.29	669.90	657.67	663.43	667.65	668.10
Probability of working in the public sector†, *observations = 665*								
Coefficient	-0.005	0.036	0.034	-0.053*	0.041	0.017	-0.011	-0.035
Robust SE	(0.041)	(0.035)	(0.032)	(0.029)	(0.030)	(0.044)	(0.013)	(0.052)
Log-likelihood	-197.58	-197.13	-196.99	-196.06	-196.81	-197.52	-197.29	-197.38
Pseudo R^2	0.157	0.159	0.159	0.163	0.160	0.157	0.158	0.158
AIC	411.16	410.27	409.99	408.12	409.63	411.04	410.58	410.76
BIC	447.16	446.27	445.99	444.12	445.62	447.04	446.58	446.76
Probability of being self employed†, *observations = 665*								
Coefficient	0.047	0.041	0.023	0.037	0.048	0.072*	-0.012	-0.036
Robust SE	(0.037)	(0.032)	(0.028)	(0.028)	(0.029)	(0.041)	(0.012)	(0.049)
Log-likelihood	-266.59	-266.63	-267.14	-266.67	-266.00	-265.94	-266.97	-267.19
Pseudo R^2	0.192	0.192	0.190	0.192	0.194	0.194	0.191	0.190
AIC	549.17	549.27	550.27	549.35	547.99	547.89	549.94	550.38
BIC	585.17	585.26	586.27	585.35	583.99	583.89	585.93	586.38
Probability of smoking†, *observations = 663*								
Coefficient	-0.126***	-0.218***	-0.096***	-0.092***	-0.100***	-0.236***	0.088***	-0.164***
Robust SE	(0.033)	(0.034)	(0.029)	(0.026)	(0.030)	(0.049)	(0.014)	(0.054)
Log-likelihood	-224.25	-208.48	-224.90	-225.13	-224.63	-215.53	-211.70	-225.31
Pseudo R^2	0.130	0.191	0.127	0.126	0.128	0.164	0.179	0.126
AIC	464.51	432.96	465.81	466.27	465.25	447.06	439.40	466.62
BIC	500.48	468.93	501.78	502.24	501.23	483.03	475.38	502.59
Probability of drinking†, *observations = 638*								
Coefficient	-0.116***	-0.134***	-0.098***	-0.064**	-0.103***	-0.194***	0.034***	-0.266***
Robust SE	(0.034)	(0.033)	(0.030)	(0.028)	(0.030)	(0.045)	(0.013)	(0.059)
Log-likelihood	-205.53	-202.48	-205.13	-208.09	-204.77	-201.17	-207.08	-198.69
Pseudo R^2	0.125	0.138	0.127	0.114	0.129	0.144	0.119	0.154
AIC	427.07	420.96	426.26	432.19	425.54	418.33	430.15	413.38
BIC	462.73	456.62	461.93	467.85	461.20	454.00	465.82	449.04

Notes: Gender, age, education level (3 category variable) and household monthly income (dummies) are controlled for in all regressions. †Probit estimations. ‡Negative binomial estimation. Dependent variable can take values 0, 1 or 2. * 'average' is the average of the five SRRA measurements.
***, ** and * stands for 1%, 5% and 10% significance respectively.

Table 7: Influence of risk aversion on risky behaviors - sample of income contributors

	Self-reported risk aversion						**Lottery questions**	**Income prospect choices**
	in general	on the road	in sport	in health	in finance	average*		
Probability of working in the private sector†, *observations = 372*								
Coefficient	-0.063	-0.089**	-0.087***	-0.020	-0.127***	-0.147***	0.023*	-0.044
Robust SE	(0.040)	(0.035)	(0.030)	(0.033)	(0.033)	(0.047)	(0.014)	(0.053)
Pseudo R^2	0.090	0.098	0.101	0.086	0.118	0.106	0.091	0.086
Probability of working in the public sector†, *observations = 372*								
Coefficient	-0.012	0.036	0.059*	-0.049	0.063*	0.039	-0.009	0.008
Robust SE	(0.046)	(0.039)	(0.034)	(0.033)	(0.033)	(0.049)	(0.015)	(0.058)
Pseudo R^2	0.078	0.079	0.086	0.083	0.085	0.079	0.078	0.077
Probability of being self-employed†, *observations = 372*								
Coefficient	0.045	0.045	0.035	0.052*	0.067**	0.093**	-0.013	-0.008
Robust SE	(0.041)	(0.036)	(0.029)	(0.031)	(0.031)	(0.046)	(0.013)	(0.053)
Pseudo R^2	0.029	0.030	0.029	0.032	0.036	0.035	0.028	0.027

Notes: Gender, age, education level (3 category variable) and household monthly income (dummies) are controlled for in all regressions. †Probit estimations. ***, ** and * stands for 1%, 5% and 10% significance respectively.

Table 8: Influence of risk aversion on occupational choices with heterogenous effects

	Self-reported risk aversion						**Lottery questions**	**Income prospect choices**
	in general	on the road	in sport	in health	in finance	average*		
Probability of working in the public sector†, *observations = 657*								
Risk aversion coefficient	-0.032	-0.088	0.021	0.069	0.173	-0.025	0.079	0.350
	(0.148)	(0.135)	(0.148)	(0.145)	(0.123)	(0.181)	(0.056)	(0.217)
Education level (3 groups)	0.272	0.223	0.519*	0.664**	0.688***	0.490	0.901***	0.797***
	(0.284)	(0.271)	(0.267)	(0.306)	(0.235)	(0.327)	(0.347)	(0.250)
RA × Education level	0.010	0.025	-0.027	-0.064	-0.068	-0.026	-0.041*	-0.174**
	(0.055)	(0.050)	(0.052)	(0.052)	(0.045)	(0.065)	(0.021)	(0.080)
Belongs to a low caste (=1)	0.021	-0.957**	-1.059***	-1.072*	-0.534	-1.521***	-0.434	-0.346
	(0.438)	(0.424)	(0.397)	(0.560)	(0.382)	(0.509)	(0.420)	(0.325)
RA × Belongs to a low caste	0.010	0.202***	0.256***	0.217**	0.128*	0.326***	0.039	0.168
	(0.083)	(0.077)	(0.077)	(0.095)	(0.071)	(0.099)	(0.029)	(0.112)
Pseudo R^2	0.151	0.165	0.187	0.182	0.169	0.175	0.168	0.169
Probability of being self-employed†, *observations = 657*								
Risk aversion coefficient	-0.099	-0.095	-0.096	-0.139	-0.115	-0.202	-0.023	-0.378**
	(0.117)	(0.112)	(0.098)	(0.100)	(0.07)	(0.147)	(0.040)	(0.167)
Education level (3 groups)	-0.630**	-0.556**	-0.483***	-0.655***	-0.589***	-0.814***	-0.395*	-0.661***
	(0.252)	(0.232)	(0.184)	(0.223)	(0.189)	(0.276)	(0.236)	(0.183
RA × Education level	0.067	0.056	0.047	0.071*	0.070*	0.112**	0.008	0.144**
	(0.047)	(0.043)	(0.036)	(0.038)	(0.037)	(0.054)	(0.016)	(0.064)
Belongs to a low caste (=1)	-0.380	-0.456	-0.393	-0.673*	-0.489	-0.610	0.038	-0.383
	(0.432)	(0.403)	(0.289)	(0.390)	(0.323)	(0.469)	(0.368)	(0.288)
RA × Belongs to a low caste	0.015	0.031	0.020	0.062	0.038	0.061	-0.028	0.029
	(0.080)	(0.074)	(0.060)	(0.068)	(0.063)	(0.092)	(0.026)	(0.105)
Pseudo R^2	0.204	0.203	0.201	0.206	0.209	0.209	0.209	0.203

Notes: Gender, age and household monthly income (dummies) are controlled for in all regressions. †Probit estimations.
Robust standard errors are reported in parentheses. ***, ** and * stands for 1%, 5% and 10% significance respectively.
* 'average' is the average of the five SRRA measurements.

Table 9: Influence of risk aversion on risky behaviors controlling for religious practices and beliefs

	Self-reported risk aversion							
	in general	on the road	in sport	in health	in finance	average*	**Lottery questions**	**Income prospect choices**
Probability of working in the private sector†, *observations = 661*								
Risk aversion coefficient	-0.007	-0.058**	-0.061**	-0.027	-0.093***	-0.097**	0.020*	-0.087*
	(0.003)	(0.029)	(0.028)	(0.028)	(0.028)	(0.042)	(0.011)	(0.046)
Pray daily (=1)	-0.238*	-0.248**	-0.222*	-0.247**	-0.252**	-0.252**	-0.232*	-0.259**
	(0.126)	(0.126)	(0.127)	(0.126)	(0.127)	(0.127)	(0.125)	(0.126)
Believes his life is in God's hands	0.688***	0.660***	0.654***	0.687***	0.666***	0.652***	0.675***	0.709***
	(0.236)	(0.236)	(0.235)	(0.235)	(0.231)	(0.234)	(0.237)	(0.238)
Pseudo R^2	0.165	0.171	0.173	0.167	0.182	0.174	0.170	0.170
Probability of working in the public sector†, *observations = 661*								
Risk aversion coefficient	-0.005	0.034	0.032	-0.051*	0.048	0.019	-0.009	-0.013
	(0.042)	(0.036)	(0.032)	(0.030)	(0.030)	(0.046)	(0.013)	(0.053)
Pray daily (=1)	0.458**	0.462**	0.453**	0.445**	0.465**	0.460**	0.456**	0.455**
	(0.182)	(0.184)	(0.183)	(0.182)	(0.184)	(0.183)	(0.182)	(0.182)
Believes his life is in God's hands	-0.288	-0.274	-0.267	-0.288	-0.279	-0.280	-0.283	-0.283
	(0.215)	(0.215)	(0.211)	(0.220)	(0.216)	(0.214)	(0.218)	(0.216)
Pseudo R^2	0.176	0.177	0.178	0.182	0.180	0.176	0.177	0.176
Probability of being self employed†, *observations = 661*								
Risk aversion coefficient	0.050	0.043	0.016	0.040	0.045	0.070*	-0.013	-0.037
	(0.037)	(0.032)	(0.028)	(0.029)	(0.029	(0.042)	(0.012)	(0.050)
Pray daily (=1)	0.178	0.168	0.156	0.174	0.163	0.170	0.156	0.155
	(0.138)	(0.139)	(0.139)	(0.139)	(0.139)	(0.139)	(0.139)	(0.139)
Believes his life is in God's hands	-0.153	-0.155	-0.165	-0.171	-0.160	-0.150	-0.170	-0.166
	(0.186)	(0.187)	(0.187)	(0.186)	(0.187)	(0.187)	(0.186)	(0.186)
Pseudo R^2	0.196	0.196	0.194	0.196	0.197	0.198	0.195	0.194
Probability of smoking†, *observations = 659*								
Risk aversion coefficient	-0.115***	-0.213***	-0.097***	-0.089***	-0.099***	-0.226***	0.089***	-0.172***
	(0.034)	(0.036)	(0.031)	(0.027)	(0.031)	(0.050)	(0.014)	(0.057)
Pray daily (=1)	0.389**	0.381**	0.440***	0.376**	0.391**	0.386**	0.456***	0.377**
	(0.161)	(0.169)	(0.164)	(0.161)	(0.161)	(0.166)	(0.165)	(0.161)
Believes his life is in God's hands	0.884***	0.935**	0.870**	0.942***	0.917***	0.865**	0.971***	0.984***
	(0.337)	(0.371)	(0.343)	(0.346)	(0.330)	(0.352)	(0.326)	(0.340)
Pseudo R^2	0.162	0.221	0.163	0.160	0.163	0.194	0.214	0.163
Probability of drinking†, *observations = 635*								
Risk aversion coefficient	-0.109***	-0.130***	-0.099***	-0.063**	-0.105***	-0.188***	0.033**	-0.272***
	(0.035)	(0.034)	(0.030)	(0.028)	(0.030)	(0.045)	(0.013)	(0.060)
Pray daily (=1)	0.128	0.122	0.186	0.128	0.139	0.130	0.154	0.101
	(0.158)	(0.158)	(0.160)	(0.157)	(0.158)	(0.160)	(0.156)	(0.160)
Believes his life is in God's hands	0.587**	0.613**	0.575*	0.640**	0.626**	0.585*	0.630**	0.662**
	(0.296)	(0.299)	(0.300)	(0.294)	(0.287)	(0.299)	(0.286)	(0.304)
Pseudo R^2	0.138	0.151	0.142	0.129	0.144	0.156	0.133	0.171

Notes: Gender, age and household monthly income (dummies) are controlled for in all regressions. †Probit estimations.
Robust standard errors are reported in parentheses. ***, ** and * stands for 1%, 5% and 10% significance respectively.
* 'average' is the average of the five SRRA measurements.

Table 10: Socio-demographic characteristics of respondents - restricted, missing, full samples

Sample	All answers	Missing	p-value	Full
Observations	*675*	*227*		*902*
Male (%)	69.73	60.35	0.009	67.37
Age (years)	36.06	37.67	0.118	36.47
Married (%)	71.98	77.53	0.102	73.39
Education				
Illiterate (%)	6.31	8.85	0.194	6.95
Tertiary education (%)	46.7	38.94	0.043	44.73
Education (3 groups)	2.26	2.11	0.012	2.22
Low caste (SC/ST, %)	36.43	28.77	0.039	34.54
Household monthly income				
below 10,000 INR	31.41	31.72	0.931	31.49
10,000 - 20,000 INR	34.07	28.19	0.102	32.59
above 20,000 INR	17.63	15.42	0.444	17.07
Contribute to income (%)	55.87	52.42	0.367	55.00