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Hakan J. Holm, Sonja Opper

Department of Economics, Lund University, 22007 Lund, Sweden
{hakan.holm@nek.lu.se, sonja.opper@nek.lu.se}

Victor Nee

Department of Sociology, Cornell University, Ithaca, New York 14850, victor.nee@cornell.edu

This study reports findings from the first large-scale experiment investigating whether entrepreneurs differ from other people in their willingness to expose themselves to various forms of uncertainty. A stratified random sample of 700 chief executive officers from the Yangzi delta region in China is compared to 200 control group members. Our findings suggest that in economic decisions, entrepreneurs are more willing to accept strategic uncertainty related to multilateral competition and trust. However, entrepreneurs do not differ from ordinary people when it comes to nonstrategic forms of uncertainty, such as risk and ambiguity.

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1. Introduction

Why entrepreneurs routinely accept the high uncertainties associated with entrepreneurial activities has fascinated social scientists over centuries. Not only do payoffs of investment take place over time; but prospective payoffs are highly uncertain because of the novelty of entrepreneurial activities (Say 1855, Kirzner 1973, Kihlstrom and Laffont 1979, Knight 2006). What accounts for the entrepreneur's capacity for making highly concentrated equity investments in spite of the considerable risks entailed (Hamilton 2000, Moskowitz and Vissing-Jorgensen 2002)? And why do entrepreneurs accept the uncertainties of market cooperation, if contracting and governance remain incomplete (Williamson 1987)? Given the nature of entrepreneurial action, most theories of entrepreneurship and entrepreneurial decision making emphasize uncertainty as a conceptual cornerstone. Two broad explanations can be identified. One focuses on the ability to develop strategic responses in the presence of uncertainty embedded in the environment (Pich et al. 2002, Bernstein and Federgruen 2005); the other emphasizes behavioral traits that distinguish entrepreneurs from nonentrepreneurs in their willingness to accept uncertainty.

The emphasis on identifying distinct "entrepreneurial types" reflects the popularity of the latter approach; however, the evidence confirming higher uncertainty tolerance of entrepreneurs is largely inconclusive, in spite of intensifying research efforts over the last three decades. In reviewing some of the most influential studies published across the social science disciplines, a few observations stand out (see the appendix for a literature review): First of all, the empirical research has focused on standard risk situations with known probabilities of different outcomes. Standard risk situations, however, do not represent typical scenarios in entrepreneurial decision making. More often than not, entrepreneurs act under nonstrategic uncertainty with unknown probabilities of outcomes. Similarly, prior research has almost completely neglected study of behavioral responses under strategic forms of uncertainty (where the outcome is contingent on responses of another individual as typical in any bilateral business contract). Second, methodological limitations of sampling strategy and subject pool do not invite general inferences on behavioral traits of entrepreneurs. Studies confirming higher risk tolerance of entrepreneurs have typically employed relatively small samples of non-randomly selected populations (Begley 1995, Koh 1996, Sarasvathy et al. 1998, Stewart et al. 1999). Confirmatory evidence from randomly sampled survey populations, in contrast, almost exclusively involves studies comparing self-employed individuals with those who report that they have never been self-employed, but they overlook the more narrowly defined category of

entrepreneurs whose firms actually employ wage-labor (Van Praag and Cramer 2001, Uusitalo 2001, Cramer et al. 2002, Caliendo et al. 2010). Moreover, recent attempts to compare randomly sampled populations of entrepreneurs and nonentrepreneurs have produced mixed results (Djankov et al. 2006, 2007; both studies use a comparable survey instrument). Third, experimental studies using incentivized tasks shed further doubt on the assumed behavioral differences between entrepreneur and nonentrepreneurs. Evidence based on nonrandomly selected samples suggests that entrepreneurs do not behave differently than nonentrepreneurs when exposed to situations of standard risk (Elston et al. 2006, Macko and Tyszka 2009, Sandri et al. 2010, List and Mason 2011), although they may be better able to cope with uncertainty (Macko and Tyszka 2009).

Our approach builds on the research of Elston et al. (2006) and Macko and Tyszka (2009) using controlled incentivized tasks (instead of psychometric survey measures) to elicit behavioral differences between entrepreneurs and nonentrepreneurs. In particular, we exploit well-established methods from experimental economics, namely, the multiple price list method (see Binswanger 1980, Holt and Laury 2002, Andersen et al. 2006).[1] To take research a step forward, we introduce two methodological innovations: First, instead of relying on convenience samples, our study is the first that utilizes large-scale samples of entrepreneurs and nonentrepreneurs randomly selected from firm and household registers. Second, we employ a multidimensional analysis incorporating four types of uncertainty rather than just one behavioral trait. On one hand, we employ standard risk and ambiguity as common forms of nonstrategic uncertainty salient in entrepreneurial decision making. On the other, we use competition (where uncertainty concerns an individual's performance relative to others) and trust (where there is a "social" risk that another party does not act favorably toward the trustee) to exemplify situations involving strategic forms of uncertainty.

Experimental research involving entrepreneurs faces the practical question of whether monetary incentives are high enough to offer sufficiently attractive rewards. Our research site in the Yangzi delta region in China—an emerging economy known to be one of the most entrepreneurial regions—partly

alleviates this concern in light of its lower per capita income relative to a developed economy (Nee and Opper 2012). Our experimental group includes 700 entrepreneurs randomly sampled from local firm registers. All entrepreneurs have been in business for at least three years and employ at least 10 salaried workers. The focus on established business seems most appropriate to capture the "entrepreneurial function" discussed in entrepreneurship theories. Two hundred randomly sampled nonentrepreneurs located in the same region serve as control group. Our motivating question is do entrepreneurs display unique behavioral traits that distinguish them from nonentrepreneurs. Our study does not address an equally important question of who actually becomes an entrepreneur, nor do we have clear evidence whether entrepreneurial traits are acquired by learning or stem from self-selection (Evans and Leighton 1989, Shane 2003, Lazear 2004).

2. Theory and Hypotheses

Entrepreneurs face multiple dimensions of uncertainty, both nonstrategic and strategic. We focus on risk and ambiguity to examine nonstrategic forms of uncertainty. Risk involves situations in which the decision maker has information about the probability of different outcomes and can choose between different alternatives. According to neoclassical utility theory, such decisions are affected by the curvature of the individual's utility function for money. We define ambiguity, as did Ellsberg (1961), as situations where economic actors have information about conceivable outcomes, but not about their probabilities.

The characteristic feature of strategic forms of uncertainty is that the outcome of decision making is contingent upon other individuals' actions. Here we focus on competition and trust. In both cases, beliefs about other people are likely to influence individual decisions. To assess tolerance for uncertainty stemming from competition, we ask the participant to choose between a competitive situation and a noncompetitive one. Clearly, the choice will depend on the decision maker's beliefs about his or her own performance relative to others and also to some extent on her preference for competition per se. To assess trust, we let participants choose between delegating a distribution task to a stranger or to a random device. Evidently, decisions will reflect a decision maker's beliefs whether or not a stranger is more likely to take a favorable decision than a random device.

2.1. Risk
In Kihlstrom and Laffont (1979), economic agents can choose between supplying their labor on the labor market to secure relatively risk-free wage employment or becoming an entrepreneur facing risky

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[1] Harrison and List (2004) used the term "artefactual" to describe field experiments (like this one) that expose uncommon subject categories to experimental procedures normally used in the economic laboratory. We use an "abstract" rather than a "natural" frame when eliciting attitudes to uncertainty. The strategy to provide both entrepreneurs and nonentrepreneurs with a neutral scenario is also likely to reduce the impact of so called background risk, a problem proven to be associated with "natural" frames (Harrison et al. 2007b).

income prospects. In the equilibrium, less risk-averse agents become entrepreneurs, and more risk-averse agents become wage earners. From this theory, we derive our first hypothesis.[2]

HYPOTHESIS 1A. *Entrepreneurs differ from others with respect to risk taking.*

Prospect theory suggests that people use weighting functions instead of probabilities when choosing between different alternatives (Kahneman and Tversky 1979). Except for certain outcomes (with probability one), actors put too little weight on outcomes not obtained with certainty. This phenomenon—denoted as "subcertainty" or as "certainty effect"—explains risk aversion in choices involving sure gains and drives results like the Allais paradox. Because it is plausible that entrepreneurs differ from others in their certainty preference, we compare entrepreneurs with ordinary people when choosing between a certain and a risky alternative (where weights do not sum to one). Potentially, this allows us to separate between differences relating to the shape of the so-called "value function" and differences with respect to the "weighting function."[3] Thus we specify the following hypothesis:

HYPOTHESIS 1B. *When facing a risky alternative, entrepreneurs have a different preference for guaranteed outcomes compared to ordinary people.*

2.2. Ambiguity
Knight (2006, p. 231) was one of the first to emphasize that business decisions typically involve unmeasurable risk, because they "deal with situations which are far too unique, generally speaking, for any sort of statistical tabulation to have any value for guidance. The conception of an objectively measurable probability or chance is simply inapplicable." Such uncertainty poses a dilemma for firms, in that economic actors must make investment and production decisions that shape long-term business strategy and performance despite not being able to assess downstream risks. Knight (2006) does not claim that entrepreneurs have a higher or lower aversion to uncertainty than others, but asserts that entrepreneurs may have a high "capacity for forming correct judgments," implying that entrepreneurs behave differently from others when acting under uncertainty (Knight 2006, p. 43).

To reserve "uncertainty" as the more general concept, we use in the following the term *ambiguity* for situations where the probability distributions of the outcomes are completely or partially unknown. Our hypothesis is therefore as follows:

HYPOTHESIS 2. *Entrepreneurs have a different degree of ambiguity aversion than others.*

2.3. Willingness to Compete
An essential feature of entrepreneurship is exposure to competition, which involves a risk contingent on the entrepreneur's performance in comparison to the competitors. There are at least two conceivable mechanisms behind differences in the entrepreneur's willingness to compete with others. The first concerns beliefs about one's own performance relative to others. It is possible that entrepreneurs are more optimistic than others or may even be overconfident. The theoretical literature draws on this to explain excessive market entry (Bernardo and Welch 2001, Hayward et al. 2006, Wu and Knott 2006).[4] The other possible mechanism is that entrepreneurs may have a preference for competition per se. For instance, Marshall (1920, p. 23) claimed that "a manufacturer or a trader is often stimulated much more by the hope of victory over his rivals than by the desire to add something to his fortune." Similarly, Schumpeter (1983, p. 93) interpreted the wish to innovate, to succeed, and to prove superiority as an exogenous factor having its roots in a person's *Unternehmergeist*, the entrepreneurial spirit. It is "the will to conquer: the impulse to fight...to succeed for the sake, not of the fruits of success, but of success itself" that sets entrepreneurs apart from others. This leads us to our third hypothesis:

HYPOTHESIS 3. *Entrepreneurs have a different willingness to compete than others.*

2.4. Trust
In the words of Coleman (1990, p. 91), "Situations involving trust constitute a subclass of those involving risk. They are situations in which the risk one takes depends on the performance of another actor." Trust is the willingness to expose oneself to such uncertainty. Entrepreneurs are constantly exposed to these "social risks" when interacting with suppliers, customers, employees, debtors, and their competitors. A delicate task here is to strike a balance between trust and control, a task entrepreneurs may be particularly good at (Say 1855, Sections III, VII, p. 30). Thus, whether or not trust in general is higher or lower among entrepreneurs compared to average people, entrepreneurs may in a given situation have a

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[2] Although the crucial assumption of Kihlstrom and Laffont (1979) implies a direction of the difference in risk taking, we prefer to keep our hypotheses open to allow for two-sided tests, because this paper does not aim to test isolated theories. The theories are merely used to motivate the investigation of different forms of uncertainty.

[3] This is the more exact test of Kihlstrom and Laffont's (1979) theory, because here individuals chose between a certain and a risky outcome.

[4] Overconfidence and optimism are general human tendencies that are not restricted to competitive situations and should be distinguished from the more narrowly defined willingness to compete.

different level of trust than others (Knight 2006, p. 43). Our fourth hypothesis states:

HYPOTHESIS 4. *Trust behavior among entrepreneurs is different from that among others.*

3. Research Strategy and Design

This study combines five features previously not jointly applied to study entrepreneurial behavior under uncertainty: (1) reliance on incentivized behavioral tasks, (2) multidimensional specification of uncertainty, (3) a focus on entrepreneurs as founders and chief executive officers (CEOs) of industrial firms, (4) generation of a large-scale sample, and (5) reliance on random-sampling of participants.

3.1. Design

Most of the research to date is based on surveys exploring psychological attitudes toward uncertainty (see the appendix). This makes the economic interpretation of these earlier results somewhat difficult. In this experiment, the behavioral tasks we use allow for a relatively straightforward interpretation. For instance, the behavioral task measuring risk can be directly related to the shape of the utility function. Furthermore, we agree with many experimental economists that the use of monetary incentives in behavioral tasks increases the credibility of the observed data.[5] After all, entrepreneurial decisions involve real stakes. The introduction of monetary incentives therefore should increase the external validity of our observations. Another important feature of our design is the parallel study of different facets of uncertainty. Testing hypotheses for each of these dimensions of uncertainty with the same research design allows us to better distinguish between different behavioral characteristics. Consider the following example: The decision to trust generates a distribution of uncertain outcomes, and the expected utility of this distribution is affected by the curvature of the decision maker's utility function in the same way as for standard risk decisions. In addition, beliefs about others' behavior affect trust. Evidently, the observation that entrepreneurs are more inclined to trust than others is open to two competing explanations. By also testing for risk preferences it is possible to distinguish between the two.

In our study, we formulated each behavioral task in a multiple price list format, where option A was expected to be the most attractive for the first decisions, whereas the relative attractiveness of option B grew for decisions further down the list. This

was done to minimize the cognitive load of the subjects and to make comparisons between tasks easier. After a number of pilot tests with undergraduates in Sweden and a pretest with 70 entrepreneurs located in the Yangzi delta region, we decided to present each decision separately, which seemed to make the tasks easier to grasp for the entrepreneurs. Below we describe the different tasks and how they were designed.[6]

3.1.1. Risk. The experiment utilized a multiple price list format to elicit risk aversion (see Binswanger 1980, Holt and Laury 2002), which has become more or less the standard design in experimental studies of risk aversion (see Andersen et al. 2006, 2008). We used two different lists, one with two lotteries of different relative risk (called task R1) and one with a certain outcome and a risky lottery (called task R2). This was done to investigate both the standard risk attitudes and the certainty effect (discussed above). The list for the R1 task is presented in Table 1 (with the decisions in the middle omitted for reasons of space). The R2 task has the same specifications for option A as the A1 task and the same specifications for option B as the R1 task.

3.1.2. Ambiguity Aversion. Ambiguity aversion was elicited by letting outcomes for option A be certain and the probabilities for the outcomes in option B be fully or partially unknown, denoted as the A1 and A2 tasks, respectively (see Table 1).[7] This means that further information about the risky lottery is removed, which may increase the feeling of uncertainty. To investigate the degree of ambiguity aversion, we need some "price" of the ambiguous lottery reflecting the aversion. This method is similar to the one used by Fox and Tversky (1995), who elicited the willingness to pay for some of their ambiguous lotteries. When the subject in our design switches from the certain (option A in the A1 task) to the ambiguous alternative (option B in the A1 task), we take this as an indication that the subject has reached her reservation price. In some business decisions one might know a lower or upper bound on the probability for an event but not the exact probability. To elicit the aversion to such situations, we also included a treatment with partially ambiguous lotteries (the A2 task).[8]

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[5] For a theory of incentives in experiments, see Smith (1982). There is also evidence that subjects put a higher degree of cognitive effort in decisions when these are incentivized (Camerer and Hogarth 1999). Attitudinal responses may even be unrelated to incentivized decisions (Glaeser et al. 2000).

[6] The instructions and forms used are provided in the online supplement (available at http://www.nek.lu.se/NEKJHO/MS _SUPPLMATERIAL.pdf).

[7] The difference between A1 and A2 was that both uncertain outcomes (i.e., in option B) in the latter task had a probability of at least 25%.

[8] This is also motivated by the finding that ambiguity aversion may differ in various groups depending on the level of ambiguity (Borghans et al. 2009).

Table 1   Decision Tasks

| | Task R1 | | Task A1 | |
| | Option A (probabilities of payoffs) | Option B (probabilities of payoffs) | Option A | Option B (probabilities of payoffs) |
Decision				
1	10% of ¥300 90% of ¥240	10% of ¥580 90% of ¥15	¥360	?% of ¥580 ?% of ¥15
2	20% of ¥300 80% of ¥240	20% of ¥580 80% of ¥15	¥330	?% of ¥580 ?% of ¥15
…	…	…	…	…
9	90% of ¥300 10% of ¥240	90% of ¥580 10% of ¥15	¥120	?% of ¥580 ?% of ¥15
10	100% of ¥300	100% of ¥580	¥90	?% of ¥580 ?% of ¥15

| | Task C1 | | Task T | |
| | Option A (amount earned per correct answer) | Option B (amount earned per correct answer if you/your coparticipant have/has the highest number of points) | Option A (X decides between payments I and II) | Option B (probabilities of payments I and II) |
Decision				
1	¥50	¥50/¥5	X decides	100% of II
2	¥45	¥50/¥5	X decides	10% of I 90% of II
…	…	…	…	…
9	¥10	¥50/¥5	X decides	80% of I 20% of II
10	¥5	¥50/¥5	X decides	90% of I 10% of II

3.1.3.   Willingness to Compete. The willingness to compete may be triggered by many mechanisms, and depending on which the subject considers important, there are different methods to elicit it. One method related to the one we used is to let subjects choose between a fixed fee and entering a contest with an unknown endogenously determined number of entrants, in which the winner gets a larger fixed prize (see Camerer and Lovallo 1999, Elston et al. 2006). The subjective expected utility of the uncertain alternative will depend on many things, including beliefs about the number of entrants, the shape of the utility function, the belief about the subject's own performance relative to others, and possibly also preferences for competition per se (as suggested by Marshall 1920).[9] Because the shape of the utility function is investigated in the standard risk task, the purpose of our elicitation method is to get a more distinct measure of beliefs about relative performance

and preferences for competition per se. To dampen the risk element, we compare two uncertain alternatives, where one involves a competitive element.[10] We also believe that in many situations, the alternative to an entrepreneurial income (at least in the long run) is not a fixed salary, which is the same for all, but rather a performance-based salary, which (like the entrepreneurial income) has an expected value associated with beliefs about absolute performance. The payoff for the winner in the competitive alternative is therefore scaled up from the individual one (see Table 1), which means that beliefs about absolute performance are more or less controlled for. Hence, the measure emphasizes the subject's beliefs about her relative performance and potential preferences for competition per se. To get an indication of subjects' belief about relative performance, we asked subjects to guess their performance in the task compared to their coparticipant(s). Because the performance task was a trivia quiz, we asked "If you do the quiz, what percentage of the other participants do you think will have more correct answers than you?"

In task C1 (see the Table 1) subjects could choose between being paid a certain sum (from CNY 5 to CNY 50) per correctly answered question (option A) in the quiz or entering a competition with another subject and being paid CNY 50 per correctly answered question if the subject had the highest number of correct answers and CNY 5 if the competitor had the highest number.[11] We also included a task C2 where competition was multilateral instead of bilateral. In this case the subject could choose between the same option A as in C1, but option B concerned a competition with three other participants, thus making the competition fiercer.

3.1.4.   Trust. An individual's aversion to exposing herself to the discretion of another person (the trustee) involves both a component of risk (in the sense that more than one outcome is possible) and a belief component (the trustor's subjective belief that the trustee's action will be advantageous to him, or not). Although these components are seldom separated in the literature on trust behavior, we believe it is important not to confound trust with low levels of risk aversion. We have therefore designed an elicitation method where the trustor chooses between one socially risky option, in which the outcome is conditional upon the trustee's action (option A), and a risky option (B) in the standard "lottery" sense, with different payment probabilities. The trustee/lottery will then decide about two different payment distributions: Payment

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[9] Such beliefs may be linked to the decision to become an entrepreneur. Koellinger et al. (2007) demonstrated in a cross-country study that the decision to start a firm is correlated with beliefs about business skills.

[10] This design was partly inspired by Gneezy et al. (2003) and Charness and Villeval (2009).

[11] In the trivia quiz, we used the quiz performance from a pretest group of entrepreneurs as competitors.

I gives the trustor CNY 580 and the trustee CNY 50. Payment II gives the trustor CNY 15 and the trustee CNY 55. The T task is formulated in a multiple price list format of 10 individual choices, where option A, i.e., reliance on the trustee's decision, is expected to be the most attractive for the first decision, whereas the relative attractiveness of option B, i.e., reliance on the payment decision via a random lottery outcome, increases for decisions further down the list (see Table 1). The level of trust in others is thereby revealed by the switching point at which the trustor rather relies on a lottery decision than on another person. Note that the trustor's decision cannot in any obvious way be driven by social preferences.[12]

A small group from the staff at the Shanghai Academy of Social Sciences served as trustees. Decisions from this group were recorded for all conceivable contingencies (i.e., the strategy method was used). To participants in our experiment, the other person was described in general terms (as an anonymous person who was born and lives in China), to capture what Putnam (2001) described as "thin" trust.

The general design of the task simulates situations where one person at a low personal cost can make a big difference to another person. For instance, at the end of the workday, an employee might detect that a machine needs lubrication. The employee can choose between lubrication, which costs a few minutes extra work, or ignore it, which will damage the machine and incur costs to the owner of the firm.

3.1.5. The Distribution of Tasks. Each subject was exposed to four different tasks, one for each type of uncertainty (see Table 2). To have some observations uncontaminated by potential order effects and to check for certain treatment effects, the entrepreneurs were divided into six different treatment groups. The distribution of tasks and their order were decided after several pilots and one pretest. Different issues like cognitive difficulties were taken into account. Each task was placed first in at least one treatment. The exception was task T, because this was the most difficult to grasp. However, it seemed to be easier to understand if the subject had first understood the multiple price list format through some of the other tasks. To minimize the potential influence of order effects in between subjects' comparisons, we made sure to have the control group in their treatments getting mostly the same sequences of tasks as the entrepreneurs.

Table 2 Treatment Design and Mean Switching Points

Treatment	Entrepreneurs						Control group			
	1	2	3	4	5	6	Treatment	7	8	9	10
1st task	A1	A2	R1	R2	C1	C2	1st task	A1	R2	R1	C1
2nd task	R2	R1	A2	A1	T	T	2nd task	R2	A1	A2	T
3rd task	T	T	T	T	A1	A2	3rd task	T	T	T	A1
4th task	C1	C2	C1	C2	R2	R1	4th task	C1	C2	C1	R1
# subjects	117	117	117	117	116	116	# subjects	50	50	50	50

Mean switching points[a]	Entrepreneurs	Control group
R1 task	5.98 (1.69; 111)	5.77 (2.36; 48)
R2 task	5.86 (1.80; 234)	5.30** (1.86; 98)
A1 task	6.25 (2.05; 347)	6.11 (2.45; 147)
A2 task	6.22 (2.10; 115)	6.28 (2.43; 49)
C1 task	6.21 (1.69; 344)	6.39 (1.91; 147)
C2 task	6.10 (1.71; 116)	6.76* (1.97; 50)
T task	5.10 (2.00; 464)	4.79** (1.95; 197)

[a]Means and tests are based on treatments, where the entrepreneurs and the control group share the same history (or histories) of tasks up to the task considered (e.g., the R1 task is based on T1 and T9, R2 is based on T1, T7, T4, and T8). Standard deviations and number of observations in parentheses.
*Statistically significant at the 10% level; **statistically significant at the 5% level (Wilcoxon–Mann–Whitney test).

3.2. Sampling and Descriptive Statistics

A large-scale experiment involving 700 randomly selected entrepreneurs would be a demanding undertaking anywhere in the world. Owners and CEOs of established firms are rarely willing to devote their scarce time to time-consuming academic studies. Many studies of entrepreneurial characteristics have for this reason focused on self-employed individuals. This may be perfectly reasonable for studying characteristics related to some specific forms of activities such as start-up strategies of very small businesses. However, because some individuals are pushed to self-employment for lack of alternatives, such subjects obviously do not reflect the entrepreneurial functions that Say (1855), Marshall (1920), Schumpeter (1983), Knight (2006), or Kirzner (1973) studied. Other studies secure participation of entrepreneurs by relying on small-scale "convenience samples."[13] In these studies, researchers visit public events attended by the survey population and let subjects then self-select into the subject pool. Although understandable in practical terms, the use of convenience samples naturally raises concerns over the external validity of findings (Levitt and List 2007).

We were able to mitigate some of these problems by appending our experiment to a multiyear research project already in progress since 2006 in the Yangzi delta region utilizing a random sample of

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[12] For instance, all standard parameterizations of the Fehr and Schmidt (1999) model would suggest that the trustor prefers the first to the second payment. However, it is quite possible that the trustor's behavior can be guided by *beliefs* about the trustee's social preferences, but this is something different and a reasonable component in trust.

[13] This is not necessarily a problem, because large differences between entrepreneurs and others can also be detected in small samples. What is more problematic is that studies with few observations that do not detect any differences may have a limited value, because small samples may mask moderate differences. This in turn may lead to a publication bias that favors studies reporting significant differences.

entrepreneurs running sizeable industrial firms (see Nee and Opper 2012, pp. 52–71). The economy of scale allowed us to offer credible monetary rewards in our experiments. Our study thus uses a stratified random sample of firms, stratified according to city, industry, and firm size and selected from 7 of the region's 16 municipalities (Nanjing, Nantong, and Changzhou in Jiangsu province; Wenzhou, Ningbo, and Hangzhou in Zhejiang province; and Shanghai municipality) from which 100 entrepreneurs were recruited for each city (for a total of 700). The sample of private enterprise excludes newly founded and small-scale household firms from the sampling pool, and only includes those firms that survived the first three years of firm operation (with a sample median of eight years in business). To narrow down industrial diversity, the sampling procedure selected five industries reflecting strong local production lines. These industries range from labor-intensive to technology-intensive productions covering textiles, ordinary machinery, vehicle and auto parts, medical and pharmaceutical products, and computer and communication equipment. To reach sizable establishments, the sample oversampled "large" (more than 300 employees) and "medium-size" (100–300) firms.

The recruitment of participants followed a two-stage procedure. In a first step, firms were randomly sampled from local firm registers of China's Bureau of Industry and Commerce. The control group consists of individuals randomly selected from local household registers in the same region that resembles the entrepreneurs with respect to gender and age. In a second step, the survey team contacted the randomly selected firms and households by mail and phone to arrange for interview appointments. In total, 2,842 entrepreneurs were invited to participate yielding an overall response rate of 25%, an acceptable result for studies targeting CEOs and top managers.[14] On average, the participating firms employ 130 employees falling into the category of medium-size private firms. Eighty-six percent of these CEOs were owners, and 78% were founders or cofounders of the firm, thereby qualifying as "entrepreneurs" in the most literal meaning. Given the fairly large sample of 700 entrepreneurs and 200 individuals sampled as a control group, observations of potential "no differences" are of great interest, because one can be relatively sure not to overlook substantive differences in the underlying distributions.

Clearly, the ideal control group would be one that is identical to the entrepreneurs except that they are not entrepreneurs. But such a sampling frame does not exist. Our strategy instead was to employ a rich set of controls including the standard control variables gender, age, years of education, and income. We also add four multidimensional measures to capture less standard variables like career experience and parental characteristics, both aspects that not only may well influence the decision to become an entrepreneur (Shane 2003, Chap. 4; Lindquist et al. 2012), but may also have a continuing effect on behavior under uncertainty (Dohmen et al. 2011). First, we include 10 dummy variables controlling for the last position individuals held before the current occupation (i.e., becoming an entrepreneur). The occupational categories include technical personnel, sales and marketing staff, accounting and finance staff, administrative officer, enterprise director, ordinary worker, retail service staff, farmer, military personnel, and unemployment. Second, we include six dummy variables capturing the father's highest level of education and the same 10 dummy variables to capture the father's occupation before retirement as used to classify the individual's prior occupation. Furthermore, we include 10 dummy variables to classify the organizational unit of the father's last occupation. These include research institution, higher education institution, party and government organization, state-owned enterprise, red-hat firm, collective enterprise, private enterprise, individual household business, rural collective enterprise, and foreign invested firm.[15]

Table 3 summarizes the descriptive statistics of the 900 participants in our study. The matching of gender and age in the control group worked well, with an almost identical composition of subjects with regard to these variables. As to educational attainment, entrepreneurs have a higher level of education than the average control group member. Another factor to control for is personal income, which is expected to differ between both groups. According to self-reports of annual personal income, entrepreneurs earn substantially more than the control group members. The median annual personal income of the entrepreneur was CNY 175,000 per year, whereas control group members earned only CNY 21,600. In line with previous research, entrepreneurs have a partially different career background from those in the control group, which is indicated by the differences in jobs before the current one (in Table 3). Also, the parental background differs in some characteristics, mainly with respect to the father's organizational unit.

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[14] Based on a survey including 175 different studies published in the years 1975, 1985, and 1995 in top-tier academic journals in management and behavioral studies, Baruch (1999) identified a norm value of 35.5% ± 13.3 for studies involving top management, whereas mean values in non-Western societies tend to be even lower.

[15] Jointly these four measures provide a fine-grained account of the respondent's personal background. For instance, information that a respondent was brought up by a college graduate working as a technician in a state-owned firm provides a precise picture of the social and economic background of a member of the urban middle class. Compare this with the lower end of the social strata, the child of a farmer without formal education.

Table 3   Descriptive Statistics

Variable	Entrepreneurs (mean/SD)	Control group (mean/SD)	*t*-value
Male	0.833 (0.373)	0.855 (0.353)	0.749
Age	43.056 (8.283)	42.435 (8.576)	−0.927
Years of formal education	12.93 (2.918)	11.76 (2.947)	−4.990***
Log of income	5.120 (0.744)	2.939 (1.020)	−31.485***
Job before current job			
Technical personnel	0.12 (0.325)	0.2 (0.401)	2.905***
Sales/marketing	0.064 (0.245)	0.11 (0.314)	2.175**
Accounting/finance	0.017 (0.130)	0.065 (0.247)	3.655***
Administrative officer	0.569 (0.496)	0.255 (0.437)	−8.093***
Enterprise director	0.167 (0.373)	0.07 (0.256)	−3.454***
Ordinary worker	0.023 (0.150)	0.205 (0.405)	9.803***
Retail service staff	0.006 (0.075)	0.02 (0.140)	1.900*
Farmer	0.003 (0.053)	0 (0)	−0.756
Military personnel	0.001 (0.038)	0 (0)	−0.534
Unemployed	0 (0)	0.005 (0.071)	1.873*
Other	0.024 (0.154)	0.065 (0.247)	2.834***
Father's highest education			
No formal education	0.144 (0.352)	0.075 (0.264)	−2.586***
Primary school	0.256 (0.437)	0.305 (0.462)	1.390
Junior high school	0.279 (0.449)	0.27 (0.445)	−0.239
Vocational school/high school	0.209 (0.407)	0.245 (0.431)	1.102
Junior college	0.09 (0.286)	0.085 (0.280)	−0.219
Undergraduate education	0.021 (0.145)	0.02 (0.140)	−0.124
Master degree and above	0.001 (0.038)	0 (0)	−0.534
Father's last occupation			
Technical personnel	0.161 (0.368)	0.145 (0.353)	−0.562
Sales/marketing	0.013 (0.113)	0.02 (0.140)	0.746
Accounting/finance	0.05 (0.218)	0.03 (0.171)	−1.196
Administrative officer	0.147 (0.355)	0.19 (0.393)	1.471
Enterprise director	0.04 (0.196)	0.045 (0.208)	0.314

Table 3   (Continued)

Variable	Entrepreneurs (mean/SD)	Control group (mean/SD)	*t*-value
Father's last occupation			
Ordinary worker	0.34 (0.474)	0.32 (0.468)	−0.528
Retail service staff	0.006 (0.075)	0.01 (0.100)	−0.656
Farmer	0.219 (0.414)	0.19 (0.393)	−0.871
Military personnel	0.001 (0.038)	0.005 (0.071)	0.945
Unemployed	0 (0)	0 (0)	—
Other	0.023 (0.150)	0.045 (0.208)	1.681*
Organizational unit/father's job			
Research institute	0.009 (0.092)	0.01 (0.010)	0.190
Higher education institute	0.007 (0.084)	0.005 (0.071)	−0.328
Party/government organization	0.004 (0.065)	0.045 (0.208)	4.471***
State-owned enterprise	0.364 (0.482)	0.445 (0.498)	2.074**
Red-hat firm	0.01 (0.010)	0 (0)	−1.420
Collective firm	0.206 (0.405)	0.1 (0.301)	−3.434***
Private firm	0.126 (0.332)	0.125 (0.332)	−0.027
Individual business	0.044 (0.206)	0.04 (0.196)	−0.262
Rural collective enterprise	0.087 (0.282)	0.145 (0.353)	2.410**
Foreign invested firm	0.001 (0.038)	0.01 (0.100)	1.856*
Other	0.141 (0.349)	0.075 (0.264)	−2.497**

Notes. Diff = mean(0) − mean(1). Ha: diff ! = 0. Null hypothesis: Diff is not equal to 0.
   *$p < 0.1$; **$p < 0.05$; ***$p < 0.01$.

3.3.   Research Site

Skeptics may still question whether China's economic and political system provides conditions to derive general insights on behavioral differences between entrepreneurs and nonentrepreneurs. Generally, however, there is little reason to believe that China's private entrepreneurs differ much from their counterparts in other countries. Entrepreneurs have to organize resources, take decisions under various forms of uncertainty, negotiate, and compete in a highly competitive market economy.[16] These are common qualities generally noted by the classical literature on entrepreneurship, and they are not less

[16] All industries in our study are highly competitive with low concentration ratios. The highest concentration ratios are in the vehicle and electronics sectors, with 20% market share of the top 10 producers in the country.

valid in China's emerging market economy. Zhejiang province, the center of the private enterprise economy in the Yangzi delta region already in 2005, ranked as comparable with the United States in enterprise competitiveness (IMD 2005, p. 498). *Forbes* magazine ranks the capital of Zhejiang repeatedly as the city with the best business climate in China.

Historical features of the recent rise of private entrepreneurship in China even control for some confounding effects usually present in firm samples in developed economies. At any given point in time, the structure of a private firm population naturally depends on a complex set of different determinants. Some firm owners were simply pushed into entrepreneurship because they lost their job, others became second-generation entrepreneurs because they took over their parents' firms. Clearly, these firm owners bear little resemblance to the entrepreneurial types or *pioneers* envisioned by Say (1855), Marshall (1920), or Schumpeter (1983). Ideally, one would like to explore a population of entrepreneurs where individuals actively self-select to become entrepreneurs. We claim that China provides an appropriate research site to study such populations of true start-up entrepreneurs. First of all, the history of private entrepreneurship is relatively brief. Before 1988, private entrepreneurship was not even legalized, and full constitutional recognition was not granted before 2004. With this brief history, the current generation of entrepreneurs is truly a generation of founders, not yet diluted by owners of inherited productive assets. Second, China's government has not implemented policies aimed at actively promoting private start-up firms. To the contrary, private entrepreneurs are disadvantaged relative to the state-owned enterprises, which benefit from government policies and loans from state-owned banks. Briefly, China's current generation of private industrialists represent a generation of start-up entrepreneurs who fit fairly well the original idea of entrepreneurship as observed in the rise of modern capitalism in the West (Schumpeter 1947). Third, a specific concern in using a high-income group like entrepreneurs in experiments is whether incentives can be considered salient (see Smith 1982). However, even if the entrepreneurs belong to the high-income group, their median annual personal income is only around USD 25,000 (according to the exchange rate 6.83 per USD 1 in July 2009). This suggests substantial incentives can still be given at a reasonable cost in China. The average subject in our experiment earned CNY 289 (or USD 42) on the behavioral tasks that took only 25 minutes. The median of the entrepreneur's self-reported daily personal income (if he works 300 days a year) is CNY 583. The average experimental earning would thus equate to half a day's earnings (realized in

25 minutes).[17] Notwithstanding these advantages of conducting our study in China, we naturally do not claim perfect external validity. Obviously, all experimental studies have to acknowledge cultural and historical idiosyncrasies that may to some extent shape behavioral responses.

3.4. Training and Execution

All research assistants selected for the implementation of the experiment were familiar with the local dialect and had worked as professional interviewers for several years. Starting on December 7, 2008, in Shanghai, all research assistants participated in a three-day training program designed and led by the authors of this paper to standardize the implementation of the experiment. Each assistant was trained to do the interviews and all tasks. They also received detailed written instructions and questionnaires for each task. At the end of the training, the authors accompanied teams of research assistants and supervisors to the field to conduct a series of trial experiments to check and test the design and implementation by our research assistants.

To minimize the time and inconvenience for the participating entrepreneurs, the behavioral tasks were conducted at the firm site, usually in a conference room or the entrepreneur's private office with no other people attending the experiment. The session proceeded as follows: The entrepreneurs were asked questions about their background (education, demographics) and the firm (start-up capital, firm revenues, etc.). Subjects in the control group, also visited by two research assistants at their private residences, received the same set of questions, except for those about the firm and business. Each subject was then presented with four different behavioral tasks, designed to measure risk aversion, ambiguity aversion, trust, and willingness to cooperate. Afterward, one task was randomly selected as the money-earning task. The earning was calculated, and the entrepreneur received the payment.

4. Results

For each task, our analysis first presents the mean switching points in the different treatment groups (see Table 2).[18] To mitigate order effects, we only compare groups that received the same treatments before

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[17] The average hourly experimental earning (which was CNY 763) corrected for purchasing power (which was 1.95 according to the Big Mac index in July 2009), would translate to an average experimental pay of approximately USD 200.

[18] We have omitted a few observations due to incorrectly filled out forms, such as "multiple switching points." For no task is the share of omitted observations above 5%. Research assistants were carefully trained and given instructions, for example, to repeat the information when the subjects seemed to not fully understand the task.

the task under review.[19] A consequence of this is that the number of observations will vary between the tasks, and we pool only those treatment groups of entrepreneurs that have a matching control group.[20] In a second step we conduct a regression analysis (using ordered probit estimations) to check the robustness of results to the inclusion of all variables listed in Table 3. We also include experimental variables to control for experimenter and order effects. Even if the interviewers were carefully instructed to act in a standardized way, it is well known that the experimenter may affect the subject's choices (Rosenthal 1966).[21]

Definitions of "entrepreneurs" vary. Up to this point we defined entrepreneurs relatively broadly as a firm's CEO (denoted as "Entrepreneur"). This definition is widely accepted because CEOs are in charge of entrepreneurial decisions in everyday business operations. Fifty-five percent of the firms in the sample implemented more than three types of innovations—i.e., new products, new production processes, new management techniques, new quality control—consistent with Schumpeter's definition of innovation as "new combinations" (Nee and Opper 2012, pp. 195–198). Notwithstanding, a narrower definition of the entrepreneur as the owner or actual founder of a firm may come closer to the classical concept of entrepreneurs as individuals who *undertake* a venture instead of relying on wage employment. To check whether our regression results depend on the specific definition of the entrepreneurial role, we ran each regression also for the subsample of 604 owner-entrepreneurs (denoted as "Owners" in the regressions) and the group of 546 founders, who actually started their company (denoted as "Founders").

4.1. Risk
Table 2 summarizes the mean and standard deviations of the individual switching points. Both groups exhibit a certain degree of risk aversion in the R1 task, because a risk-neutral subject should switch at decision 5 and a risk lover at an earlier decision. This result is consistent with studies of risk aversion in other groups (for college students, see Holt and Laury 2002; for the general population, see Harrison et al. 2007a, von Gaudecker et al. 2011). Contrary to what many would expect, the entrepreneurs are not

more risk taking than other people. In fact, their average switching point (5.98) is slightly higher than the one for the control group (5.77), although the difference is not significant in a Wilcoxon–Mann–Whitney test (henceforth, WMW test). Because entrepreneurs have, on average, substantively higher incomes than the control group, this would reinforce risk taking in the former group.[22]

When the decision is between a riskless outcome and a risky one (R2 task), the entrepreneurs show a significantly lower inclination to take risk than the control group (WMW, $p = 0.021$). However, this result is not robust under inclusion of control variables (see Table 4). Hence, we do not find robust evidence against Hypotheses 1A and 1B. In the regressions, the signs of the various definitions of entrepreneurs are negative, suggesting the reverse impact (i.e., less risk aversion), but the coefficients are far from significant. Few of the control variables predict the switching point well. Age is negatively correlated to risk aversion, whereas education has the reverse sign and is significant in some equations. We also observe some indications of parental background effects as well as experimenter effects. Thus, we do not find robust predictors of standard risk taking, nor do entrepreneurs seem to differ from ordinary people.

4.2. Ambiguity
The results on the A1 and A2 tasks do not suggest that there are any notable differences on the level of ambiguity aversion between the groups (see Table 2). This is confirmed by regression analysis (see Table 4). Age is negatively correlated with ambiguity aversion and is marginally significant in the A2 task. Higher education is significantly associated with lower ambiguity aversion in the A1 task. This correlation is slightly weaker in the A2 tasks. As for risk aversion, there exist significant parental background and experimenter effects. The subject's career experience (previous job) also has a relatively robust association with ambiguity aversion.

4.3. Willingness to Compete
For the C1 and C2 tasks, willingness to compete is generally slightly higher among entrepreneurs (see Table 2). The difference in switching point levels is significant for the C2 task, although only at the 10% level (WMW, $p = 0.082$). There is also a tendency that the entrepreneurs' distribution of switching points has a slightly lower variance. A Kolmogorov–Smirnov test rejects equality of distributions at the

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[19] In a study of the multiple price list method, Andersen et al. (2006) detected that responding to a given task in a list might effect how the subject responded in later tasks.

[20] Thus, if one treatment group of entrepreneurs received task X before the task to be studied and another group received tasks YZ, we can pool these groups if and only we can find one treatment group in the control that received X and another that received YZ.

[21] For each subject, we record the interviewer code. All regressions include interviewer codes as dummy variables.

[22] Based on previous studies there is no evidence that income has a substantial impact on the subjects' risk-taking behavior (see Donkers et al. 2001, Harrison et al. 2007a, von Gaudecker et al. 2011).

Table 4   Nonstrategic Uncertainty: Ordered Probit Regressions of Switching Points

	Risk						Ambiguity					
	R1 task coeff. (SE)			R2 task coeff. (SE)			A1 task coeff. (SE)			A2 task coeff. (SE)		
Entrepreneur	−0.138 (0.257)			0.045 (0.270)			0.053 (0.247)			−0.182 (0.305)		
Owner		−0.137 (0.263)			0.048 (0.282)			0.091 (0.260)			−0.136 (0.310)	
Founder			−0.171 (0.268)			−0.023 (0.304)			0.105 (0.278)			−0.176 (0.318)
Male	−0.128 (0.138)	−0.057 (0.152)	−0.041 (0.157)	−0.009 (0.155)	−0.058 (0.171)	0.002 (0.185)	−0.009 (0.147)	−0.046 (0.161)	0.005 (0.173)	−0.093 (0.146)	−0.069 (0.161)	−0.041 (0.167)
Age	−0.008 (0.007)	−0.008 (0.007)	−0.006 (0.008)	0.001 (0.008)	−0.000 (0.008)	−0.005 (0.009)	0.011 (0.007)	0.009 (0.008)	0.000 (0.009)	−0.012* (0.007)	−0.015* (0.008)	−0.015* (0.008)
Education	0.042* (0.023)	0.044* (0.025)	0.030 (0.026)	0.032 (0.022)	0.042* (0.025)	0.055** (0.026)	0.048** (0.021)	0.059** (0.023)	0.061** (0.024)	0.047* (0.024)	0.049* (0.026)	0.043 (0.028)
Log *income*	−0.005 (0.064)	−0.010 (0.067)	−0.008 (0.069)	−0.025 (0.080)	−0.011 (0.084)	−0.013 (0.090)	−0.021 (0.074)	−0.012 (0.077)	0.012 (0.082)	0.003 (0.069)	−0.014 (0.072)	−0.016 (0.074)
Task 2	−0.085 (0.139)	−0.157 (0.148)	−0.082 (0.153)	0.089 (0.126)	−0.046 (0.136)	−0.045 (0.144)	0.123 (0.126)	0.246* (0.135)	0.225 (0.142)	0.041 (0.144)	0.035 (0.154)	−0.001 (0.159)
Task 3							0.029 (0.126)	0.063 (0.134)	0.082 (0.134)	0.012 (0.143)	−0.004 (0.155)	−0.030 (0.162)
Task 4	−0.197 (0.124)	−0.222* (0.132)	−0.203 (0.138)	0.120 (0.141)	−0.005 (0.158)	0.077 (0.169)						
Job before current job	Yes	Yes	Yes	Yes	Yes**	Yes	Yes***	Yes***	Yes**	Yes*	Yes**	Yes
Father's education	Yes	Yes	Yes	Yes	Yes	Yes	Yes***	Yes**	Yes**	Yes*	Yes	Yes
Father's job at retirement	Yes**	Yes***	Yes***	Yes**	Yes**	Yes**	Yes**	Yes***	Yes***	Yes***	Yes***	Yes***
Organizational unit of father's last job	Yes	Yes	Yes	Yes*	Yes	Yes	Yes*	Yes	Yes*	Yes**	Yes	Yes**
Interviewer[a]	Yes	Yes*	Yes*	Yes**	Yes**	Yes**	Yes**	Yes**	Yes**	Yes*	Yes*	Yes*
Prob. $> \chi^2$	0.009	0.010	0.012	0.017	0.048	0.019	0.000	0.000	0.000	0.000	0.000	0.002
Pseudo-R^2	0.054	0.060	0.035	0.056	0.058	0.038	0.064	0.069	0.071	0.068	0.072	0.072
Observations	428	381	362	426	377	344	462	414	377	390	345	325

[a]Dummy variables indicate the main interviewer conducting the experiment. The level of significance reflects highest level of significance found for at least one dummy variable. Coefficient estimates for dummy variables are available from the authors.

*Statistically significant at the 10% level; **statistically significant at the 5% level; ***statistically significant at the 1% level.

10% level of significance ($p = 0.078$) for task C1. One explanation might be that entrepreneurs have a more distinct evaluation of this type of uncertainty. We also controlled whether the higher willingness to compete among entrepreneurs is associated with the belief that they will have a higher score on the performance task than others. This is not the case, because the average relative performance beliefs of the entrepreneurs and the control subjects are almost identical.[23] Higher willingness to compete among entrepreneurs therefore seems to be driven by a preference for competition per se.

Our results are confirmed under inclusion of control variables (see Table 5). In the case of multilateral competition (task C2), the entrepreneur effect is robustly significant at the 5% level. In all three samples, entrepreneurs are less averse to multilateral competition than ordinary people. Two specifications also show a significant gender effect. Male participants are more willing to participate in multilateral competition than females, which is consistent with results reported by Gneezy et al. (2003).[24]

4.4. Trust

Entrepreneurs are more willing to expose themselves to social risks than the control group (see Table 2). The switching points of the entrepreneurs are significantly higher than for the control group (WMW, $p = 0.012$), although the effect is moderate.[25] The average

[23] In the *C*1 task, both entrepreneurs and control subjects believed that 44.7% would have a higher score than themselves. In the C2 task, entrepreneurs believed that 48.1% would have a higher score, and the corresponding figure among the control group was 48.9%.

[24] Gneezy et al. (2003) used student subjects. The study's results suggest that gender differences may also hold in multilateral competition among more experienced subjects, like CEOs who own or founded their firms.

[25] Here the switching point is increasing in the subject's willingness to expose herself to trust.

Table 5   Strategic Uncertainty: Ordered Probit Regressions of Switching points

	Competitiveness						Trust		
	C1 task coeff. (SE)			C2 task coeff. (SE)			T task coeff. (SE)		
Entrepreneur	0.014 (0.252)			−0.877*** (0.300)			0.564*** (0.178)		
Owner		−0.105 (0.261)			−0.771** (0.314)			0.551*** (0.177)	
Founder			−0.006 (0.282)			−0.750** (0.321)			0.565*** (0.191)
Male	0.028 (0.142)	0.098 (0.153)	0.085 (0.164)	−0.230 (0.150)	−0.309* (0.169)	−0.350* (0.179)	0.056 (0.099)	0.007 (0.108)	0.101 (0.114)
Age	−0.003 (0.007)	−0.007 (0.007)	−0.009 (0.008)	−0.007 (0.007)	−0.005 (0.008)	−0.010 (0.008)	0.002 (0.005)	0.002 (0.005)	−0.002 (0.006)
Education	0.025 (0.021)	0.024 (0.023)	0.045* (0.024)	−0.057** (0.024)	−0.058** (0.027)	−0.065** (0.028)	0.015 (0.015)	0.023 (0.017)	0.012 (0.017)
Log *income*	−0.012 (0.065)	0.012 (0.067)	−0.016 (0.070)	0.093 (0.079)	0.097 (0.083)	0.095 (0.088)	−0.070 (0.048)	−0.065 (0.050)	−0.042 (0.052)
Task 3							0.157** (0.077)	0.195** (0.084)	0.209** (0.088)
Task 4	−0.255** (0.109)	−0.221* (0.115)	−0.237* (0.123)	−0.335*** (0.126)	−0.176 (0.131)	−0.093 (0.146)			
Job before current job	Yes*	Yes*	Yes	Yes*	Yes*	Yes	Yes	Yes	Yes
Father's education	Yes	Yes	Yes	Yes**	Yes	Yes	Yes*	Yes*	Yes*
Father's job at retirement	Yes**	Yes**	Yes**	Yes**	Yes	Yes	Yes**	Yes*	Yes*
Organizational unit of father's last job	Yes**	Yes**	Yes	Yes**	Yes	Yes	Yes*	Yes	Yes
Interviewer[a]	Yes**	Yes**	Yes***	Yes**	Yes**	Yes**	Yes*	Yes*	Yes*
Prob. > χ^2	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
Pseudo-R^2	0.066	0.068	0.074	0.082	0.047	0.052	0.040	0.042	0.042
Observations	465	423	388	388	337	317	857	761	703

[a]Dummy variables indicate the main interviewer conducting the experiment. The level of significance reflects highest level of significance found for at least one dummy variable. Coefficient estimates for dummy variables are available from the authors.

*Statistically significant at the 10% level; **statistically significant at the 5% level; ***statistically significant at the 1% level.

difference between the switching points is 19% of the standard deviation. Because we compare two risky options, it is reasonable to interpret this difference as a higher confidence in another person's willingness to act favorably toward the subject.[26] Entrepreneurs routinely rely on ongoing personal ties in upstream and downstream transactions with their suppliers and distributors. Moreover, in industrial districts the capacity for on-the-fly cooperation between producers is an important source of competitive advantage (Uzzi 1996). Because business networks provide a ready conduit of fine-grained information on reputation and trustworthiness, trust in relational contracting may be a self-reinforcing feature of entrepreneurial activity. The regression analysis confirms the robustness of the result (see Table 5). The dummy for entrepreneur is

significant with the expected sign at the 1% level in all three equations. Hence, the nonparametric result and the regression analysis suggest that entrepreneurs have a higher tolerance of social risks than other people.[27]

4.5. Robustness Concerns

We have scrutinized our findings along three different dimensions, exploring the presence of sample selection problems, overspecification, and omitted variable concerns.

Although our baseline models have controlled for individual income and education, skeptics might still claim that both groups are too different with respect to their economic and educational status to be compared. One statistical method to deal with this issue

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[26] Because we did not detect any significant difference in risk aversion when two risky alternatives were present, it is unlikely that this result is driven by risk aversion.

[27] Fehr and List (2004) made congruent observations when they compared CEOs in the Costa Rican coffee industry with undergraduate students. The CEOs were more trusting than the students.

is the application of propensity score analysis (PSA). However, the extreme size requirements of such balancing strategies rarely allow application of PSA in experimental research.[28] However, running the regressions on a subsample of the entrepreneurs and the control group that overlap in some critical dimensions may alleviate some of these concerns. With respect to income, we therefore exclude control group members who do not reach the income of the poorest entrepreneur represented in the sample. With respect to education, we use the spread of education observed in the control group (5 to 19 years) to exclude all those entrepreneurs who either have less or more years of formal education. Regression estimates are consistent with the findings of our baseline models, confirming significant entrepreneur effects in the case of strategic uncertainty.[29]

A second concern may be the risk of overspecifying our model. Our estimation model includes a large number of variables (26 dummy variables controlling for parental background). To confirm that our results are not driven by the numerous control variables, we did a robustness check by running a reduced model excluding the dummy variables for career experiences and parental background.[30]

Others may still fear an omitted variable bias. For example, members of the Chinese Communist Party typically have better access to government and party networks, and may enjoy a higher social and political status (Nee and Opper 2010). This could theoretically affect behavioral choices, particularly when it comes to decisions under uncertainty. Statistical mean comparison tests, however, do not suggest significant behavioral differences between groups. Inclusion of party membership as an additional control variable also does not affect our baseline estimations.[31] Finally, we have explored the possibility that the estimated entrepreneur effect could simply reflect on-the-job learning of entrepreneurs stemming from more frequent exposure to situations involving trust and competition. A closer review of the mean responses of entrepreneurs, however, does not hint at any obvious learning experience driving their choices. Mean responses of experienced entrepreneurs who have been in business for more than 15 years do not differ significantly from mean responses of those entrepreneurs in charge of newly founded firms with less than five years of experience. Years in business and individual behavioral responses generally seem only weakly correlated. Inclusion of a continuous variable capturing "years in business" into our baseline estimations confirms this. Coefficient estimates are never even close to being statistically significant.[32] This suggests that selection mechanisms explaining the entry into entrepreneurship (rather than learning effects) are more likely to explain the behavioral differences between entrepreneurs and ordinary people.

We do not claim that our results are robust to all conceivable modifications of our estimation strategy. As with any empirical design, we cannot exclude that there are unobservable covariates to both uncertainty behavior and becoming an entrepreneur, which may explain our results. What we can claim, however, is that our results hold for a number of alternate specifications of observables, which cover central predictors of both behavioral choices as well as individual career choices.

5. Concluding Remarks

This paper reports results from the first large-scale experimental study on a randomly sampled population to investigate whether entrepreneurs are more prone than nonentrepreneurs to expose themselves to various forms of uncertainty. Our multidimensional design of four experimental tasks builds on the observation that uncertainty has both strategic and nonstrategic dimensions, which require separate treatments to better understand the nature of distinct entrepreneurial traits. Results from our stratified random sample of 700 established entrepreneurs and 200 control group members located in the Yangzi delta region in China suggest that entrepreneurs do not generally differ from other people when it comes to behavior under uncertainty. When exposed to nonstrategic forms of uncertainty such as situations involving standard risk or ambiguity, entrepreneurs act similarly to ordinary people. This observation contradicts the theory by Kihlstrom and Laffont (1979) that selection into entrepreneurship is based on risk aversion.[33] It does also not support risk tolerance as a key causal mechanism explaining entrepreneurs' undiversified portfolios (Moskowitz and Vissing-Jorgensen 2002).

At the same time, entrepreneurs seem to be more willing to bear uncertainties involving a strategic

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[28] To be successful, these matching methods typically require control groups that are multiple times larger than the treatment group, which in our case is the entrepreneurs (Dehejia and Wahba 2002). Control groups of that size, however, are almost impossible to realize given the obvious financial constraints of conducting such an experiment.

[29] Tables S2 and S3 in the online supplement present our regression estimates.

[30] Regression estimates are given in Tables S4 and S5 in the online supplement.

[31] Results are available upon request.

[32] Results are available upon request.

[33] It should be noted that our focus on established entrepreneurs may reflect that the market punishes and weeds out less prudent individuals who are willing to take unnecessary risks (see Caliendo et al. 2010).

element. First of all, entrepreneurs are significantly more willing to enter situations involving multilateral competition than members of the control group. This result is not unexpected. An essential feature of entrepreneurship is to compete with other firms in various respects and also to expose others (e.g., upstream firms and employees) to competitive pressure. Established entrepreneurs cannot shy away from competition. It is therefore likely that this group, as suggested by Marshall (1920) and Schumpeter (1983), has a preference for such situations. As a consequence, our results correspond with Hamilton's (2000) observation that entrepreneurs are willing to enter and persist in business even if the pecuniary compensation is low. Second, our findings suggest that entrepreneurs are more willing to accept uncertainties related to trusting an anonymous other. Due to our design and results on nonstrategic uncertainty, we can rule out lower risk aversion among entrepreneurs as a causal explanation. Still, several alternative explanations remain, and further research is needed to disentangle the deeper mechanisms involved. Studies of comparison groups that match entrepreneurs' properties more closely are likely to give important insights. However, at this stage, a preliminary conclusion is that entrepreneurship requires a certain amount of trust, and that more trusting individuals are selected into the group of entrepreneurs. This view is consistent with the important role of private order and relational contracting in everyday business situations (Williamson 1987, Macaulay 1963). Clearly entrepreneurship is not a purely individualistic endeavor and requires the willingness and ability to cooperate even though complete contracts are typically missing. Trust may therefore provide the glue that makes business networks actually work.

Appendix. Entrepreneurship and Uncertainty

	Focus group	Comparison group	Region	Method	Sampling	FG more prone to accept uncertainty than CG
Risk						
Hull et al. (1980)	Owner-managers ($n = 57$)	Business school alumni ($n = 250$)	United States	S	NR	Yes
Brockhaus (1980)	Start-up entrepreneurs ($n = 31$)	Business managers ($n = 62$)	United States	S	R	No
Caird (1991)	Owner managers ($n = 73$)	Professional groups ($n = 189$)	United States	S	NR	Yes
Begley (1995)	Firm founders ($n = 114$)	Business managers ($n = 114$)	United States	S	NR	Yes
Koh (1996)	Entrepreneurially inclined MBA students ($n = 22$)	Not entrepreneurially inclined MBA students ($n = 32$)	Hong Kong	S	NR	Yes
Sarasvathy et al. (1998)	Entrepreneurs participating in education program ($n = 4$)	Bankers participating in same education program ($n = 4$)	United States	S	NR	Yes
Stewart et al. (1999)	Entrepreneur ($n = 428$)	Corporate manager ($n = 239$)	United States	S	NR	Yes

Appendix. (Continued)

	Focus group	Comparison group	Region	Method	Sampling	FG more prone to accept uncertainty than CG
Risk						
Van Praag and Cramer (2001)	Currently or before self-employed ($n = 258$)	Never before self-employed ($n = 1,505$)	Netherlands	S	R	Yes
Uusitalo (2001)	Self-employed ($n = 2,418$)	Not self-employed ($n = 23,551$)	Finland	S	R	Yes
Cramer et al. (2002)	Self-employed at some point in life ($n = 330$)	Never self-employed ($n = 1,567$)	Netherlands	S	R	Yes
Elston et al. (2006)	Entrepreneurs ($n = 42$)	Nonentrepreneurs ($n = 38$)	United States	E	NR	No
Djankov et al. (2006)	Entrepreneurs ($n = 414$)	Nonentrepreneurs ($n = 561$)	China	S	Stratified RS	Yes
Djankov et al. (2007)	Entrepreneurs ($n = 400$)	Nonentrepreneurs ($n = 550$)	Russia	S	Stratified RS	No
Caliendo et al. (2010)	Individuals who transfer into self-employment ($n = 147$)	Individuals who remain employed ($n = 8,561$)	Germany	S	RS	Yes
Macko and Tyszka (2009)	Entrepreneurs ($n = 40$)	Students ($n = 86$)	Poland	E	NR	No
Sandri et al. (2010)	Entrepreneurs ($n = 15$)	Students/nonstudents ($n = 84$)	Germany	E	NR	No
List and Mason (2011)	Entrepreneurs ($n = 29$)	Students ($n = 101$)	Costa Rica	E	NR	No
Burmeister-Lamp et al. (2012)	Entrepreneurs ($n = 25$)	Students ($n = 29$)	Germany	E	NR	No
Ambiguity						
Schere (1982)	Firm founders ($n = 52$)	Managers ($n = 65$)	United States	S	NR	Yes
Koh (1996)	Entrepreneurially inclined students ($n = 22$)	Not entrepreneurially inclined students ($n = 32$)	Hong Kong	S	NR	Yes
Macko and Tyszka (2009)	Entrepreneurs ($n = 40$)	Students ($n = 86$)	Poland	E	NR	Yes
Willingness to compete						
Begley and Boyd (1987)	Business founders ($n = 268$)	Nonfounding chief executives ($n = 203$)	United States	S	NR	Yes
Begley (1995)	Firm founders ($n = 114$)	Business managers ($n = 114$)	United States	S	NR	No
Elston et al. (2006)	Entrepreneurs ($n = 42$)	Nonentrepreneurs ($n = 38$)	United States	E	NR	No
Trust						
Fehr and List (2004)	CEOs ($n = 76$)	Students ($n = 126$)	Costa Rica	E	NR	Yes

Notes. FG, focus group; CG, comparison group; S, survey; E, experiment; R, random; NR, nonrandom.

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CORRECTION

In this article, "Entrepreneurs Under Uncertainty: An Economic Experiment in China" by Hakan J. Holm, Sonja Opper, and Victor Nee (first published in *Articles in Advance*, January 8, 2013, *Management Science*, DOI:10.1287/mnsc.1120.1670), Option B of Task T in Table 1 has been corrected to read: Decision 1, 100% of II; Decision 2, 10% of I, 90% of II; Decision 9, 80% of I, 20% of II; Decision 10, 90% of I, 10% of II.