

PRELIMINARY VERSION. PLEASE DO NOT CIRCULATE OR  
QUOTE.

Are entrepreneurs lone wolves?  
An experimental analysis of sorting into teams\*

Eszter Czibor, Laura Rosendahl Huber and Martin Koudstaal

June 10, 2016

**Abstract**

In order to test for the role of preferences in the decision to start up alone, we conduct a large scale lab-in-the-field experiment analyzing endogenous team formation among entrepreneurs, managers and employees. In a setting where the team option entails potential efficiency gains we show that entrepreneurs are actually more likely to opt for team production than employees, a difference explained entirely by risk preferences and demographic characteristics. We find no evidence that entrepreneurs are more averse to team decision making than non-entrepreneurs, either. These results bring into question the widely held belief that entrepreneurs are ‘lone wolves’ with exceptionally strong preferences for working alone rather than in teams. We also show that characteristics of one’s potential teammate influence the decision to join teams in a way that is consistent with status-varying homophily: entrepreneurs and managers are more likely to choose team over individual pay when their partner belongs to their own occupational category, while results are the opposite among employees.

## 1 Introduction

Both in popular press and in academic research, entrepreneurs are often portrayed as “lone wolves” who prefer individual over teamwork, are drawn to autonomy, and value decision rights more than non-entrepreneurs.<sup>1</sup> This claim is consistent with the observation that a large share of firms are founded by solo entrepreneurs: according to Burton et al. (2009) and Åstebro and Serrano (2015), 50-60% of new ventures are established by

---

\* We are grateful to the Research Priority Area Behavioral Economics of the University of Amsterdam for their generous financial support and to the Amsterdam Center for Entrepreneurship for the help they provided in conducting our experiment.

<sup>1</sup>As an example, consider the theoretical model by Blanchflower and Oswald (1998) where entrepreneurs are explicitly assumed to derive non-pecuniary utility from being independent and one’s own boss.

a single individual.<sup>2</sup> Even though the last two decades have seen a strong shift away from solo entrepreneurship towards team start-ups (Åstebro and Serrano, 2015), these teams mainly consist of two people and are very often formed with spouses or family members (Ruef et al., 2003).

Given the prevalence of solo entrepreneurs in society, the question arises if it is actually profitable to start up alone, or do entrepreneurs leave money on the table by going solo? There are several reasons why teaming up might be beneficial, including access to more diverse skills and information (Parker, 2009), increased start-up capital (Beckman et al., 2007; Cooper and Saral, 2013; Fairlie and Robb, 2007), access to support and external financing (Beckman et al., 2007; Franke et al., 2006) and improved decision making by teams (Cooper and Saral, 2013; Kerr and Tindale, 2004). Using propensity score matching to alleviate endogeneity concerns arising from self-selection, Åstebro and Serrano (2015, p.231) show that the benefits of being in a partnership are indeed substantial: “partnerships double the probability of commercialization and increase revenues by 29% at the sample mean”.

Given these considerable benefits it is important from a policy perspective to understand why so many entrepreneurs forgo the gains associated with teaming up. If founders are restricted in their networks (as suggested by Ruef et al. (2003)) or are unaware of the benefits of teaming up, then there is room for improvement by targeted interventions to increase team start-ups. However, if the primary motive for being a solo entrepreneur is a preference for independence/autonomy (as has recently been proposed by Cooper and Saral (2013)), then interventions are unlikely to succeed.

The aim of this paper is to gain more insight into the team preferences of entrepreneurs. Using an incentivized online survey we test whether entrepreneurs indeed have a stronger desire than non-entrepreneurs (in our study, a control group of managers and employees) to work alone instead of in a team. We study three potential mechanisms that could explain entrepreneurs’ choices. First, we investigate the importance of entrepreneurs’ own characteristics, such as their beliefs and preferences, for the willingness to join a team. Second, we look at the influence of the specific team context, in particular, whether the team setting involves only joint production or also joint decision making. Finally, we consider how the characteristics of the potential teammate might affect the choice to join a team.

The literature has identified a number of individual characteristics that influence people’s choices to join a team. A crucial determinant is confidence: perceived (absolute and relative) ability is found to be negatively related to one’s willingness to join a team (Kuhn and Villeval, 2014). Since entrepreneurs are shown to be more (over)confident than non-entrepreneurs (Åstebro et al., 2014), this attribute might explain why entrepreneurs decide to work alone. Another important characteristic that has been studied in relation to team choices is attitude towards uncertainty: risk aversion is predicted to be negatively correlated with team bids (Bäker and Mertins, 2013).<sup>3</sup> Given the finding that entrepreneurs are less risk averse than the general

---

<sup>2</sup> Burton et al. (2009)’s results are based on data from the Panel Study of Entrepreneurial Dynamics (PSED) II. Åstebro and Serrano (2015) use the data from the US Small Business Administration 2009 for their estimates.

<sup>3</sup>Team work contains two different sources of risk, i.e. strategic and idiosyncratic risk. By joining a team an individual can reduce the idiosyncratic risk component, but at the same increases the strategic risk component due to the uncertainty related to the unknown ability of the potential teammate. Bäker and Mertins (2013) find that the latter is the dominant factor in the decision to join a team.

population (Holm et al., 2013), this channel might cause entrepreneurs to join teams more than others.

The attractiveness of team work is heavily influenced by the specifics of the team setting: the monetary gains expected from joint production and the loss of authority in case decisions are made jointly. So far, these two aspects have been studied separately in the literature on endogenous team formation.<sup>4</sup> In real life teams, however, the advantages of joint production often come at the cost of shared decision rights. If entrepreneurs perceive themselves as having different preferences than others, then they might be particularly reluctant to make decisions jointly. Moreover, even when the instrumental value of decision rights is not too high (in the sense that the joint choice is not far from the individual's optimum), the loss of power and authority could still make the team choice unattractive for some (Bartling et al., 2014; Fehr et al., 2013; Sloof and von Siemens, 2014). The existing evidence suggests that people differ in the intrinsic value they attach to decision rights. Self-employed, for instance, are claimed to value independence more than non-entrepreneurs (Bartling et al., 2014; Benz and Frey, 2008; Fehr et al., 2013; Reynolds and Curtin, 2008), suggesting that we should observe a greater tendency among entrepreneurs to stay out of teams that involve joint decision making.

In our exploration of preferences for team work we also consider the characteristics of the potential teammate. In particular, we focus on the status of team members. In an influential study, Ruef et al. (2003) hypothesize that teams composed of high-status members will be more common than those composed entirely of lower status members and that there will be more isolation among low status occupations. Following Ruef et al. (2003), we classify entrepreneurs and managers as high-status occupational categories, whereas being an employee is considered as low-status. Based on their model of status-varying homophily, we predict that entrepreneurs and managers will show a strong assortative preference for other entrepreneurs and managers, while we expect the opposite to be true for employees (i.e. if employees do not have the opportunity to form partnerships with entrepreneurs and managers, they will prefer to stay alone rather than to team up with another employee).

To test the above predictions, we conduct a large scale lab-in-the-field experiment, combining a controlled experimental environment with the flexibility and reach allowed by an online survey. Our sample consists of 1,164 individuals (entrepreneurs, manager and employees) and is very diverse in terms of age, education, experience and income.

The experiment consists of four incentivized parts. In the first part, we measure the productivity level of each individual in a real-effort task. In the second part, we elicit participants' risk preferences through an investment choice. In the third part, we use an incentive-compatible mechanism to elicit participants' willingness to pay for the team option. Participants are randomly assigned to one of two treatments conditions that differ in whether the team option entails only joint production or also joint decision making. We introduce a novel team production function that rewards complementarities between the teammates' outputs. Team preferences are measured in two subsequent scenarios: in the first scenario, respondents are offered

---

<sup>4</sup>E.g. Cooper and Saral (2013); Dargnies (2012); Dohmen and Falk (2011); Hamilton et al. (2003); Herbst et al. (2015); Kuhn and Villeval (2014) study the choice between individual and team production, while Kocher et al. (2006) and Masclet et al. (2009) analyze the willingness to make decisions alone vs. in a group.

to form a team with a random survey respondent, while in the second scenario the potential teammate is drawn from the same occupational category (i.e. entrepreneur, manager or employee) as the respondent. In the fourth part of the experiment we measure participants' beliefs regarding their own performance as well as the performance and risk preferences of their potential teammates. These four incentivized parts are followed by a short questionnaire collecting background information.

Contrary to the 'lone wolf' hypothesis, we find that entrepreneurs pay *more* than employees for the possibility to join a team, while there is no significant difference between entrepreneurs and managers. A regression analysis shows that the higher willingness to pay of entrepreneurs compared to employees can be fully explained by differences between the two groups in risk attitudes and demographic characteristics (in particular, education). Comparing willingness to pay for the team option between the two treatments (without and with joint decision making), we find no evidence for entrepreneurs being more averse to group decision making than other participants. Finally, we find that characteristics of the potential teammate have a large influence on participants' willingness to join teams in a way that is consistent with Ruef et al. (2003)'s model of status-varying homophily: entrepreneurs and managers pay substantially more for the possibility to team up with someone from their own occupational category than with a random other participant, while employees pay less, a result that is not fully explained by beliefs about the partner's behavior.

Our paper extends the literature on endogenous team formation in multiple ways. First, while most empirical studies in this area are based on student samples, our participants are entrepreneurs, employees and managers.<sup>5</sup> We know of only two papers that consider entrepreneurs' choices for teams in an incentivized, experimental setting. Masclet et al. (2009) analyze individual and team decisions over risky gambles and report that self-employed participants bid more for the option to decide alone than others. Cooper and Saral (2013) conduct a team production experiment and show that entrepreneurs pay substantially more to stay out of teams, a result that post-experimental survey answers suggest is driven by a fear of losing control. Both above-mentioned studies are based on relatively small samples that do not allow for heterogeneity analysis, so it is not clear whether their findings pertain mostly to self-employed people with small businesses and no intention to grow (as suggested by Hurst and Pugsley (2011)) or to successful entrepreneurs with fast-growing businesses.<sup>6</sup>

Our contributions further include identifying and testing different factors that explain preferences for teams: individual characteristics, the team context and traits of the teammate. We confirm existing results about the importance of confidence and risk preferences for the choice to enter teams. We combine two strains of the literature and analyze teams that include both joint production and also joint decision making, and show how the threat of a suboptimal team decision discourages participants from sorting into teams. Finally, to the best of our knowledge, we are the first to test and find support for the model on status expectation developed by Ruef et al. (2003) in an experimental setting.

---

<sup>5</sup>Two notable exception are the field experiments by Hamilton et al. (2003) and Bandiera et al. (2013).

<sup>6</sup>In Masclet et al. (2009), the total number of participants is 144, 43% of whom are salaried workers or self-employed (i.e. farmers, artisans, shopkeepers and professionals), while Cooper and Saral (2013) have 29 full-time and 15 part-time entrepreneurs in their sample.

The rest of this paper is structured as follows. Section 2 provides the details of the context and design of our experiment. Section 3 contains an overview of the data and the descriptive statistics. Section 4 presents the main results of the study. Section 5 concludes.

## 2 Context and Design

### 2.1 Context

Our study was conducted as the fourth wave of an extensive scientific project studying behavioral traits of entrepreneurs, managers and employees in The Netherlands. Each wave of this project encompasses a large-scale lab-in-the-field (or, in the terminology of Harrison and List (2004), *artefactual field*) experiment in the form of an online incentivized survey.<sup>7</sup> We follow the definitions outlined in Koudstaal et al. (2015) to classify survey participants into occupational categories. Entrepreneurs are defined as having founded, inherited or taken over a company that they currently (co-)manage. Managers are employed by an organization they did not start up themselves and have at least two subordinates for whom they are directly responsible (i.e. “direct reports”). Finally, we consider someone an employee if they are employed by an organization they did not set up themselves and have less than two direct reporting lines.<sup>8</sup>

Our survey was conducted in the spring of 2015. To recruit participants for our study, we used the following channels: we contacted entrepreneurs with the help of “Synpact”, a large organizer of entrepreneurship events while managers were contacted via “De Baak”, a highly reputed training institute for managers. For the recruitment of employees, we collaborated with a Dutch market research agency.<sup>9</sup> In total, close to 25,000 potential participants received an e-mail with an invitation to participate and 1,164 individuals (400 entrepreneurs, 155 managers and 609 employees) completed our online survey.

Since our respondents belong to the working population and many of them have high income, the relatively low earnings used in traditional laboratory experiments with student subjects were unlikely to provide proper incentives in our case. Instead, we decided to offer very high prizes (that were contingent on decisions in the survey) to twenty randomly selected prizewinners. Such an approach is common in the literature and should produce similar results as when paying out all participants (see e.g. Gneezy and Rustichini (2000)

---

<sup>7</sup>The waves all have a different focus: risk and uncertainty (Wave 1, October-November 2013), confidence and optimism (Wave 2, May 2014), intuitive vs. rational decision making (Wave 3, December 2014) and preference for teams (Wave 4, discussed in this study). A detailed description of the general project and the results of the first wave may be found in Koudstaal et al. (forthcoming)

<sup>8</sup>We also regard project managers as ‘managers’ whenever they have overall responsibility of their project and at least two direct reporting lines. Survey participants who belonged to multiple occupational categories were instructed to select the one generating most of their income. The 34 participants who reported they did not belong to either of the three above occupational categories were excluded from analysis.

<sup>9</sup>Since these are the same channels used to recruit participants in the earlier waves of the scientific study mentioned above, there is considerable overlap in the subject pool of our study and the previous waves, especially among entrepreneurs and managers. Approximately half of our respondents (542 people) participated in one or more of the earlier waves, but only 67 individuals completed all four surveys of the general project. There is little difference in terms of demographic characteristics between respondents who participated before and those who were new to the project (the gender composition and the level of education is similar in the two groups, but “new” participants are on average 2.5 years younger), and we found no significant difference in their performance or choices in our survey.

and Laury (2006)). The payment structure was clearly communicated to participants at the beginning of the survey, together with the assurance that prizewinners would be drawn by a civil-law notary. Prizewinners earned on average €330.58 with a minimum of €148 and a maximum of €785.<sup>10</sup>

Participants spent on average 13 minutes completing the survey that was designed and pre-tested to take approximately 15 minutes, suggesting that they took the tasks and choices seriously. The original survey was conducted in Dutch.<sup>11</sup>

## 2.2 Design

Our experiment consisted of four incentivized parts: a production phase, an investment phase, a choice between an individual or a team incentive scheme, and an evaluation phase; followed by a non-incentivized background questionnaire. We give a short overview of each part of the survey, then discuss in detail the elicitation of team preferences.

### 2.2.1 Overview of the survey

The first part of the experiment entailed a real-effort task: participants had 10 minutes to solve 10 puzzles from the Raven Advanced Progressive Matrices (Raven et al., 2003). This task required participants to complete puzzles consisting of three rows of three figures where the bottom-right figure was missing (see Figure A1 in Appendix A). Performance on this task provides a proxy for cognitive ability, as Raven matrices are developed to serve as a “culture-free IQ test” (Herz et al., 2014, p.5). The task is particularly suited for online applications since correct solutions are not easily found on the Internet. Participants faced individual piece rate incentives of €40 per correctly solved puzzle. Participants were informed that they would receive feedback on the number of puzzles they solved correctly at the very end of the survey.

Part 2 measured participants’ risk preferences using the investment method of Gneezy and Potters (1997). Participants were asked to report what share of their Part 1 earnings they were willing to invest in a risky gamble that offered a 67% chance that the money invested would be lost and a 33% chance to win two and a half times the amount invested (on top of the investment). Subjects made their investment choice using a slider, as shown in Figure A2 in Appendix A.<sup>12</sup>

In Part 3, the key element of our survey, participants were offered a choice between an individual and a team remuneration scheme. Individuals were randomly assigned to one of the two treatment conditions that determined the content of the team option (only joint production or also joint decision making). Participants

---

<sup>10</sup>The *ex post* chance of being paid out was approximately 1 in 58. To alleviate the concern that participants *ex ante* might hold different beliefs about the likelihood of being a prizewinner, they were informed at the beginning of the survey that the chance of being paid out had been approximately 1 in 100 in earlier research waves (e.g. in Koudstaal et al. (forthcoming)).

<sup>11</sup>Both the original and a translated version of the full survey is available from the authors upon request.

<sup>12</sup>While this method is not able to differentiate between risk loving and risk neutral subjects (the expected return on the gamble is positive, so already a risk neutral subject should invest everything), it is a simple, quick and easy-to-understand method for measuring different degrees of risk aversion and has been widely used in the literature, see e.g. Charness and Gneezy (2012); Dreber et al. (2011). We assume risk preferences to be stable traits and thus do not expect the actual level of Part 1 earnings to influence participants’ investment choices.

made two subsequent choices, expressing the willingness to form a team first with a random teammate, then with a teammate drawn from one's own occupational category. Section 2.2.2 discusses in detail the content of the team option and our elicitation technique.

In Part 4 of the survey we measured participants' beliefs about their own performance as well as their potential teammate's performance and investment choice. All three belief elicitation questions were incentivized: participants received €20 for correctly guessing the number of puzzles they and their potential teammate solved correctly, and could earn another €20 when their guess for their partner's investment decision was less than five percentage points away from the true value.

After the four incentivized parts, the survey concluded with a questionnaire to gain insight into respondents' decision making process and to collect some background characteristics. First, participants were asked to select from a list of possible explanations the option(s) they found most applicable to their Part 3 choice. The list was based on the most common answers from a pilot survey, and included option such as "*I believed the team option could increase my earnings.*", "*I did not want to take too much risk.*", "*I thought I solved more puzzles correctly than other participants.*" etc. Respondents then answered background questions specific to their occupational categories. Entrepreneurs reported the legal structure of their companies, whether they were founders, the number of their employees and the share they owned in their companies. Managers reported whether they were general or project managers, whether they were the CEOs of their organization and the number of their direct reports. All respondents were asked to report the years of work experience they had, and to select the income category they belonged to (with the option to keep this information private). Information about gender, age, education and occupational category was collected at the beginning of the survey.

## 2.2.2 Details of the team choice

This section reviews the details of the third part of our survey where respondents had to decide whether they wanted to keep their individual piece rate earnings from Part 1 or whether they wanted to form a team with another survey participant instead.<sup>13</sup> We used a between-subjects design and randomly assigned respondents to one of the two treatment conditions that differed in the content of the team option.<sup>14</sup> Table 1 provides an overview of the design. In the Joint Production treatment, the team option only affected the earnings from the real effort task but not the investment decision from Part 2. The Joint Decision treatment, on the other hand, entailed both joint production and a joint investment decision: in the team option, the share invested in

<sup>13</sup>Note that by asking participants to choose a remuneration scheme *ex post* for their Part 1 performance, we have ruled out the possibility of free-riding by design. This decision was motivated in part by practical concerns (we wanted to save time by avoiding a second production round) and also by the belief that eliminating free-riding makes the design cleaner and the results easier to interpret. Moreover, even though theoretical papers often emphasize the incentives to free ride (e.g. Holmstrom, 1982), empirical studies often find little evidence for such practice in teams (e.g. Bäker and Mertins, 2013; Hamilton et al., 2003; Herbst et al., 2015). We believe a design where free-riding is not possible is a good approximation for several real life team settings where group members can e.g. monitor each other and there is a threat of punishment (Ernst Fehr, 2000) or exclusion (Kopányi-Peuker et al., 2015).

<sup>14</sup>We performed a stratified randomization by gender and occupational category to ensure that we can analyze these subsamples separately.

the risky bet was determined as the unweighted average of the two teammates' individual choices in Part 2. Hence, the team option in this treatment entailed the possibility of being moved away from one's individual utility-maximizing risk exposure.<sup>15</sup>

Table 1: SUMMARY OF THE TREATMENT CONDITIONS

	Team option influences:	
	Earnings from Raven puzzles	Share of earnings to be invested
Joint Production treatment	✓	
Joint Decision treatment	✓	✓

A distinguishing feature of our design is the introduction of conditional efficiency gains in team production. In particular, participants received the following instruction regarding earnings in the team option: *“You get €40 for each puzzle that **either you or your teammate** solved correctly in Part 1. Therefore your earnings in the team option are always at least as high as in the individual option, and higher in case your teammate solved more/different puzzles correctly than you did”*. This team production function allows participants to benefit from teaming up even with a less able partner provided that there are complementarities between their outputs, i.e. that their correct answers do not completely overlap. At the same time, this way of modeling team production does not automatically guarantee an efficiency gain in the team option but makes it conditional on the ‘match’ between teammates. This approach is a unique addition to existing studies on endogenous team formation where the team option is modeled as a simple revenue sharing contract, e.g. an equal split of the pooled total output of the members (Bäker and Mertins, 2013; Dohmen and Falk, 2011; Herbst et al., 2015) or with some pre-defined, automatic mark-up on top of the joint output (Cooper and Saral, 2013; Kuhn and Villeval, 2014). To ensure that the set-up was clear to all participants, we provided them with numerical examples on how the team option could affect their earnings and investment decisions (see Figure A3 in Appendix A).

Participants were asked to report their choice between the individual and team option in two subsequent scenarios. In the Scenario 1, participants learned that their teammate would be randomly drawn from the total sample of survey respondents. To fix beliefs, we explicitly mentioned that their teammate is equally likely to belong to either of the three occupational categories (entrepreneur, manager or employee). In the Scenario 2, the potential teammate would be randomly drawn from among survey respondents of one's own occupational category. Participants were told that one of the two scenarios would be randomly selected to be implemented. Participants received no feedback at any point in the survey about the identity, performance or bid of their potential teammate.

Instead of a binary choice between the individual and the team option, we elicited participants' will-

<sup>15</sup>In our design, there is no scope for the ‘wisdom of crowds’: since the decision is related to individual preferences, there is no single ‘correct’ answer. Team decision making thus does not help the members to achieve a more efficient outcome: individual choice in our setting is always weakly preferred to the group choice. We do not model the bargaining process either: the compromise that results from the joint decision making is always the unweighted average of the two members' individual choices.



ingness to pay for the team option in each scenario by means of a BDM mechanism (Becker et al., 1964) that allowed us to obtain a continuous measure of team preferences in an incentive-compatible manner. Specifically, we gave each respondent an endowment of €50 that they could either keep or use to bid for the possibility to be in a team. Participants were informed that the actual price of the team option would be randomly drawn from the interval  $[\epsilon 1, \epsilon 50]$  at the notary after the survey was closed. Teams were only formed if both potential team members submitted a bid that was at least as high as the actual price. Team formation thus required mutual consent. Bids only had to be paid in case subjects actually formed a team. Participants were reminded that it was in their best interest to report their preferences truthfully.<sup>16</sup>

The team option in our setting did not involve an actual interaction between the teammates. This design choice was mostly due to practical constraints imposed by our data collection method: respondents of our online survey did not necessarily work on the questionnaire at the same time, so real-time interaction or communication would not have been possible. In the experimental economics literature it is common to study sorting into team incentive schemes without allowing respondents to interact with each other (Cooper and Saral, 2013; Kuhn and Villeval, 2014, see e.g.). Moreover, there are also examples from real life that resemble the way we modeled teamwork. In the world of open-source software, developers often work individually and remotely on issues, submit their solutions, and the best suggestion gets accepted.<sup>17</sup> Similarly, in case of international scientific cooperations, the parties often already have ideas or preliminary results at the time when they decide to cooperate and pool their resources for a better final outcome.

### 3 Descriptive statistics

The aim of this section is to provide a general overview of our data. In particular, we present demographic information for the entrepreneurs, managers and employees in our sample (Panel A of Table 2), followed by a summary of their survey choices (Panel B of Table 2).

Our group of respondents is comprised of 400 entrepreneurs, 155 managers and 609 employees. The main take-away from Panel A of Table 2 is that differences in demographic characteristics between entrepreneurs and managers in our sample, although statistically significant, are rather small in size. The differences are substantial, however, when we compare entrepreneurs to employees. Entrepreneurs and managers in our sample tend to be older: they are on average 50.29 and 48.30 years old, respectively, compared to a mean age of 43.25 years for employees. The differences in experience between occupational categories could be misleading because they refer to professional experience *in the given occupational category*, and neither entrepreneurs nor managers tend to start in their current categories immediately after finishing school. As a result, they report fewer years of work experience (approx. 14 years for both groups) than employees (close to 22 years). The share of female respondents is rather low among entrepreneurs and

<sup>16</sup>In this setting the team option weakly dominates the individual option in terms of expected payoffs, and bidding zero always ensured that a respondent is paid on the individual basis, so we did not allow negative bids.

<sup>17</sup>An example is the Linux kernel development process: <http://techblog.aasisvinayak.com/linux-kernel-development-process-how-it-works/>.

managers: just over a quarter of the entrepreneurs and 37% of the managers are women, while the sample of employees is completely balanced by gender.<sup>18</sup>

Table 2: DESCRIPTIVE STATISTICS

	Entrepreneurs (N = 400)		Managers (N = 155)		Employees (N = 609)	
	mean	std. dev.	mean	std. dev.	mean	std. dev.
<i>Panel A: Demographic characteristics</i>						
Age	50.29	9.65	48.30**	8.47	43.25***	11.72
Professional experience (years) <sup>1</sup>	14.09	10.11	13.92	8.32	21.79***	11.66
Female (dummy)	0.26	0.44	0.37***	0.49	0.50***	0.50
<i>Panel B: Survey choices</i>						
Puzzles correct (actual) (0-10)	5.28	2.20	6.06***	1.95	4.58***	2.24
Puzzles correct (guess) (0-10)	6.18	1.76	6.27	1.99	5.29***	2.01
Investment in risky gamble (0-100)	52.70	26.72	52.34	28.87	40.51***	25.53
Partner's correct (guess), Scenario 1 (0-10)	5.63	1.33	5.82	1.39	5.40**	1.57
Partner's correct (guess), Scenario 2 (0-10)	5.90	1.38	6.30***	1.53	5.04***	1.59
Partner's investment (guess), Scenario 1 (0-100)	48.44	19.28	51.07	18.16	45.22**	19.37
Partner's investment (guess), Scenario 2 (0-100)	55.77	21.89	54.64	19.90	44.51 ***	20.43

<sup>1</sup>This variables measures years of experience in current occupational category and is missing for 34 respondents.

Notes: Significance of differences of means from t-tests with unequal variances (comparison group: entrepreneurs.) \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In addition to the characteristics discussed above, Figure 1 compares the three occupational categories in terms of educational attainment and income. Panel (a) shows that in our sample managers tend to have the highest, while employees the lowest education: among the former group, the majority has a university degree, in contrast with a share of 15% of university graduates among employees. Entrepreneurs are most likely to have attained a college education. The self-reported income data presented in Panel (b) of Figure 1 confirm the finding that entrepreneurship is an activity with a large variance in returns (Astebro et al., 2014): while the most frequently selected income category is the same for both entrepreneurs and managers (€75,001 - 125,000), entrepreneurs are much more likely than managers to fall into either the highest or the lowest income categories.<sup>19</sup> The modal income category for employees in our sample is €25,001 - 50,000 per annum (as a comparison, the gross modal income was €33,500 in 2014 in the Netherlands (Netherlands Bureau for Economic Policy Analysis, 2014)). Chi-square tests confirm that the differences between entrepreneurs and managers or employees in terms of education and income are highly significant.

<sup>18</sup>As mentioned before, employees were recruited via a market research agency, and the sampling aimed for gender balance.

<sup>19</sup>These results, however, should be treated with caution as almost half of the entrepreneurs and managers chose not to report their income.

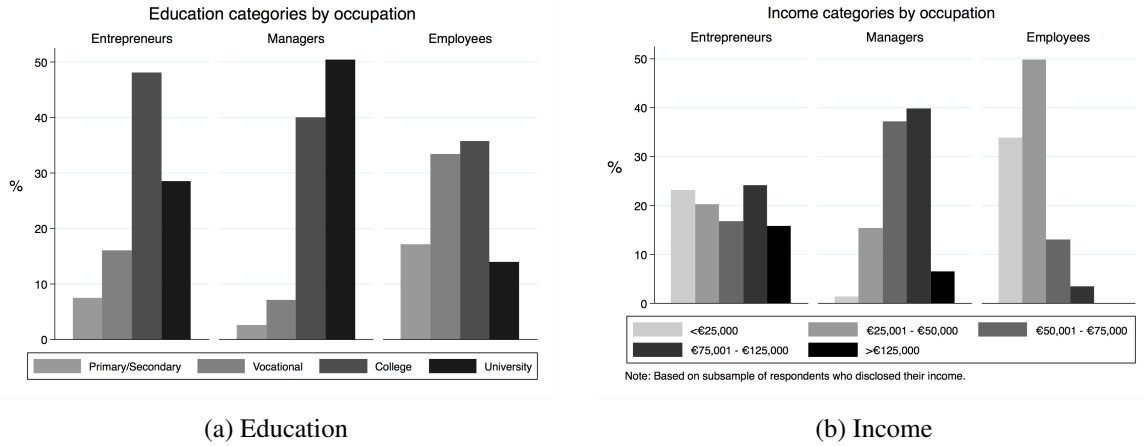


Figure 1: Characteristics by occupation

Before discussing respondents' survey choices, we provide some additional information on the entrepreneurs in our sample. As shown in Table 3, the vast majority of respondents are founders of their company: only 15.50% reported to have inherited, taken over or joined the firm they currently manage. About half of the entrepreneurs have firms that are incorporated, and two thirds of them are majority shareholders in their company. There is great variation among our respondents in terms of the number of their employees: while the mean is 14.22, the median respondent employs only one person and the maximum number of employees reported is 1000 (see Figure B1 in Appendix A for the distribution of the number of employees).

Table 3: ENTREPRENEURS' CHARACTERISTICS

	Yes		No	
	N	%	N	%
Founder <sup>1</sup>	321	80.25	62	15.50
Incorporated	188	47	212	53
Majority shareholder	263	65.75	137	34.25
	<i>Mean</i>	<i>Median</i>	<i>Min</i>	<i>Max</i>
Number of employees <sup>1</sup>	14.22	1	0	1000

<sup>1</sup> Observations for these variables missing for 17 entrepreneurs.

Returning to Table 2, Panel B allows us to assess the ability, confidence, risk preferences and beliefs of entrepreneurs compared to the rest of our sample (we postpone the discussion of team bids, our main variable of interest, until Section 4). We find that entrepreneurs perform worse on the task than managers (they solve on average 5.28 puzzles out of 10, while managers have a mean score of 6.06) but better than employees who answer 4.58 puzzles correctly. The differences in scores between entrepreneurs and the two other groups are highly significant according to t-tests with unequal variances. The second row of Panel

B shows that entrepreneurs are prone to overestimation: on average, their guessed performance exceeds their true score by almost 1 puzzle. Employees are similarly overconfident about their absolute performance while managers are rather accurate in predicting their own scores. As displayed in row 3, entrepreneurs and managers are very similar in terms of their risk preferences (both groups invest about 52% of their earnings in the risky gamble on average), while employees are substantially more risk averse. These findings are consistent with existing results on behavioral characteristics of entrepreneurs, see e.g. Astebro et al. (2014) and Koudstaal et al. (forthcoming).

Rows 4 and 5, displaying respondents' guesses for their potential partners' scores in Scenarios 1 and 2, show that these guesses are sensitive to the characteristics of the partner. In particular, entrepreneurs and managers expect a teammate drawn from their own occupational category (Scenario 2) to perform better than a partner drawn from among all participants (Scenario 1), while employees expect the opposite. Also, entrepreneurs and managers believe they score higher than a random other survey respondent, while employees don't. Relatedly, the final two rows of Panel B show that respondents expect different investment behavior from their potential partners in the two scenarios. The difference is particularly striking among entrepreneurs whose mean guess for their teammate's investment in the risky bet is 48.44% when teamed up with random survey participant but 55.77% in case of a potential entrepreneur partner.

## 4 Results

We begin our analysis of the willingness to join teams by focusing on the choice in Scenario 1 of the Joint Production treatment, entailing team production, individual decision making and a potential teammate chosen randomly from among all respondents. This enables a more straightforward comparison of our findings with results from other studies of endogenous team formation that focus exclusively on joint production and do not consider characteristics of the partner. To estimate the effect of joint decision making on preferences for the team option, in Section 4.2 we then compare the willingness to pay for the team option between the Joint Production and the Joint Decision treatments (still considering Scenario 1 choices only). Finally in Section 4.3 we analyze the impact of the potential partner's status by comparing answers between Scenarios 1 and 2.

### 4.1 Preferences for joint production

Figure 2a gives a general overview of participants' willingness to pay for the team option in Scenario 1 of the Joint Production treatment. The mean bid in this group is 28.00 with a standard deviation of 16.32. Little more than 10% of the participants chose to bid zero and 18% was willing to pay the maximum possible amount, €50 for the team option. Even though bids were reported using a slider, respondents were still inclined to choose "round" numbers, i.e. multiples of five and especially ten. We see no indication for participants being biased by the slider's default setting: €25, the default option is only the fifth most popular choice.

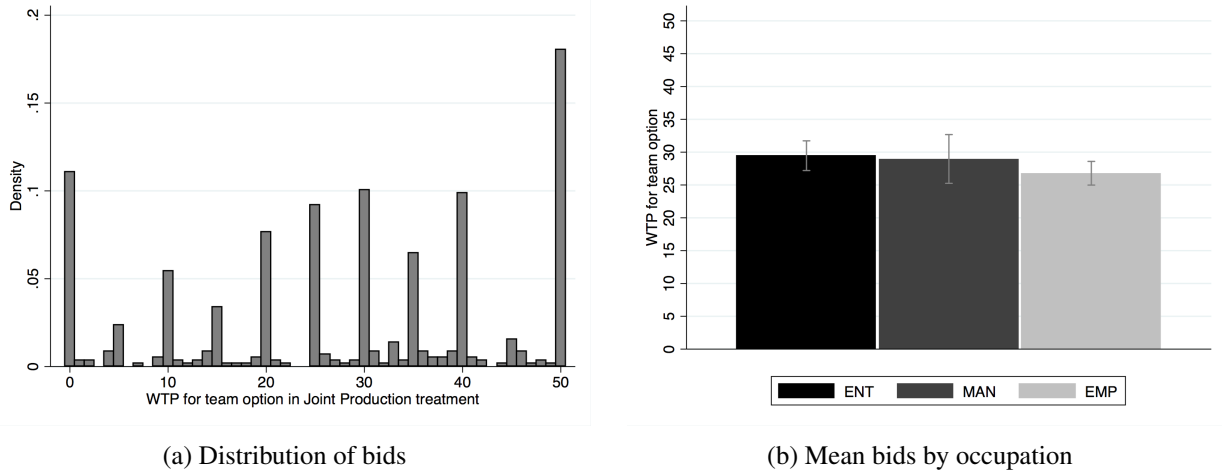


Figure 2: Bids for the team option in the Joint Production treatment

Figure 2b shows the mean bids for the team option separately for entrepreneurs, managers and employees. A surprising pattern emerges from this figure: while there is no difference between the bids of entrepreneurs and managers, entrepreneurs seem to pay *more* for the team option than employees. The raw difference is €2.7 (or one-seventh of a standard deviation) and is marginally significant. (The difference between managers' and employees' bids is similar in size but it is imprecisely estimated.) Figure B2 in Appendix B presents the distribution of team bids by occupational categories, and shows that employees are much less likely than either managers or entrepreneurs to bid the maximum possible amount, €50 for the team option. This finding seems to be in contrast with the 'lone wolf' myth that entrepreneurs have a stronger preference than non-entrepreneurs to work independently rather than in a team.

In the following, we test whether differences in ability, confidence or risk preferences between entrepreneurs and employees are the drivers of this surprising result. Each column of Table 4 presents estimated coefficients from different model specifications explaining respondents' bids for the team option in Scenario 1 in the Joint Production treatment condition, adding control variables sequentially to analyze their impact on the gap between entrepreneurs and employees. We present results from tobit models to account for the potential left- and right-censoring introduced by our elicitation method.<sup>20</sup> Column (1) presents results from the 'baseline' model that only includes dummy variables for being an entrepreneur or a manager (the omitted category is employee). Correcting for censoring, entrepreneurs are estimated to pay €3.74 more for the team option than employees, a difference that is significant at the 10% level.

In columns (2) and (3) we replicate the findings of Kuhn and Villeval (2014) who show that confidence is negatively related to the willingness to join teams. We also see that controlling for participants' beliefs about their own and their partner's performance, the difference between entrepreneurs' and employees' team bids increases, confirming the result that entrepreneurs are more prone to overestimation and overplacement than non-entrepreneurs (Astebro et al., 2014).

<sup>20</sup>Our results are qualitatively unchanged when we estimate OLS regressions instead.

Table 4: BIDS FOR THE TEAM OPTION IN THE JOINT PRODUCTION TREATMENT

<i>Dependent variable: bids for the team option in Scenario 1</i>					
	(1) Occupation	(2) Overestimation	(3) Overplacement	(4) Risk aversion	(5) Demographics
ENT	3.737* (2.050)	4.103** (2.089)	4.484** (2.049)	2.810 (2.018)	0.513 (2.197)
MAN	3.117 (2.859)	3.552 (2.941)	3.561 (2.880)	1.852 (2.818)	-1.147 (2.936)
Puzzles correct (actual)		0.028 (0.527)	0.244 (0.519)	0.364 (0.506)	0.080 (0.524)
Puzzles correct (guess)		-0.457 (0.587)	-1.611** (0.634)	-1.840*** (0.619)	-1.854*** (0.618)
Partner's correct (guess)			3.076*** (0.700)	3.063*** (0.683)	3.201*** (0.680)
Risk aversion				-0.179*** (0.033)	-0.173*** (0.033)
Female					-0.784 (1.886)
Age					0.078 (0.084)
Education					3.225*** (1.003)
Constant	27.289*** (1.285)	29.545*** (2.836)	17.766*** (3.855)	29.035*** (4.299)	18.404*** (6.286)
N	588	588	588	588	588
Pseudo R <sup>2</sup>	0.001	0.001	0.006	0.013	0.015

Notes: The table displays estimated coefficients from tobit models (lower limit 0, upper limit 50). All regressions are estimated on the subsample of respondents who participated in the Joint Production treatment. ENT and MAN are dummy variables indicating entrepreneurs and managers, respectively. The omitted category is employees. Standard errors in parentheses; \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

We continue by testing whether differences in risk preferences can explain entrepreneurs' higher team bids. According to Bäker and Mertins (2013), risk aversion is predicted to be negatively correlated with team bids. Since entrepreneurs on average invest more in the risky gamble than employees (see Panel B of Table 2), controlling for risk preferences is thus expected to shrink the gap in the willingness to pay for the team option. Column (4) of Table 4 shows that this is indeed the case: the point estimate for the difference in bids between entrepreneurs and employees is reduced to €2.81 and is no longer significant once we control for risk aversion.

Entrepreneurs and employees in our sample are very different in terms of all the observed demographic characteristics: age, experience, gender, education and income.<sup>21</sup> In column (5) of Table 4 we observe that

<sup>21</sup>The variable professional experience is highly correlated with age, and is missing for 34 respondents, so we decided not to

controlling for these variables closes the gap between entrepreneurs' and employees' bids completely. We find no impact of gender on the willingness to join teams, replicating the results of Kuhn and Villeval (2014) that men and women are equally likely to join teams in the presence of efficiency gains. Education, on the other hand, is significantly related to the willingness to join teams: all else equal, higher education is positively correlated with team bids. Analyzing the exit survey answers we find suggestive evidence that high- and low-educated respondents in our sample differ in the way they evaluate the team option: the higher educated a respondent, the more she considers the potential gains and the less she is focused on the associated risks.

In sum, a simple comparison of bids reveals a difference in the willingness to pay for the team option by occupation: contrary to our expectations, entrepreneurs in our sample pay *more* for the possibility to join a team than employees, while there is no significant difference in bids between entrepreneurs and managers. However, once we control for confidence, risk preferences and demographic characteristics, the difference disappears: entrepreneurs pay as much for the team option as employees, *ceteris paribus*. As shown in Table B2 in the Appendix, this finding is robust to using stricter definitions of entrepreneurship, such as focusing only on founders, owners of incorporated businesses or majority shareholders. Self-employed individuals with no employees behave similarly to entrepreneurs who have employees. We thus find no support in our data for the hypothesis that entrepreneurs have a stronger preference for payoff autonomy than non-entrepreneurs. This conclusion is supported by respondents' self-reported explanations for their bids, collected at the end of the survey: entrepreneurs were no more likely than others to select the statement "*I wanted to be responsible for my earnings and not depend on others*".<sup>22</sup>

## 4.2 The impact of joint decision making

In this section we analyze the effect of joint decision making on respondents' willingness to pay for the team option by contrasting the bids between the Joint Production treatment (that only entails shared earnings) and the Joint Decision treatment (that entails both shared earnings and a shared investment decision).<sup>23</sup> For now, we focus on choices in Scenario 1.

In the Joint Decision treatment, respondents bid on average 26.91 (with a standard deviation of 15.83) which is only slightly lower than the mean bid of 28.00 in the Joint Production treatment. Figure 3a shows that the distribution of bids is very similar in the two treatments. A Kolmogorov-Smirnov test does not

---

include it in our analysis and focus only on age. All the results presented in this section are robust to including experience instead of age in the analyses. Moreover, since information on income is missing for approximately one third of our sample, it is not included as a control variable in our main specifications, either. Results from regressions including income categories as covariates are very similar to those presented in column (5) and are available from the authors upon request.

<sup>22</sup>Overall, the most selected explanation in the Joint Production treatment was the one emphasizing the monetary benefits of the team option ("*I believed the team option could increase my earnings*"), listed by 39.3% of the respondents. Participants also frequently cited following their intuition (38.9%) and trying to avoid taking too much risk (23.6%). About a fifth of the respondents expressed a preference for control ("*I wanted to be responsible for my earnings and not depend on others*"), while 14.1% based their decision on the belief that they performed better than others. Reassuringly, only about 10 percent of respondents indicated that they made their team bid at random ("It was just a guess").

<sup>23</sup>Table B1 in Appendix B shows that randomization worked and participants are balanced in terms of observable characteristics between the two treatment conditions.

reject the equality of the two distributions ( $p\text{-value}=0.187$ ). The difference in mean bids between the two treatments is not significant even when we perform the comparison within occupational categories, as shown by Figure 3b.

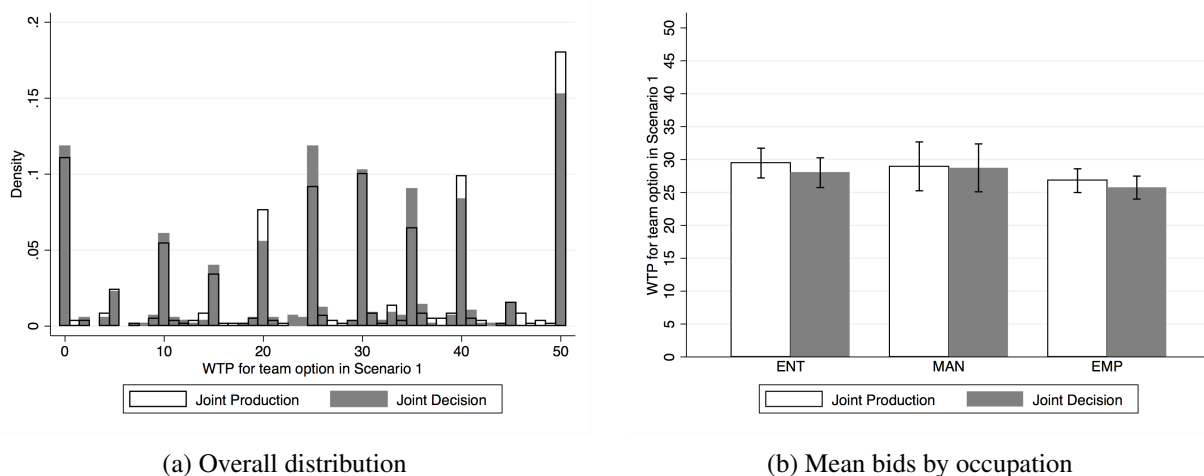
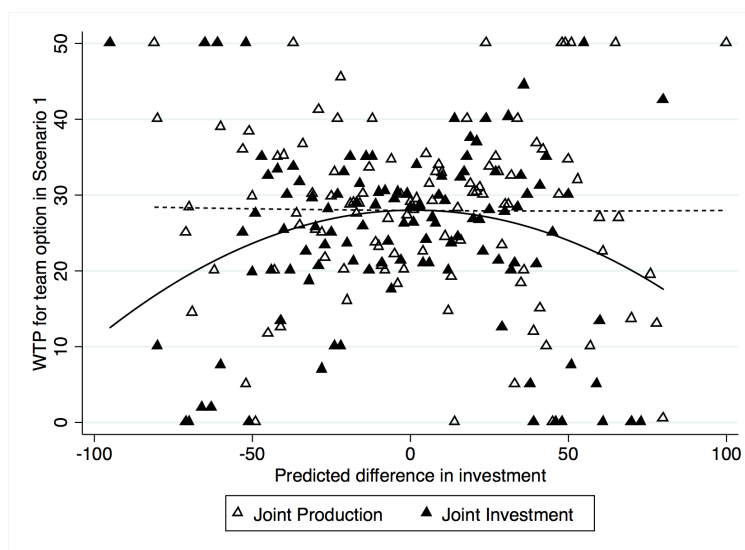


Figure 3: Comparison of bids for the team option between the two treatments



Note: Quadratic fit lines: dotted - Joint Production; solid - Joint Decision treatment.

Figure 4: Bids in the two treatments, by predicted investment difference

We continue our analysis by testing whether participants who expect their potential teammate to make very different investment choices are more discouraged from entering teams that entail joint decision making. Respondents with such beliefs expect that the team's investment decision (formed as the unweighted average of the two teammate's individual choices) will be relatively far away from their own stated prefer-



ences. On the other hand, those respondents who believe their teammate made a similar investment choice have less to lose from joint decision making in terms of departure from their individually optimal risk exposure.

Table 5: COMPARISON OF BIDS BETWEEN TREATMENTS

<i>Dependent variable: bids for the team option in Scenario 1</i>			
	(1)	(2)	(3)
ENT	0.534 (1.527)	0.519 (1.523)	-1.579 (2.809)
MAN	-0.632 (2.061)	-0.711 (2.057)	-0.641 (2.057)
JD treatment	-1.379 (1.228)	1.932 (1.810)	0.979 (2.200)
Predicted abs. diff.	-0.050 (0.035)	0.028 (0.047)	-0.016 (0.058)
JD treatment * Predicted abs. diff.		-0.171** (0.069)	-0.108 (0.085)
ENT * JD treatment			2.823 (3.875)
ENT * Predicted abs. diff.			0.122 (0.098)
ENT * JD treatment * Predicted abs. diff.			-0.178 (0.145)
Controls	✓	✓	✓
Constant	28.930*** (4.609)	26.901*** (4.670)	27.661*** (4.720)
N	1163	1163	1163
Pseudo-R <sup>2</sup>	0.014	0.015	0.015

The table displays estimated coefficients from tobit models (lower limit 0, upper limit 50).

All models include the same control variables as column (5) of Table 4

Standard errors in parentheses: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Figure 4 shows for each level of predicted investment difference (i.e. the difference between one's own Part 2 allocation choice and their guess for their potential partner's investment) the mean bid for the team option in the two treatments (together with estimated quadratic fit lines). The figure suggests that the willingness to join teams in the joint Decision treatment is indeed responsive to the expected investment difference: the larger the discrepancy in either direction, the lower the bid for the team option. Reassuringly, there seems to be no association between the bids and the expected investment difference in the Joint Production treatment.

We explore this idea further in Table 5. Column (1) shows that bids for the team option are not significantly different in case of joint decision making even after controlling for various characteristics of the respondents. Column (2) confirms our interpretation of Figure 4 that joint decision making makes teams less attractive when the gap between the teammate's investment choices is expected to be larger: the interaction term between the indicator for the Joint Decision treatment and the predicted (absolute) difference in

investment choice is significant and negative.<sup>24</sup> In column (3) we test whether this relationship is different among entrepreneurs by including a triple interaction term between the entrepreneur dummy, the treatment dummy and the predicted absolute difference in investment. We find no significant differential response among entrepreneurs, although our estimates are imprecise in this specification.

### 4.3 Characteristics of the teammate

The third aspect of the team formation decision we consider is related to one's potential teammate. In particular, we explore whether offering respondents the chance to form a team with someone from their own occupational category (as opposed to a random survey participant who is equally likely to be an entrepreneur, manager or employee) affects their willingness to join teams. Figure 5 shows the mean difference in bids between Scenario 2 (teammate from own category) and Scenario 1 (teammate from among all respondents) by occupation category and treatment. We find that in both treatments the difference is positive and significantly different from zero for entrepreneurs and managers, that is, they prefer to form teams with someone from their own occupational group. The effect is the opposite for employees who bid significantly less in Scenario 2 than in Scenario 1.

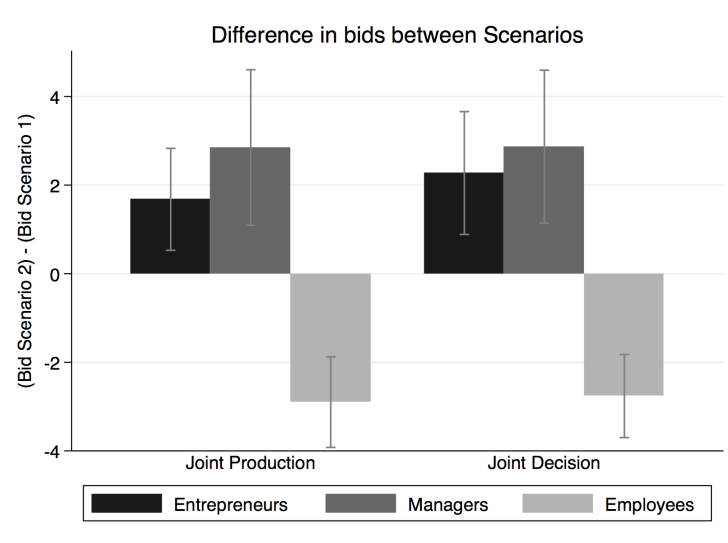


Figure 5: Mean difference in bids between scenarios, by occupation

Table 6 presents results from tobit models explaining Scenario 2 bids for the team option in the Joint production (columns 1-2) and the Joint Decision (columns 3-4) treatment. We find that in both treatments entrepreneurs and managers bid significantly and substantially more than employees. Contrary to Scenario 1 results, we find that controlling for performance, beliefs, risk preferences and demographic characteristics does not fully explain the difference: the estimated coefficients for entrepreneurs and managers remain siz-

<sup>24</sup>We use the absolute value of the expected difference for ease of exposition. Using the actual level of the difference with a quadratic term added leaves our results qualitatively unchanged.

able even after the inclusion of covariates (the estimates are imprecise in the Joint production but significant in the Joint Decision treatment).

These findings are consistent with the status expectations model proposed by Ruef et al. (2003) who predict *differential homophily* among status groups. They assert that teams composed entirely of high-status members will occur more often than those composed of only low-status members. As a prime example of status-dependent associative preferences, Ruef et al. (2003) mention the “old boys network”, i.e. homophily among entrepreneurs and managers.

Table 6: BIDS FOR THE TEAM OPTION IN SCENARIO 2

<i>Dependent variable: bids for the team option in Scenario 2</i>				
	Joint Production		Joint Decision	
	(1)	(2)	(3)	(4)
ENT	9.363*** (2.079)	3.512 (2.247)	9.746*** (1.875)	4.216** (1.967)
MAN	10.299*** (2.903)	2.992 (3.018)	10.686*** (2.626)	4.576* (2.713)
Puzzles correct (actual)		0.147 (0.525)		0.096 (0.435)
Puzzles correct (guess)		-1.950*** (0.614)		-1.798*** (0.589)
Partner's correct (guess)		3.536*** (0.670)		1.124* (0.627)
Risk aversion		-0.175*** (0.034)		-0.139*** (0.034)
Female		-1.025 (1.894)		-1.977 (1.644)
Age		0.123 (0.085)		0.050 (0.074)
Education		2.920*** (1.010)		-0.618 (0.879)
Partner's risk (guess)				0.290*** (0.045)
Constant	23.834*** (1.297)	13.773** (6.254)	22.341*** (1.168)	21.943*** (5.879)
N	588	588	576	575
Pseudo-R <sup>2</sup>	0.006	0.022	0.008	0.033

The table displays estimated coefficients from tobit models (lower limit 0, upper limit 50).

Standard errors in parentheses: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

## 5 Conclusion

Our study presents results from a large-scale incentivized online survey analyzing the decision to sort into teams among entrepreneurs, managers and employees. We differentiate between two team contexts: one that only entails joint production (with uncertain efficiency gains) and one that also involves joint decision making (such that the team's choice is the average of the two teammate's individual allocation choices).

We also test whether characteristics of the potential teammate (in particular, their occupational category) affect respondents' choice to join teams. Our results are in contrast with the popular belief that portrays entrepreneurs as 'lone wolves': we find no difference between entrepreneurs and others in their preferences for team production once we control for demographic characteristics, risk preferences, confidence and beliefs. Entrepreneurs in our sample do not differ in their response to shared decision rights, either. Finally, we find evidence for status-varying homophily among our respondents: while members of high-status groups (entrepreneurs and managers) are more likely to form teams with a potential partner from their own occupational category, entrepreneurs prefer a teammate drawn from among all survey participants rather than employees only.

We would like to stress that the cross-sectional nature of our study only allows us to measure the possible correlation between occupational categories and team preferences, but it does not address the question of causation. Our results do not rule out the possibility that those with a stronger taste for individual work are more likely to become entrepreneurs but they are also more likely to fail and thus less likely to show up in our sample. Similarly, we are not able to tell whether working as an entrepreneur alters people's preferences for teams. To address these issues, a panel data set would be required.

It is also important to note that in our setting joining a team does not involve a total loss of control and authority since payoffs are determined *jointly* and decision rights are not passed on to someone else but *shared*. It is possible that entrepreneurs have a stronger taste for independence in settings where the choice is between individual work and complete delegation. Moreover, in our experiment we intentionally abstract away from several features of real-life teamwork. People receive no feedback about the identity or payoffs of their partners, minimizing the impact of social preferences on the choice to join teams. Neither do we allow any actual interaction between teammates, making preferences for social interactions occurring in teams irrelevant. An interesting avenue for future research is to augment our settings with these aspect and see whether we find more support for the myth of the 'lone wolf entrepreneur'.

## References

- Astebro, T., Herz, H., Nanda, R., and Weber, R. (2014). The behavioral economics of entrepreneurship. *Journal of Economic Perspectives*, 28(3):pp. 49–70.
- Bäker, A. and Mertins, V. (2013). Risk-sorting and preference for team piece rates. *Journal of Economic Psychology*, 34:285–300.
- Bandiera, O., Barankay, I., and Rasul, I. (2013). Team incentives: evidence from a firm level experiment. *Journal of the European Economic Association*, 11(5):1079–1114.
- Bartling, B., Fehr, E., and Herz, H. (2014). The Intrinsic Value of Decision Rights. *Econometrica*, 82:2005–2039.
- Becker, G. M., DeGroot, M. H., and Marschak, J. (1964). Measuring utility by a single-response sequential method. *Behavioral science*, 9(3):226–232.
- Beckman, C. M., Burton, M. D., and O'Reilly, C. (2007). Early teams: The impact of team demography on vc financing and going public. *Journal of Business Venturing*, 22(2):147 – 173.
- Benz, M. and Frey, B. S. (2008). The value of doing what you like: Evidence from the self-employed in 23 countries. *Journal of Economic Behavior & Organization*, 68(3-4):445–455.
- Blanchflower, D. and Oswald, A. (1998). What makes an entrepreneur? *Journal of Labor Economics*, 16:pp. 26–60.
- Burton, M. D., Anderson, P. C., and Aldrich, H. E. (2009). *Owner Founders, Nonowner Founders and Helpers*, pages 115–133. Springer New York, New York, NY.
- Charness, G. and Gneezy, U. (2012). Strong evidence for gender differences in risk taking. *Journal of Economic Behavior & Organization*, 83(1):50–58.
- Cooper, D. J. and Saral, K. J. (2013). Entrepreneurship and team participation: An experimental study. *European Economic Review*, 59:126–140.
- Dargnies, M.-P. (2012). Men too sometimes shy away from competition: The case of team competition. *Management Science*, 58(11):1982–2000.
- Dohmen, T. and Falk, A. (2011). Performance pay and multidimensional sorting: Productivity, preferences, and gender. *The American Economic Review*, pages 556–590.
- Dreber, A., Rand, D., Wernerfelt, N., Garcia, J., Vilar, M., Lum, J., and Zeckhauser, R. (2011). Dopamine and risk choices in different domains: Findings among serious tournament bridge players. *Journal of Risk and Uncertainty*, 43(1):19–38.
- Ernst Fehr, S. G. (2000). Cooperation and punishment in public goods experiments. *The American Economic Review*, 90(4):980–994.
- Fairlie, R. and Robb, A. (2007). Families, human capital, and small business: Evidence from the characteristics of business owners survey. *Industrial and Labor Relations Review*, pages 225–245.

- Fehr, E., Herz, H., and Wilkening, T. (2013). The lure of authority: Motivation and incentive effects of power. *American Economic Review*, 103(4):1325–59.
- Franke, N., Gruber, M., Harhoff, D., and Henkel, J. (2006). What you are is what you like - similarity biases in venture capitalists' evaluations of start-up teams. *Journal of Business Venturing*, 21(6):802 – 826.
- Gneezy, U. and Potters, J. (1997). An experiment on risk taking and evaluation periods. *The Quarterly Journal of Economics*, pages pp. 631–645.
- Gneezy, U. and Rustichini, A. (2000). Pay enough or don't pay at all. *The Quarterly Journal of Economics*, 115(3):791–810.
- Hamilton, B. H., Nickerson, J. A., and Owan, H. (2003). Team incentives and worker heterogeneity: An empirical analysis of the impact of teams on productivity and participation. *Journal of Political Economy*, 111(3):465–497.
- Harrison, G. W. and List, J. A. (2004). Field experiments. *Journal of Economic Literature*, 42(4):1009–1055.
- Herbst, L., Konrad, K. A., and Morath, F. (2015). Endogenous group formation in experimental contests. *European Economic Review*, 74:163–189.
- Herz, H., Schunk, D., and Zehnder, C. (2014). How do judgmental overconfidence and overoptimism shape innovative activity? *Games and Economic Behavior*, 83:pp. 1–23.
- Holm, H., Opper, S., and Nee, V. (2013). Entrepreneurs under uncertainty: An economic experiment in china. *Management Science*, 59(7):pp. 1671–1687.
- Holmstrom, B. (1982). Moral Hazard in Teams. *Bell Journal of Economics*, 13(2):324–340.
- Hurst, E. and Pugsley, B. (2011). What do small businesses do? Technical report, National Bureau of Economic Research.
- Kerr, N. L. and Tindale, R. S. (2004). Group performance and decision making. *Annual Review of Psychology*, 55(1):623–655. PMID: 14744229.
- Kocher, M., Strauß, S., and Sutter, M. (2006). Individual or team decision-making: causes and consequences of self-selection. *Games and Economic Behavior*, 56(2):259–270.
- Kopányi-Peuker, A., Offerman, T., and Sloof, R. (2015). Team Production benefits from a Permanent Fear of Exclusion. Tinbergen Institute Discussion Papers 15-067/VII, Tinbergen Institute.
- Koudstaal, M., Sloof, R., and van Praag, C. (2015). Are entrepreneurs more optimistic than managers? Evidence from a large lab-in-the-field experiment. Unpublished manuscript.
- Koudstaal, M., Sloof, R., and van Praag, C. (forthcoming). Risk, uncertainty and entrepreneurship: Evidence from a large lab-in-the-field experiment. *Management Science*.
- Kuhn, P. and Villeval, M. C. (2014). Are women more attracted to co-operation than men? *The Economic Journal*, 125(582):115–140.

- Laury, S. K. (2006). Pay One or Pay All: Random Selection of One Choice for Payment. Experimental Economics Center Working Paper Series 2006-24, Experimental Economics Center, Andrew Young School of Policy Studies, Georgia State University.
- Masclet, D., Colombier, N., Denant-Boemont, L., and Loheac, Y. (2009). Group and individual risk preferences: A lottery-choice experiment with self-employed and salaried workers. *Journal of Economic Behavior & Organization*, 70(3):470–484.
- Netherlands Bureau for Economic Policy Analysis (2014). Table main economic indicators 2012-2015. <http://www.cpb.nl/cijfer/kerngegevensstabel-2012-2015-voor-het-centraal-economisch-plan-2014>. Accessed: 2015-07-08.
- Parker, S. (2009). *The Economics of Entrepreneurship*. University Press, Cambridge.
- Åstebro, T. and Serrano, C. J. (2015). Business partners: Complementary assets, financing, and invention commercialization. *Journal of Economics & Management Strategy*, 24(2):228–252.
- Raven, J., Raven, J. C., and Court, J. H. (2003). *Manual for Raven's Progressive Matrices and Vocabulary Scales*. San Antonio, TX: Harcourt Assessment.
- Reynolds, P. D. and Curtin, R. T. (2008). Business Creation in the United States: Panel Study of Entrepreneurial Dynamics II. Initial Assessment. *Foundations and Trends in Entrepreneurship*, 4(3):155 – 307.
- Ruef, M., Aldrich, H., and Carter, N. (2003). The structure of founding teams: Homophily, strong ties, and isolation among u.s. entrepreneurs. *American Sociological Review*, 68(2):195–222.
- Sloof, R. and von Siemens, F. (2014). Illusion of Control and the Pursuit of Authority. CESifo Working Paper Series 4764, CESifo Group Munich.

## A Excerpts from the online survey

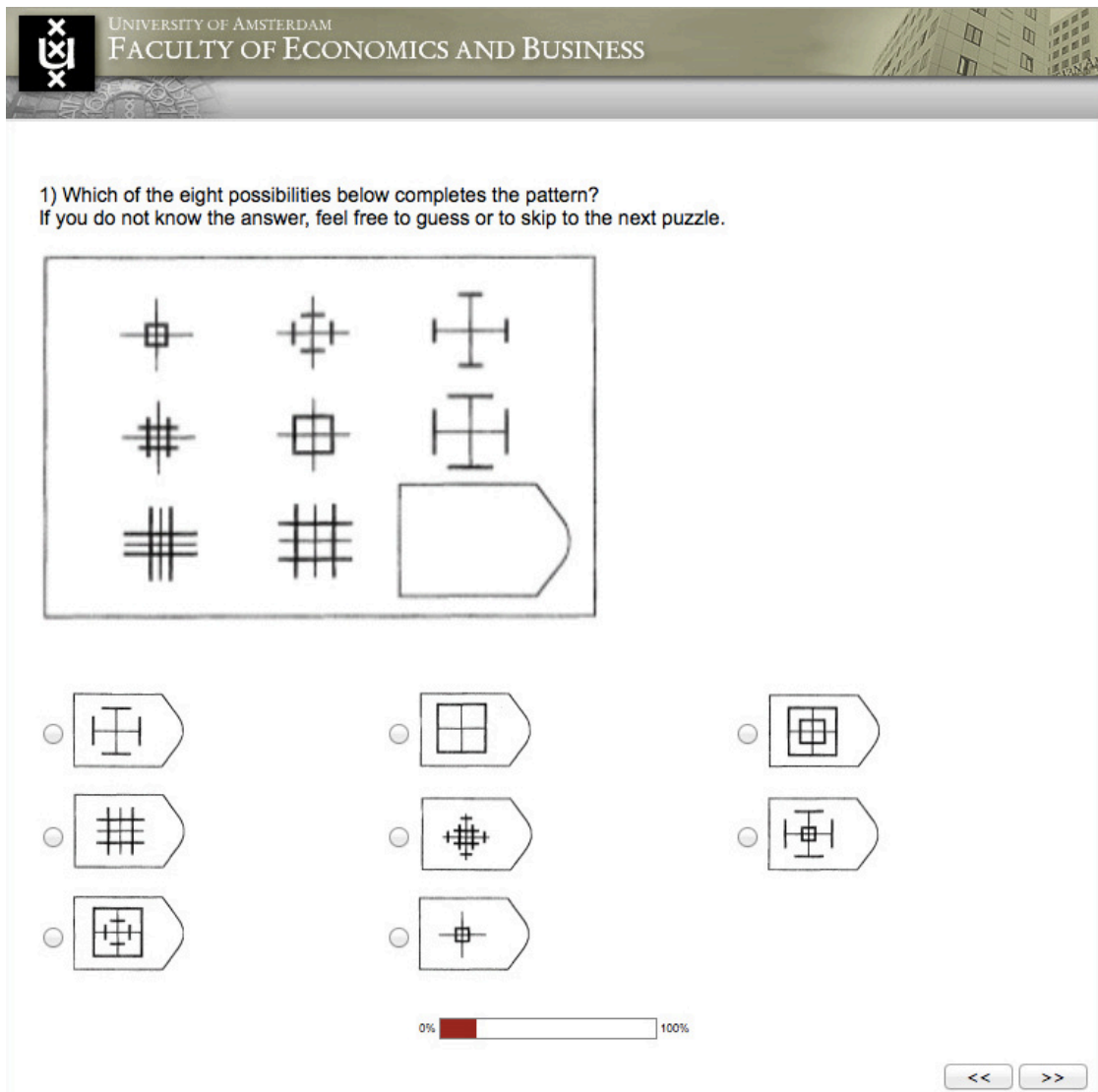


Figure A1: Example of a Raven puzzle



## Part 2: Investment decision

In Part 1 you have accumulated a certain amount (between €0 and €400) by earning €40 for each puzzle you solved correctly. In Part 2 of the survey, we ask you to indicate **what share** of these earnings you would like to invest in a risky bet. Anything you do not invest, you keep with certainty. You may decide to invest any share between 0 and 100% of your earnings.

The risky bet has two possible outcomes:

- with 2/3 (67%) chance, you lose the money you invested
- with 1/3 (33%) chance, you win two and a half times the amount you invested (on top of your investment)

If you are among the 20 prizewinners and you decide to invest a share of your earnings, an additional draw at the civil-law notary will determine the outcome of the lottery, based on the probabilities given above. We can therefore provide no immediate feedback in the survey on whether you have lost or won in the lottery.

Please use the slider below to indicate what share of your earnings you wish to invest in this risky bet.

Share to invest in the risky bet (in %)

0102030405060708090100

0%100%

>>

Figure A2: Measuring risk aversion

**Example:**

*(Please note that the numbers in the example below are hypothetical and convey no information about the actual performance/choices of other respondents.)*

- Imagine you solved puzzles 1 and 2 correctly (Part 1), and chose to invest 60% (Part 2).
- Participant B solved puzzles 2 and 3 correctly (Part 1), and chose to invest 20% (Part 2).
- Participant C solved puzzle 1 correctly (Part 1), and chose to invest 80% (Part 2).

The table below shows **your outcomes**, depending on your choice (team/individual option) and your randomly assigned partner (either B or C).

Your outcomes	Individual	In a team	
		with Participant B	with Participant C
# correct puzzles	2	3	2
Earnings	2*€40	3*€40	2*€40
Investment (share of earnings)	60%	60%	60%

(a) Joint Production treatment

**Example:**

*(Please note that the numbers in the example below are hypothetical and convey no information about the actual performance/choices of other respondents.)*

- Imagine you solved puzzles 1 and 2 correctly (Part 1), and chose to invest 60% (Part 2).
- Participant B solved puzzles 2 and 3 correctly (Part 1), and chose to invest 20% (Part 2).
- Participant C solved puzzle 1 correctly (Part 1), and chose to invest 80% (Part 2).

The table below shows **your outcomes**, depending on your choice (team/individual option) and your randomly assigned partner (either B or C).

Outcomes of Participant A	Individual	In a team	
		with Participant B	with Participant C
# correct puzzles	2	3	2
Earnings	2*€40	3*€40	2*€40
Investment (share of earnings)	60%	40%	70%

(b) Joint Decision treatment

Figure A3: Explaining the team option in the survey

## B Additional figures and tables

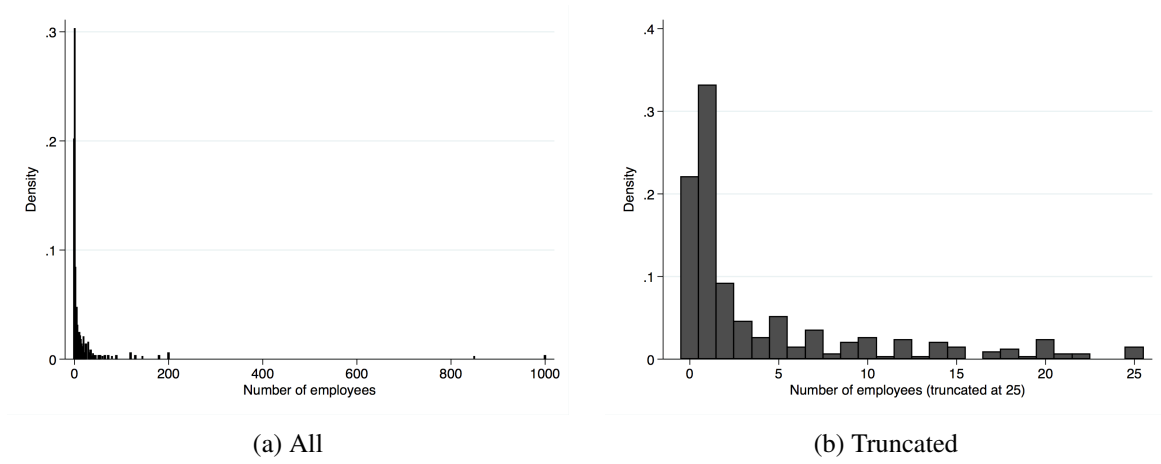


Figure B1: Distribution of the number of employees

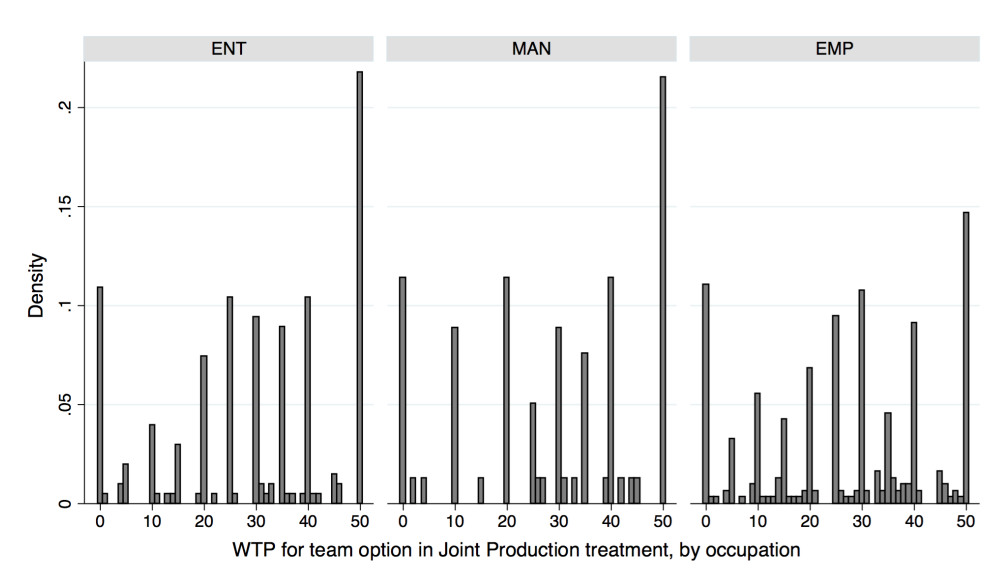


Figure B2: Distribution of bids for the team option in the Joint Production treatment, by occupation

Table B1: TESTING THE SUCCESS OF RANDOMIZATION

	Total sample (N = 1,164)		Joint Production (N = 588)		Joint Decision (N = 576)	
	mean	std. dev.	mean	std. dev.	mean	std. dev.
<i>Panel A: Demographic characteristics</i>						
Age	46.34	11.14	46.69	11.20	45.98	11.07
Professional experience (years) <sup>1</sup>	18.74	11.56	18.86	11.75	18.62	11.40
Female (dummy)	0.40	0.49	0.40	0.49	0.40	0.49
Education (highest degree), share in each category:						
- High school	11%		12%		11%	
- Lower vocational degree	24%		22%		26%	
- College education	41%		41%		40%	
- University	24%		25%		23%	
Income, share in each category						
- < €25,000	18.4%		19.1%		17.7%	
- €25,001 - €50,000	25.6%		24.7%		26.6%	
- €50,001 - €75,000	10.9%		10.2%		11.6%	
- €75,001 - €125,000	8.3%		7.5%		9.2%	
- > €125,000	3.2%		2.9%		3.5%	
- N.A.	33.6%		35.7%		31.4%	
Occupational category:						
- Entrepreneur	35%		34%		34%	
- Manager	13%		14%		13%	
- Employee	52%		52%		53%	
<i>Panel B: Main variables</i>						
Puzzles correct (actual) (0-10)	5.01	2.25	5.06	2.27	4.97	2.22
Puzzles correct (guess) (0-10)	5.73	1.98	5.67	2.03	5.78	1.92
Partner's correct (guess) (0-10)	5.54	1.48	5.54	1.49	5.53	1.47
Investment in risky gamble (0-100)	46.28	27.06	45.74	27.79	46.83	26.31
Partner's investment (guess) (0-100)	47.11	19.29	47.25	19.23	46.96	19.36

<sup>1</sup> This variable measures years of experience in current occupational category and is missing for 34 respondents

Notes: Significance of differences between treatments from t-tests with unequal variances; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table B2: ALTERNATIVE DEFINITIONS OF ENTREPRENEURS

<i>Dependent variable: bids for the team option in Scenario 1</i>					
	All (1)	Founders (2)	Incorporated (3)	Majority shareholders (4)	Zero employees (5)
ENT	0.513 (2.197)	-0.995 (2.581)	1.130 (2.837)	0.015 (2.488)	0.842 (4.304)
MAN	-1.147 (2.936)	-0.840 (2.989)	-0.941 (2.940)	-1.058 (2.895)	0.068 (2.969)
Controls	✓	✓	✓	✓	✓
N	588	501	479	515	414
Pseudo-R <sup>2</sup>	0.015	0.017	0.017	0.017	0.016

Estimated coefficients from tobit models (lower limit 0, upper limit 50). Sample: participants in Joint Production treatment. Entrepreneurs included: Column (1): all; (2): only founders; (3): only incorporated; (4): only majority shareholders; (5): zero employees.

All models include the same control variables as column (5) of Table 4.

Standard errors in parentheses: \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$