

working paper
2017-21

Peer effects and risk-taking among entrepreneurs: Lab-in-the-field evidence

Maria Adelaida Lopera Baena
Steeve Marchand

June 2017



pep
partnership for
economic
policy



Peer effects and risk-taking among entrepreneurs: Lab-in-the-field evidence

Abstract

We study how social interactions influence entrepreneurs' attitudes toward risk. We conduct two risk-taking experiments with young Ugandan entrepreneurs. Between the two experiments, the entrepreneurs participate in a networking activity where they build relationships and discuss with each other. We collect data on peer network formation and on participants' choices before and after the networking activity. We find that participants tend to become more (less) risk averse in the second experiment if the peers they discuss with are on average more (less) risk averse in the first experiment. This suggests that even short term social interactions may affect risk preferences.

Authors

Maria Adelaida Lopera

University of Munich

malopera@econ.lmu.de

Steeve Marchand

Universite Laval

steeve.marchand@ecn.ulaval.ca

Acknowledgements

This study was carried out with financial and scientific support from the Partnership for Economic Policy (PEP) (www.pep-net.org) with funding from the Department for international Development (DFID) of the UK Aid and the government of Canada through the International Development Research Centre (IDRC).

The authors are especially grateful to the team of PEP-researchers (PIERI-12451) lead by Juliet Ssekandi, who allowed us to join her evaluation project to collect experimental data. We also thank Benjamin Kachero and Samuel Galiwango for their extraordinary assistance in the field. We thank Charles Bellemare, Luc Bissonnette, Vincent Boucher, Bernard Fortin and anonymous PEP external evaluator for useful comments that greatly improved the quality of this paper. We are grateful for the support provided by the PEP Research Director of Experimental Impact Evaluations Maria Laura Alzua, and by the PEP Scientific Advisor John Cockburn. This research benefited from collaborations with the Department for Children and Youth at the Ministry of Gender, Labor and Social Development (MGLSD), UNICEF-Uganda and Enterprise Uganda. We thank the Fonds de recherche du Quebec – Societe et culture (FRQSC) and the Social Sciences and Humanities Research Council (SSHRC) for our scholarships.

Table of contents

I.	Introduction	p.2
II.	Experimental design and data	p.6
	2.1. The workshops	
	2.2. The risk-taking experiments	
	2.3. Data	
III.	Social interactions and risk preferences	p.10
	3.1. The empirical models	
	3.2. Estimation and results	
	3.3. Testing for homophily, common shocks ad social learning	
IV.	Conclusion	p.19
	References	p.20
	Appendices	p.23

1 Introduction

Risk preferences play a fundamental role in economic decision-making. For instance, evidence suggests that entrepreneurship is associated with a higher than average tolerance toward risk (Cramer et al., 2002; Ekelund et al., 2005; Ahn, 2010). Risk preferences may also affect businesses' success rates conditional on entry (Caliendo et al., 2010). But what factors contribute to individuals' risk preferences? In this paper, we study the role of social interactions on risk preferences among groups of entrepreneurs. Using an original experimental design, we find a significant impact of conformity on risk-taking. Our findings suggest that even short-term social interactions are sufficient to affect entrepreneurs' risk-taking behaviors.

We conduct lab-in-the-field experiments on risk-taking within workshops organized for young entrepreneurs in Uganda. These workshops also include a networking activity where entrepreneurs develop new relationships and converse with each other. We collect detailed information on who participants converse with during this activity. The entrepreneurs also participate in two risk-taking experiments: one before and one after the networking activity. These two experiments are adaptations of the well-known Holt and Laury (2002) multiple choice lotteries designed to measure risk aversion. The two experiments, combined with data on the peer network formation, provide an innovative experimental design that allows us to capture the causal effect of social interactions on entrepreneurs' choices with respect to risk.

We find significant social conformity effects: Participants tend to make more (less) risky choices in the second experiment if their peers made on average more (less) risky choices in the first experiment. This suggests that social interactions may contribute to shaping risk preferences. An entrepreneur could become more (less) risk averse following a relatively short discussion with a more (less) risk averse entrepreneur. We also distinguish between preferences to conform with *successful* peers (who made the choice that led to the highest payoff given the lotteries' results) from preferences to conform with *unsuccessful* peers (who made the choice that led to the lowest payoff given the lotteries' results). When participants face a set of choices that is directly comparable to the set previously presented to their peers, we find that participants tend to conform with successful peers, but not with unsuccessful ones. However, when

the experiment is slightly different, we find that participants tend to conform with their peers regardless of the outcome.

Our design allows us to control for homophily, which is commonly a challenge in the estimation of peer effects. Homophily is the tendency of individuals to develop relationships with people similar to themselves. This behavior creates a correlation between one’s peer variable (e.g. peers’ average outcome) and his own choice even in the absence of peer effects, leading to identification issues. Attanasio et al. (2012) present evidence that individuals form social networks according to similarities in risk attitudes. However, in their context, as opposed to ours, individuals form networks with the objective of pooling risk. Thus, it is not necessarily the case that this behavior will also occur in our context. Nevertheless, individuals could still develop relationships according to some factors that also affect risk preferences. In other words, the peer network formation may be endogenous. There is a large and expanding literature that seeks to control for endogenous networks (for example, see Goldsmith-Pinkham and Imbens, 2013; Hsieh and Lee, 2016; Arduini et al., 2015; Qu and Lee, 2015; Boucher, 2016). However, controlling for endogeneity necessarily requires strong assumptions.¹ Our design allows us to identify peer effects in the presence of homophily under weaker assumptions. We use choices made in the two experiments to control for time-invariant individual characteristics through a first-difference approach. Assuming that individuals develop relationships based on these time-invariant characteristics is sufficient to rule out that the relationship between one’s choice and those of her peers is caused by homophily. Furthermore, we can directly test for homophily effects. The choices made in our first experiment cannot possibly result from peer effects, because this experiment takes place before the networking activity. Therefore, the observed similarities between individuals’ choices and those of the future peers they have not yet met can be used to identify homophily effects. We find no evidence of homophily according to characteristics that affect risk choices.

We also study the impact of social interactions on the consistency of individuals’ choices. Indeed, in multiple choice lotteries experiments, some combinations of choices

¹For example, Goldsmith-Pinkham and Imbens (2013) assume that there exist two unobserved types of individuals and that those of the same type have a greater probability to become peers. Together with other distributional assumptions, this allows them to write the joint likelihood of the observed outcomes and peer network.

are inconsistent with standard risk preferences. We therefore test for homophily effects according to characteristics that affect the consistency of choices. We find that participants who make (in)consistent choices tend to develop relationships with individuals who also make (in)consistent choices. We finally test for social learning peer effects that would cause individuals to make more consistent choices if the peers they met made more consistent choices. We find no evidence of such social learning effects.

We contribute to the literature on the formation of risk preferences, as well as the literature on peer effects and risk-taking. Firstly, there is a growing literature that suggests risk preferences vary across contexts (Barseghyan et al., 2011) and over time (Baucells and Villasís, 2010).² Understanding the factors that drive these variations is of particular importance to understand decisions about becoming an entrepreneur. Evidence suggests that family dynamics are important in shaping individuals' preferences toward entrepreneurship. Dunn and Holtz-Eakin (2000) find that parental entrepreneurial experience is a stronger predictor of entrepreneurship than individual or parental wealth. This correlation may result from both *nature* and *nurture* factors, but evidence suggests nurture factors play a larger role (Lindquist et al., 2015). The social context outside of the family can also shape individuals' attitudes toward risk and entrepreneurship, or their beliefs or confidence about the expected returns of starting a business. For instance, having entrepreneurial peers could create non-monetary benefits of running a business (Giannetti and Simonov, 2009). Nanda and Sørensen (2010) find that individuals are more likely to become entrepreneurs if they work with peers who have previously been entrepreneurs. They argue that past workers' experience may spill over to their coworkers by influencing their entrepreneurial skills, knowledge or motivation. Our paper explores the complementary idea that entrepreneurs' risk preferences may also spill over to others through peer effects.

Secondly, our paper contributes to the expanding literature on peer effects on decisions made under risk. Bursztyn et al. (2014) study peer effects on the purchase of financial assets in a field experiment conducted at a financial brokerage. They find evidence of peer effects driven by both social learning (i.e. learning from peers) and social utility (i.e. utility that results directly from a peer's possession of an asset).

²Risk preferences may also be affected by emotional states such as joviality, sadness, fear and anger (Conte et al., forthcoming), or by stress (Cahlíková and Cingl, 2017).

Ahern et al. (2014) conduct an experiment about peer effects on risk aversion among MBA students and find significant peer effects. Gioia (2016) conducts a lab experiment and finds that the intensity of peer effects on risk-taking is determined in part by group identity: when peers are matched according to interest, the influence they exert on each other is greater. This suggests that peer effects might be important in our context, as our participants all share a common entrepreneurial identity.

Lahno and Serra-Garcia (2015) conduct a laboratory experiment to investigate whether participants' decisions about risk are influenced by their peers. They find that peer effects on risk-taking seem to be driven by a desire to conform with peers' choices. They argue that this implies that policymakers who seek to influence behaviors related to risk-taking (e.g. decisions to purchase insurance or acquire or repay debt) could publicly inform others about choices made by the population. This implication is particularly relevant for our paper, as we study real entrepreneurs. Our participants are people who need to finance their business projects with loans (this is discussed in detail in the next section). A policymaker could easily inform entrepreneurs about borrowing or insurance choices made by other entrepreneurs (for example, in an activity organized for them such as our workshops). He could also decide to make certain choices public in order to encourage specific behaviors (e.g. posting only the names of entrepreneurs who choose to insure their business). The policymaker could finally create networking activities aimed at discussing risk-taking decisions. These activities may generate social conformity effects that would push behaviors toward the average behavior, reducing excessive risk-taking and increasing risk tolerance for excessively risk averse individuals.

The next section describes our experimental design and data. Section 3 models participants' risk choices and presents the estimation of the social conformity effects. Section 4 concludes.

2 Experimental Design and Data

2.1 The Workshops

We contributed to the organization of six two-day workshops, along with the Partnership for Economic Policy,³ a group of local researchers and UNICEF Uganda. The workshops took place in early 2014 in several locations in Uganda.⁴ Their primary aim was to evaluate and improve financial literacy among young Ugandan entrepreneurs. The workshops included training in finance and business planning, as well as a networking activity where entrepreneurs could share their knowledge with each other. Within each workshop, we ran two experiments on risk-taking: one before and one after the networking activity.

Entrepreneurs were recruited using U-report, a free Short Message Service (SMS) platform created and managed by UNICEF to engage Ugandan youth into policymaking and governance. In 2014 the platform counted around 200,000 subscribers across Uganda.⁵ The first contact was an SMS message asking, “Are you an entrepreneur below 35 years old?”⁶ If the answer was affirmative, a second SMS message was sent: “Would you be interested in obtaining a credit loan from the Youth Venture Capital Fund?” This question aimed at selecting only entrepreneurs who were considering a business loan. If the answer was affirmative again, the potential participant received a phone call from a recruiter. The recruiter asked whether the potential participant was available for a two-day workshop near his/her home. Interested individuals were invited to the workshop, and the potential participant either accepted or rejected the invitation.

In total, 540 entrepreneurs participated in one of the workshops. Upon arrival, participants completed a survey about their sociodemographic characteristics. All subjects then participated in an initial risk-taking experiment, which we describe in the next subsection. After this experiment, subjects proceeded to the networking activity, which included a lunch and a discussion time. All participants in a given workshop were in

³www.pep-net.org.

⁴Four workshops took place in the districts of Wakiso, M'bale, Gulu and M'barara. The other two workshops took place in the capital city of Kampala.

⁵The average age was 24 years old and 23% were female. Interested readers can visit www.unicef.org/uganda/voy.html for more information about the U-report platform.

⁶We sent a total of 2,278 text messages in large cities.

the same room for both the lunch and the discussion time, which together lasted three to four hours. After the networking activity, we asked participants to write the names and identification numbers of up to seven participants with whom they had spent the most time chatting. They also had to identify each relationship as either an extended family member, a friend from before the workshop, or a person they met at the workshop. Once all participants had completed this questionnaire, a random sample of half the participants in each workshop (258 in total) was chosen to participate in a second risk-taking experiment, also described in the next subsection.⁷ The first day of the workshop then ended and participants returned home. The second day of the workshop included training in finance and business planning, which are outside the scope of this paper.

2.2 The Risk-Taking Experiments

All subjects participate in the first risk-taking experiment, which takes place before the networking activity. The experiment is an adapted version of the well-known Holt and Laury (2002) experiment designed to measure risk preferences. It consists of nine games in which participants must choose between two lotteries: a safe lottery or a risky lottery, with the risky lottery having more variability between the potential payoffs. Each game is presented to participants in the form of a big transparent box containing 40 large white and black balls. The white balls represent low payoffs and black balls represent high payoffs. The proportion of black balls is low in the first game and increases in each subsequent game. Participants also receive a paper questionnaire that provides them with the exact proportion of the two colors in each box. They are told that after all decisions are made, only one box (only one of the nine games) will be selected at random, with one ball selected at random from inside that box. They will then be paid according to this ball’s color and the choice they made in the corresponding game. Decisions are made individually and participants are not allowed to consult each other. Appendix D provides additional details about how the experiment is presented to participants.

Table 1 presents the two possible payoffs for each lottery. The amounts are sub-

⁷Participants who were not selected for the second experiment received training in finance and business planning that was also part of the workshop, but which we do not address in this paper.

stantial. For example, 10,000 Ugandan shillings (UGX), the highest possible payoff, represents more than 16 hours of work at Uganda’s 2012-13 median wage.⁸

Table 2 shows the probability that the high payoff ball is picked for each game. It is low in the first game and increases for each game, so that the incentive to choose the risky lottery increases in each game. The last column shows the difference in expected payoffs between choosing the safe lottery and choosing the risky lottery. The combination of choices made by an individual is informative of his preferences. For example, a risk-neutral individual should choose the safe lottery in games 1 to 4, and then switch to the risky lottery in games 5 to 9. Our main variable of interest — the number of safe choices — is the number of games in which the individual chooses the safe lottery. It ranges from 0 (all risky choices) to 9 (no risky choices). A risk-neutral individual should therefore make four safe choices, because he would choose the safe lottery from games 1 to 4.

Table 1: Game payoffs (in UGX)

	Return	
	Low	High
Safe lottery	4,000	6,000
Risky lottery	1,000	10,000

Table 2: Probability of high payoff in each game

Game	Probability of high payoff	Expected payoff difference: safe - risky (in UGX)
1	1/10	2,300
2	2/10	1,600
3	3/10	900
4	4/10	200
5	5/10	-500
6	6/10	-1,200
7	7/10	-1,900
8	8/10	-2,600
9	9/10	-3,300

In theory, a participant should not switch his choice more than once. That is, if a participant chooses the safe lottery in game k and the risky lottery in game $k + 1$, it

⁸The median monthly earning in Uganda was about 110,000 UGX in 2012-13 for a paid employee, with the average work week comprised of approximately 41 hours. Because a month comprises 4.35 weeks on average, the average hourly earning is about 617 UGX per hour (see page 12 of the Uganda National Household Survey of 2012-13 [UBOS, 2014]).

would be inconsistent to switch back to the safe lottery in game $k + 2$. In practice, in our experiment as in other studies, some participants do switch more than once.⁹ This could be the result of a participant misunderstanding the experiment or having difficulty calculating the expected outcomes of each lottery. In the following sections, we will refer to a second outcome of interest: the consistency of choices, a dummy variable that equals one if the participant switches no more than once, and zero otherwise.

In the second experiment (after the networking activity), within each workshop, each participant is randomly assigned to one of two subgroups. This creates 12 subgroups in total. Some subgroups replay the original experiment. The other subgroups play three different versions of the experiment, where we introduce an ambiguity component. For these groups, in the second experiment, a small proportion of the balls are wrapped in opaque bags so that participants cannot see whether they are black or white. The proportion of balls of unknown color in the low, medium and high ambiguity groups are 5%, 10% and 15% respectively and remain fixed in all nine games. Participants are not provided any information about the distribution of the colors of the hidden balls. As for the balls that are not hidden, the proportions of white and black balls remain as described in Table 2. As we will see in Section 3, we will test whether there are any difference in peer effects when individuals face ambiguity. Appendix D provides details on all the experiments.

2.3 Data

Table 3 summarizes the data collected from the sociodemographic questionnaire, peer network questionnaire and the two risk-taking experiments' results. The average number of safe choices in the first experiment is 4.61 and slightly increases to 4.81 in the second experiment. The standard deviation of the differences in participants' number of safe choices in the two experiments is 1.80. This indicates that the number of safe choices varies upward and downward between the two experiments, even though the aggregate change is relatively small. The proportion of participants who make consistent choices in the first experiment is 54% and increases to 69% in the second second experiment. This increase could, among other things, be the result of playing the game

⁹For example, see Holt and Laury (2002) and Jacobson and Petrie (2009).

a second time or of social learning effects.

On average, participants identify 4.54 peers who they met at the workshop and 1.76 peers who they knew before the workshop. Although we do not distinguish between these two types of peers in our main results, Appendix C shows that the significance of the peer effects we estimate in Section 3 mainly results from interactions between peers who have met at the workshop, ruling out the concern of social interactions that could have occurred before the networking activity.

After the second experiment, we asked participants to identify the main reason why they changed their choices between the two experiments (if they did change their choices). Table 4 presents the frequency of each possible answer among participants who reported having changed their choices. Almost 42% answered that the discussions they had with their peers during the networking activity had changed their mind. This suggests that participants discussed the experiment and choice strategies during the networking activity, even though we did not instruct them to. It also suggests that they influenced each others in these discussions.

3 Social Interactions and Risk Preferences

3.1 The Empirical Models

We model utility as a trade-off an individual faces: making choices according to his own characteristics or according to his or her peers' choices. As participants' choices involve choosing between safe and risky lotteries, we let the choice variable be y_{ir} , the number of safe choices individual i made in experiment $r \in \{1, 2\}$, where $r = 1$ is the first experiment (before the networking activity) and $r = 2$ is the second (after the networking activity). In the first experiment, individuals do not face the trade-off because they do not know their peers' choices, so participants simply choose y_{i1} according to their own characteristics. We represent this problem by a utility function that penalizes him more if he chooses a value of y_{i1} that is further from his

Table 3: Summary statistics

	Mean	SD	Min.	Max.	Obs.
Number of safe choices (0 to 9)					
1st experiment	4.61	1.86	0	9	540
2nd experiment	4.83	1.91	0	9	258
Difference between 2nd and 1st	0.26	1.81	-6	7	258
Consistence of choices (0 or 1)					
1st experiment	0.54	0.50	0	1	540
2nd experiment	0.69	0.46	0	1	258
Difference between 2nd and 1st	0.16	0.56	-1	1	258
Experiments' payoffs (in UGX)					
1st experiment	5,025	3,193	1,000	10,000	540
2nd experiment	4,852	3,184	1,000	10,000	244
Number of peers					
Met at the workshop	4.52	2.35	0	7	540
Family, friends, other	1.76	2.15	0	7	540
Age	26.63	4.41	17	50	540
Male	0.82	0.38	0	1	540
Education level					
Primary	0.14	0.34	0	1	540
Secondary	0.30	0.46	0	1	540
Technical	0.30	0.46	0	1	540
University	0.26	0.44	0	1	540
City					
Kampala 1	0.17	0.37	0	1	540
Kampala 2	0.14	0.35	0	1	540
Wakiso	0.17	0.37	0	1	540
M'bale	0.19	0.39	0	1	540
Gulu	0.19	0.39	0	1	540
M'barara	0.15	0.35	0	1	540
Ambiguity level in 2nd exp.					
None	0.19	0.40	0	1	258
Low	0.33	0.47	0	1	258
Medium	0.30	0.46	0	1	258
High	0.17	0.38	0	1	258

Table 4: Self-reported reasons for changing choices in the 2nd experiment

Why did you change any of your choices?	Freq.	Percent
I did not understand the first time	18	12.08
The game was different	49	32.89
Discussions with others changed my mind	62	41.61
I lost the first time	20	13.42
Total	149	100

characteristics:¹⁰

$$U_{i1}(y_{i1}) = -\frac{1}{2}(y_{i1} - \alpha_1 - \mathbf{x}_i\boldsymbol{\beta} - \eta_i - \epsilon_{i1})^2, \quad (1)$$

where \mathbf{x}_i is a vector of individual i 's observed characteristics and η_i is the effect of his or her unobserved characteristics. Both \mathbf{x}_i and η_i are constant over time (i.e. $\forall r \in \{1, 2\}$). These characteristics may affect the individual's idiosyncratic risk preferences. Thus, we allow for these preferences to be specific to the individual and to be a function of individual characteristics. This is consistent with the literature, which finds differences in risk preferences across individuals (for example, see Croson and Gneezy (2009), who find gender-based differences in risk preferences). The error term ϵ_{i1} is specific to i and to the first experiment. It allows for shocks, such as stress or other emotions, which might temporally affect preferences (see Cahlíková and Cingl (2017) and Conte et al. (forthcoming)). The error term also acknowledges that we do not directly observe risk preferences, but rather an imperfect measure of it.¹¹ Thus, in the spirit of Baucells and Villasís (2010), the number of safe choices y_{i1} could be the result of both risk preferences and a random error component. This utility function does not intend to measure individuals' values of a structural parameter of risk preferences (e.g. as a CRRA utility would). In our view, this function is the simplest estimable empirical model that acknowledges that utility is a trade-off between the individual's own characteristics and

¹⁰See Bisin et al. (2006) and Boucher (2016) for other examples that model this trade-off in a similar way.

¹¹Preference elicitation methods other than Holt and Laury (2002) lotteries could lead to different measures (Anderson and Mellor, 2009).

their peers' choices. The first-order condition is:

$$y_{i1} = \alpha_1 + \mathbf{x}_i\boldsymbol{\beta} + \eta_i + \epsilon_{i1}. \quad (2)$$

In the second experiment ($r = 2$) after the networking activity, participants face a trade-off between staying true to their own characteristics and conforming with their peers' choices.¹² We model social conformity using two specifications: homogeneous peer effects, where participants partly conform with the average behavior of their peers, and heterogeneous peer effects, where participants may conform differently with different peers according to the first experiment's results.

3.1.1 Homogeneous peer effects specification

We assume that individual i in the second experiment maximizes the following utility function:

$$U_{i2}(y_{i2}) = -\frac{1}{2}(y_{i2} - \alpha_1 - \alpha_2 - \alpha_2^g - \mathbf{x}_i\boldsymbol{\beta} - \delta W_i - \eta_i - \epsilon_{i2})^2 - \frac{\theta}{2} \left(y_{i2} - \frac{1}{n_i} \sum_{j \in N_i} y_{j1} \right)^2 \quad (3)$$

where n_i is i 's number of peers and N_i is his set of peers. The first part on the right-hand side is the private component of the utility function and the second is its social component. Utility is decreasing with the distance between the individual's choice and the average choice of his peers. We allow for the possibility that playing the experiment a second time affects risk choices in some way through the parameter α_2 . We also include α_2^g , a dummy variable specific to the ambiguity-level fixed effect $g \in \{none, low, medium, high\}$ (recall from the last section that participants in the second experiment are randomly assigned to games with different ambiguity levels). We thus allow for each of these four games to have a different effect on the utility that results from choices. We set the reference category to $g = none$ so that $\alpha_2^{none} = 0$. W_i

¹²Throughout this paper, we refer to the peer effects we find as social conformity effects because we believe this is the most convincing mechanism in our setting. However, we cannot completely rule out that these peer effects are driven by other mechanisms, for example a social learning effect that would cause individuals to become more or less risk averse. We test for social learning effects on the consistency of choices in Appendix A and find no significant effect. In our view, this makes social learning effects on risk preferences less convincing as well.

is the individual's payoff from the first experiment (divided by 1,000), so that δ may capture wealth effects.¹³ The parameter θ is the social conformity effect, modeled as a preference to conform with peers' average behavior. We allow this parameter to differ depending on whether the participant faces ambiguity or not, so that we have:

$$\theta = \begin{cases} \theta_{na} & \text{if } g = \text{none}, \\ \theta_a & \text{otherwise.} \end{cases} \quad (4)$$

Therefore, θ_{na} is the social conformity effect of participants who participate in the exact same experiment the second time, whereas θ_a is the social conformity effect for those who participate in one of the games that includes ambiguity.¹⁴ Substituting equation (2) into equation (3) yields:

$$U_{i2}(y_{i2}) = -\frac{1}{2}(y_{i2} - y_{i1} - \alpha_2 - \alpha_2^g - \delta W_i - \epsilon_i)^2 - \frac{\theta}{2} \left(y_{i2} - \frac{1}{n_i} \sum_{j \in N_i} y_{j1} \right)^2 \quad (5)$$

where $\epsilon_i \equiv \epsilon_{i2} - \epsilon_{i1}$. Importantly, this first-difference approach in the private component of the utility function writes off $\mathbf{x}_i\beta$ and η_i . The first-order condition is:¹⁵

$$y_{i2} = \frac{1}{1 + \theta} \left(\alpha_2 + \alpha_2^g + y_{i1} + \delta W_i + \frac{\theta}{n_i} \sum_{j \in N_i} y_{j1} + \epsilon_i \right). \quad (6)$$

Equation (6) provides an empirical model we can estimate. The model allows us to bypass usual empirical challenges in the estimation of peer effects. First, the peer variable $(\frac{1}{n_i} \sum_{j \in N_i} y_{j1})$ is predetermined, ruling out endogeneity issues and the reflection problem described by Manski (1993), which arises when the dependent variable and the peer variable are simultaneously determined. Second, the model implicitly controls for homophily (i.e. the tendency individuals have to develop relationships with people similar to themselves). Homophily is usually a concern in the estimation of

¹³The results we will present are robust to using the logarithm of the payoff instead, or to not controlling for the payoff.

¹⁴Separate peer effect estimates for all levels of ambiguity (*low, medium, high*) are available upon request.

¹⁵If the individual has no peers ($n_i = 0$), the utility function simplifies to $U_{i2}(y_{i2}) = -\frac{1}{2}(y_{i2} - y_{i1} - \alpha_2 - \alpha_2^g - \delta W_i - \epsilon_i)^2$ and the first-order condition becomes $y_{i2} = \alpha_2 + \alpha_2^g + y_{i1} + \delta W_i + \epsilon_i$. Only one individual in our sample did not report having any peers. As we will see below, we estimate the model using nonlinear least squares, which allows to estimate this individual's first-order condition jointly with those of other individuals. Furthermore, all the results we present are robust to removing this individual.

peer effects. Individuals may match according to observable variables (e.g. gender, age, education), which is generally not a problem because these variables' effects can be controlled for. A more important concern is the possibility of homophily according to unobserved characteristics that might affect the variable of interest. In our model, this would mean that individuals with similar values of η_i would tend to become peers. This would imply a correlation between y_{ir} and the average outcome of i 's peers even in the absence of peer effects. Fortunately, our first-difference approach in the private component of the utility function cancels out η_i in equation (5). Our identification strategy relies on the assumption that individuals do not choose peers based on their values on ϵ_{i1} and ϵ_{i2} . There may be homophily based on unobserved characteristics that affect risk choices in both experiments (η_i), but we assume the remaining error term ϵ_i is independent of peers' average outcome.

3.1.2 Heterogeneous peer effects specification

We now allow for heterogeneous peer effects between *successful* peers and *unsuccessful* peers. We define being successful (unsuccessful) as having made the choice that led to the highest (lowest) payoff given the game and the ball that were picked at random in the first experiment. Let N_i^s be the set of peers of i who were successful in the first experiment and N_i^u be the set of peers who were unsuccessful. Additionally, let n_i^s and n_i^u be the respective numbers of i 's peers in these two groups (so $n_i = n_i^s + n_i^u$). Our model with heterogeneous peer effects becomes:

$$U_{i2}(y_{i2}) = -\frac{1}{2}(y_{i2} - y_{i1} - \alpha_2 - \alpha_2^g - \delta W_i - \epsilon_i)^2 - \frac{\theta^s n_i^s}{2n_i} \left(y_{i2} - \frac{1}{n_i^s} \sum_{j \in N_i^s} y_{j1} \right)^2 - \frac{\theta^u n_i^u}{2n_i} \left(y_{i2} - \frac{1}{n_i^u} \sum_{j \in N_i^u} y_{j1} \right)^2, \quad (7)$$

where θ^k is the social conformity effect for the peer group $k \in \{s, u\}$, modeled as a preference to conform with this group's average behavior. The relative importance of each group is weighted by the proportion of peers in each category n_i^k/n_i . The

first-order condition is:

$$y_{i2} = \frac{n_i}{n_i + \theta^s n_i^s + \theta^u n_i^u} \left(\alpha_2 + \alpha_2^g + y_{i1} + \delta W_i + \frac{\theta^s}{n_i} \sum_{j \in N_i^s} y_{j1} + \frac{\theta^u}{n_i} \sum_{j \in N_i^u} y_{j1} + \epsilon_i \right), \quad (8)$$

which we use as an empirical model for estimation.

3.2 Estimation and Results

We estimate our two specifications (equations 6 and 8) using nonlinear least squares (NLS). NLS relies on the assumption that the expected value of the error term, conditional on explanatory and predetermined variables, is zero. Thus, it relies on weaker assumptions than other nonlinear methods, such as maximum likelihood estimation, that rely on distributional assumptions.¹⁶ Table 5 presents the results for our two specifications. We use the sandwich estimator of variance to calculate standard errors. Column (a) shows the estimates for the homogeneous peer effects specification. The peer effect θ_{na} (for those who participated in the same experiment the second time) is 0.783 and is significant at the 10 percent level. Thus, the estimated marginal effect (the effect of a one unit increase in peers' average number of safe choices) is $\hat{\theta}_{na}/(1 + \hat{\theta}_{na}) = 0.439$. For the participants who participated in a treatment with ambiguity the second time, we find a lower social conformity effect ($\hat{\theta}_a = 0.627$). This effect is more precisely estimated and significant, possibly because of the higher number of participants who participated in a treatment with ambiguity. As described in Appendix D, 50 of the 258 participants played the exact same experiment the second time (without ambiguity). While the significance of our estimate of $\hat{\theta}_{na}$ is driven by these 50 observations, the significance of our estimate of $\hat{\theta}_a$ is driven by the rest of the sample.

Column (b) presents the results of the heterogeneous specification. For those who participated in the same experiment (without ambiguity) the second time, we find that participants tend to conform with their peers who were successful the first time. Conversely, we find a negative but not statistically significant conformity effect from peers who were unsuccessful. Furthermore, we reject the null hypothesis that social conformity effects from successful and unsuccessful peers are equal. On the contrary,

¹⁶See chapter 5 of Cameron and Trivedi (2005) for explanations on nonlinear estimators.

for participants who played a different game (with ambiguity) in the second experiment, we find positive social conformity effects from the two peer groups and do not reject that the two are equal. This suggests that peer effects can arise differently depending on whether or not the choices available are directly comparable to the observed peer choices. When this is not the case, individuals may simply conform with their peers' choices regardless of the outcome. Overall, our findings suggest a significant impact of conformism on risk-taking decisions. We also find that having won a higher payoff in the first experiment tends to make individuals more willing to take risks.

3.3 Testing for homophily, common shocks and social learning

As mentioned previously, our model implicitly controls for homophily because of the first difference approach in the private component of the utility function. Nevertheless, we test for the presence of homophily in Appendix B. Homophily according to observable characteristics can be tested for by looking at whether individuals tend to be peers with others who share these observable characteristics. Furthermore, because we observe behaviors before social interactions occur, we can also test for homophily on unobservable characteristics that affect the outcome. We do so by testing for correlations in outcomes between future peers who have not yet met. This correlation cannot possibly come from peer effects and should therefore be attributable to homophily. Appendix B provides no evidence of homophily according to observable or unobservable characteristics that affect the number of safe choices. That is, our results provide no evidence that peers have similar risk preferences before they meet and discuss with each other. This also rules out unobserved common shocks among peers that could affect the number of safe choices in the first experiment (i.e. a correlation between peers' η_i or ϵ_{i1}).

However, Appendix B shows that participants who make (in)consistent choices tend to develop relationships with participants who also make (in)consistent choices, suggesting the presence of homophily based on cognitive skills. We then test in Appendix A for the presence of another type of peer effect : social learning. We estimate another empirical model where the probability of making consistence choices may, in the sec-

Table 5: Peer effects on the number of safe choices -
Nonlinear least squares estimation

	Hom. effects (a)	Het. effects (b)
peer effect - no ambiguity θ_{na}	0.783* (0.459)	
peer effect - ambiguity θ_a	0.627*** (0.184)	
peer effect (successful peers) - no ambiguity θ_{na}^s		1.207** (0.594)
peer effect (unsuccessful peers) - no ambiguity θ_{na}^u		-0.935 (0.734)
peer effect (successful peers) - ambiguity θ_a^s		0.387** (0.164)
peer effect (unsuccessful peers) - ambiguity θ_a^u		1.261** (0.496)
second exp. effect α_2	1.122* (0.594)	1.439** (0.602)
1st exp payoff effect δ (in thousands of UGX)	-0.200*** (0.069)	-0.223*** (0.073)
p -value $H_0 : \theta_{na}^s = \theta_{na}^u$		0.05
p -value $H_0 : \theta_a^s = \theta_a^u$		0.09
number of observations	258	258
Ambiguity fixed effects α_2^g	Yes	Yes
*** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.1$		

ond, experiment, be affected by discussion with peers. After controlling for homophily, we find no evidence of social learning effects on the consistency of choices.

4 Conclusion

In this paper, we combine information on the formation of a network of entrepreneurs with observations from a field experiment on choices under risk before and after social interactions occur. This design allows us to estimate social conformity effects while controlling for homophily. We find that entrepreneurs tend to conform with their peers' choices, which suggests that social interactions play a role in shaping risk preferences.

Interestingly, Herbst and Mas (2015) compare peer effects on workers' output estimated in the lab to those estimated in the field in a meta-analysis. They find that peer effects estimates in the lab generalize quantitatively. If their results also apply in the context of peer effects on risk-taking, our results imply that a policymaker could influence entrepreneurs' real life risk-related choices, such as decisions about loans or insurance, by making other entrepreneurs' choices public. He could also influence risk-taking behaviors by organizing networking activities aimed at discussing risk-taking decisions. Social conformity effects may push behaviors toward the average behavior, reducing excessive risk-taking behaviors and increasing risk tolerance for excessively risk averse individuals.

The social interactions captured in our experiment are authentic; we do not influence the network formation or the discussions participants have. Furthermore, the peer effects we estimate result from a three- to four-hour-long networking activity. Our finding that these few hours of free discussion time are enough to influence one's choices raises the question of whether more durable interactions would have an even greater effect. When people develop long-lasting social relationships, long-lasting peer effects may contribute to shaping individuals' risk attitudes in the long run. Dohmen et al. (2012) find evidence that long-run risk attitudes are shaped during childhood through attitudes transmitted by parents and local environment. Our findings provide evidence that the transmission of risk attitudes may continue into adulthood.

Our results also raise the issue of the direction of the causal relationship between risk preferences and the decision to start a business. If individuals who start a business

enter a social world of entrepreneurs who tend to have higher risk tolerances, entry into entrepreneurship might cause more risk-taking. Cramer et al. (2002) raise the possibility of reverse causality, finding a negative effect of risk aversion on entry into entrepreneurship but questioning the causality of the relationship. Brachert and Hyll (2014) find that entry into entrepreneurship is associated with an increased willingness to take risks and argue that this entry may cause a change in risk attitudes for several reasons; our evidence suggests that social interactions with other entrepreneurs could be one of these reasons.

References

- Ahern, K. R., R. Duchin, and T. Shumway (2014). Peer effects in risk aversion and trust. *Review of Financial Studies* 27(11), 3213–3240.
- Ahn, T. (2010). Attitudes toward risk and self-employment of young workers. *Labour Economics* 17(2), 434–442.
- Anderson, L. R. and J. M. Mellor (2009). Are risk preferences stable? comparing an experimental measure with a validated survey-based measure. *Journal of Risk and Uncertainty* 39(2), 137–160.
- Arduini, T., E. Patacchini, E. Rainone, et al. (2015). Parametric and semiparametric iv estimation of network models with selectivity. Technical Report 9, Einaudi Institute for Economics and Finance (EIEF).
- Attanasio, O., A. Barr, J. C. Cardenas, G. Genicot, and C. Meghir (2012). Risk pooling, risk preferences, and social networks. *American Economic Journal: Applied Economics* 4(2), 134–167.
- Barseghyan, L., J. Prince, and J. C. Teitelbaum (2011). Are risk preferences stable across contexts? evidence from insurance data. *The American Economic Review* 101(2), 591–631.
- Baucells, M. and A. Villasís (2010). Stability of risk preferences and the reflection effect of prospect theory. *Theory and Decision* 68(1-2), 193–211.

- Bisin, A., U. Horst, and O. Özgür (2006). Rational expectations equilibria of economies with local interactions. *Journal of Economic Theory* 127(1), 74–116.
- Boucher, V. (2016). Conformism and self-selection in social networks. *Journal of Public Economics* 136, 30–44.
- Brachert, M. and W. Hyll (2014). On the stability of preferences: Repercussions of entrepreneurship on risk attitudes. Technical Report 667, SOEP papers on Multi-disciplinary Panel Data Research.
- Bramoullé, Y. and B. Fortin (2010). Social networks: econometrics. *The New Palgrave Dictionary of Economics*.
- Brock, W. A. and S. N. Durlauf (2001). Discrete choice with social interactions. *The Review of Economic Studies* 68(2), 235–260.
- Bursztyn, L., F. Ederer, B. Ferman, and N. Yuchtman (2014). Understanding mechanisms underlying peer effects: Evidence from a field experiment on financial decisions. *Econometrica* 82(4), 1273–1301.
- Cahlíková, J. and L. Cingl (2017). Risk preferences under acute stress. *Experimental Economics* 20(1), 209–236.
- Caliendo, M., F. Fossen, and A. Kritikos (2010). The impact of risk attitudes on entrepreneurial survival. *Journal of Economic Behavior & Organization* 76(1), 45–63.
- Cameron, A. C. and D. L. Miller (2015). A practitioner’s guide to cluster-robust inference. *Journal of Human Resources* 50(2), 317–372.
- Cameron, A. C. and P. K. Trivedi (2005). *Microeconometrics: methods and applications*. Cambridge University Press.
- Chandrasekhar, A. (2016). Econometrics of network formation. In Y. Bramoullé, A. Galeotti, and B. Rogers (Eds.), *The Oxford Handbook of the Economics of Networks*, Chapter 13, pp. 303–357.

- Conte, A., M. V. Levati, and C. Nardi (forthcoming). Risk preferences and the role of emotions. *Economica*.
- Cramer, J. S., J. Hartog, N. Jonker, and C. M. Van Praag (2002). Low risk aversion encourages the choice for entrepreneurship: An empirical test of a truism. *Journal of Economic Behavior & Organization* 48(1), 29–36.
- Croson, R. and U. Gneezy (2009). Gender differences in preferences. *Journal of Economic literature* 47(2), 448–474.
- Dohmen, T., A. Falk, D. Huffman, and U. Sunde (2012). The intergenerational transmission of risk and trust attitudes. *The Review of Economic Studies* 79(2), 645–677.
- Dunn, T. and D. Holtz-Eakin (2000). Financial capital, human capital, and the transition to self-employment: Evidence from intergenerational links. *Journal of Labor Economics* 18(2), 282–305.
- Ekelund, J., E. Johansson, M.-R. Järvelin, and D. Lichtermann (2005). Self-employment and risk aversion—evidence from psychological test data. *Labour Economics* 12(5), 649–659.
- Giannetti, M. and A. Simonov (2009). Social interactions and entrepreneurial activity. *Journal of Economics & Management Strategy* 18(3), 665–709.
- Gioia, F. (2016). Peer effects on risk behaviour: the importance of group identity. *Experimental Economics* 20(1), 100–129.
- Goldsmith-Pinkham, P. and G. W. Imbens (2013). Social networks and the identification of peer effects. *Journal of Business & Economic Statistics* 31(3), 253–264.
- Herbst, D. and A. Mas (2015). Peer effects on worker output in the laboratory generalize to the field. *Science* 350(6260), 545–549.
- Holt, C. A. and S. K. Laury (2002). Risk aversion and incentive effects. *American Economic Review* 92(5), 1644–1655.
- Hsieh, C.-S. and L. F. Lee (2016). A social interactions model with endogenous friendship formation and selectivity. *Journal of Applied Econometrics* 31(2), 301–319.

- Jacobson, S. and R. Petrie (2009). Learning from mistakes: What do inconsistent choices over risk tell us? *Journal of Risk and Uncertainty* 38(2), 143–158.
- Lahno, A. M. and M. Serra-Garcia (2015). Peer effects in risk taking: Envy or conformity? *Journal of Risk and Uncertainty* 50(1), 73–95.
- Lindquist, M. J., J. Sol, and M. Van Praag (2015). Why do entrepreneurial parents have entrepreneurial children? *Journal of Labor Economics* 33(2), 269–296.
- Manski, C. F. (1993). Identification of endogenous social effects: The reflection problem. *The Review of Economic Studies* 60(3), 531–542.
- Nanda, R. and J. B. Sørensen (2010). Workplace peers and entrepreneurship. *Management Science* 56(7), 1116–1126.
- Qu, X. and L.-f. Lee (2015). Estimating a spatial autoregressive model with an endogenous spatial weight matrix. *Journal of Econometrics* 184(2), 209–232.
- Uganda Bureau of Statistics [UBOS] (2014). Uganda National Household Survey 2012/2013. Kampala, Uganda.

Appendix

A Social Interactions and Consistency of Choices

A.1 The Empirical Models

In this section, we investigate the effects of social interactions on another outcome: the consistency of choices. We assume participants make some effort to understand how to make good choices. This implies a different model underlying participants’ choices than the one described in Section 3. Let the latent variable e_{ir}^* be the effort that an individual i puts in understanding experiment $r \in \{1, 2\}$. Assume participants have to reach some minimal level of understanding, normalized to 0, to make consistent

choices. This leads to the standard latent variable framework:

$$e_{ir} = \begin{cases} 1 & \text{if } e_{ir}^* \geq 0, \\ 0 & \text{otherwise,} \end{cases} \quad (9)$$

where e_{ir} is the consistency of choices that results from putting enough effort into understanding the experiment. Assume participants choose a level of effort to maximize their utility. In the first experiment ($r = 1$), they choose the effort that maximizes the following utility:

$$V_{i1}(e_{i1}^*) = (c_1 + \mathbf{x}_i\gamma + \mu_i + \psi_{i1})e_{i1}^* - \frac{e_{i1}^{*2}}{2}, \quad (10)$$

where \mathbf{x}_i and μ_i are the individual's fixed observed and unobserved characteristics, respectively, and ψ_{i1} is an error term. The first portion of the right-hand side represents the individual's perceived benefit from exerting effort, while the second portion represents the increasing cost of effort. The perceived benefit of effort depends on individual characteristics. For example, a low-skill person (low \mathbf{x}_i or μ_i) may not see why he should try to calculate anything, and instead prefer to pick lotteries at random. Conversely, individual characteristics could be seen as affecting the cost of effort: a high-skill person may find it less costly to provide sufficient effort to understand the experiment. The first-order condition is:

$$e_{i1}^* = c_1 + \mathbf{x}_i\gamma + \mu_i + \psi_{i1}. \quad (11)$$

After the networking activity, a random subgroup participates in the second experiment and may now be influenced by the discussion they had with their peers. Let m_i be the number of i 's peers who made consistent choices in the first experiment. Assume that, for the second experiment, individual i chooses effort e_{i2}^* in order to maximize:

$$V_{i2}(e_{i2}^*) = (c_1 + c_2 + c_2^g + \mathbf{x}_i\gamma + \mu_i + \epsilon_{i2})e_{i2}^* - \frac{e_{i2}^{*2}}{2} + \lambda m_i e_{i2}^*, \quad (12)$$

where c_2 is a constant that adds to the first experiment's constant. It might (among other things) capture a learning effect of doing the experiment a second time or a

fatigue effect. We again add ambiguity dummies c_2^g specific to the level of ambiguity $g \in \{none, low, medium, high\}$ in the second experiment. The reference category is set to $g = none$ so that $c_2^{none} = 0$. The individual's perceived utility is affected by his peers through social learning effects. The m_i peers who understood the experiment the first time may make it easier for i to understand the experiment because he can learn from them. We can see this as a reduction in the cost of effort needed to understand the experiment. As in the last section, we let the peer effect λ differ for those who participated in a treatment that included ambiguity the second time, so that:

$$\lambda = \begin{cases} \lambda_{na} & \text{if } g = none, \\ \lambda_a & \text{otherwise.} \end{cases} \quad (13)$$

The first-order condition is:

$$e_{i2}^* = c_1 + c_2 + c_2^g + \mathbf{x}_i \boldsymbol{\gamma} + \lambda m_i + \mu_i + \epsilon_{i2}, \quad (14)$$

which provides an empirical model we can estimate. Once again, the peer variable m_i is predetermined, which rules out the reflection problem of Manski (1993). It also rules out the multiple equilibriums problem that arises in binary outcome models where the dependent variable and the peer variables are simultaneously determined (Brock and Durlauf, 2001).

A.1.1 Naive Specification

Contrary to Section 3, the latent variable framework implies we cannot use the first-difference approach to remove equation (14)'s constant observed or unobserved variables. Thus, if there is homophily according to μ_i , m_i should be correlated with the error term. Nevertheless, as a benchmark, we first ignore homophily concerns and use equation (14) as our empirical model assuming $E(\mu_i + \epsilon_i | m_i, \mathbf{x}_i) = 0$.

A.1.2 Difference-in-Differences Specification

Homophily and peer effects may both create similarities in peers' choices in the second experiment. However, in the first experiment, only homophily can create these similarities. We can therefore use the choices in the first experiment to separately identify

the two effects.

We use a specification analogous to a difference-in-differences (DID) estimation. In a standard DID setting, a control group and a treatment group are observed both before and after a treatment occurs. The variation in the outcome of interest that occurs between the two periods for reasons other than the treatment can be controlled for using the variation in this outcome among the control group. The additional variation that is specific to the treatment group is then attributed to the treatment effect.

In our setting, the number of peers who made consistent choices (m_i) is analogous to the DID treatment variable. As in a standard DID estimation, individuals with different values of m_i may on average have different levels of understanding about the experiment, even before social interactions occur, because of homophily. The variation in the outcome that occurs between our two experiments for reasons other than social interactions can also be controlled for using a dummy variable that equals 1 if $r = 2$ and 0 otherwise. The additional variation that arises in the the second experiment as a function of m_i can then be used to identify peer effects. Specifically, we estimate the following model:

$$e_{ir}^* = c_1 + \mathbf{x}_i \boldsymbol{\gamma} + \tilde{\lambda} m_i + \mathbb{1}(r = 2) [c_2 + c_2^g + \lambda m_i] + \mu_i + \epsilon_{ir}, \quad (15)$$

where $\mathbb{1}(r = 2)$ equals 1 if $r = 2$ and 0 otherwise. The covariance between m_i and μ_i that comes from homophily is present in the two experiments and is thus captured by $\tilde{\lambda}$. Besides homophily effects, the estimate of $\tilde{\lambda}$ captures any relationship between μ_i and m_i that arises for reasons other than the social interactions occurring after the first experiment. Thus, λ excludes the effect of homophily and captures the peer effects, which only arise in the second experiment.

A.2 Estimation and Results

We estimate our two specifications using probit estimations. Table 6 presents the estimated average marginal effects. We include in \mathbf{x}_i age, sex and education, as well as fixed effects for the six locations in which the experiments took place. Column (a) presents the naive specification (equation 14) and column (b) presents the DID specification (equation 15). The number of observations in column (b) is greater because we

use the choices from the first experiment to control for homophily. The standard errors are clustered by individual, but the results are robust to using the sandwich estimator of variance without clustering.¹⁷

The naive peer effect estimates show a significant relationship between an individual’s consistency of choices and his number of peers who made consistent choices in the first experiment. However, this relationship is significant only for participants who participated in an experiment without ambiguity the second time. The relationship may, however, include both a peer effects and a homophily effect.

Our DID estimation yields a significant homophily effect. An individual’s probability of making consistent choices in the first experiment is 3.9 percentage points greater, on average, for each peer who made consistent choices, even if participants have not yet discussed with each other. The additional effect of the number of peers who made consistent choices in the second experiment — the social learning effect of having met and discussed with these peers — is not significant. Therefore, we can see that neglecting the role of homophily would have led us to interpret the relationship between one’s consistency of choices and those of her peers as peer effects.

To complement and test the robustness of our results, we test for the presence of homophily using a simple network formation model in Appendix B. We again find evidence of homophily according to unobserved characteristics that affects the consistency of choices, e_{i1} . Specifically, we find that individual i has a higher probability of becoming peers with individual j if $|e_{i1} - e_{j1}|$ equals 0 than if it equals 1, after controlling for individual variables and for similarities in i and j ’s variables. Because e_{i1} and e_{j1} are determined before social interactions occur, this effect is not caused by peer effects and can thus be attributed to homophily.

B Testing for homophily

Let the network tie d_{ij} be equal to 1 if individual i states that individual j is his new friend and 0 otherwise. We allow the network to be directed, meaning that d_{ij} is not

¹⁷We avoid clustering by the six locations (on top of the locations’ fixed effects), because clustering with too few clusters leads to a downward-biased variance matrix estimate, and thus to over-rejection. However, small cluster sizes may also lead to a biased estimate of the variance matrix. See Cameron and Miller (2015) for a discussion on problems that arise with few clusters or with small clusters.

Table 6: Peer effects on consistency of choices -
Average marginal effects of a probit estimation

	Naive (a)	DID (b)
peer effect - no ambiguity λ_{na}	0.113** (0.049)	0.044 (0.049)
peer effect - ambiguity λ_a	0.025 (0.023)	-0.020 (0.026)
homophily effect $\tilde{\lambda}$		0.039*** (0.014)
2nd exp. effect c_2		0.011 (0.204)
observable characteristics		
age	-0.001 (0.006)	-0.004 (0.004)
male	0.066 (0.076)	0.149*** (0.048)
education: secondary	0.337*** (0.104)	0.173*** (0.062)
education: technical	0.233** (0.110)	0.170*** (0.061)
education: university	0.324*** (0.106)	0.233*** (0.062)
number of observations	258	798
number of individuals	258	258
Ambiguity fixed effects c_2^g	Yes	Yes
District fixed effects	Yes	Yes

*** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.1$

necessarily equal to d_{ji} . As suggested by Bramoullé and Fortin (2010), we let the probability that $d_{ij} = 1$ depend on the absolute distance between i and j 's variables (which capture homophily effects) and on both i and j 's variables. We model individual i 's decision to state that j is one of his friends by the following rule:

$$d_{ij}^* = \delta_0 + \mathbf{x}_i \boldsymbol{\delta}_1 + \mathbf{x}_j \boldsymbol{\delta}_2 + y_{i1} \delta_3 + y_{j1} \delta_4 + |\mathbf{x}_i - \mathbf{x}_j| \boldsymbol{\rho}_x + |y_{i1} - y_{j1}| \boldsymbol{\rho}_y + v_{ij} \quad (16)$$

$$d_{ij} = \begin{cases} 1 & \text{if } d_{ij}^* > 0, \\ 0 & \text{otherwise.} \end{cases} \quad (17)$$

We call $\boldsymbol{\rho}_x$ the vector of homophily according to observable characteristics effects and $\boldsymbol{\rho}_y$ the effect of homophily on unobservable characteristics (that affect y_{i1}). Importantly, the outcome variables (y_{ir} and y_{jr}) are those of the first experiment ($r = 1$) before social interactions occur, so that $\boldsymbol{\rho}_y$ may not capture peer effects.

We estimate this model using a probit estimation. Because this is a model of peer network formation, we remove observations where peers stated that they already knew each other before the workshop. It is important to note that this model has many weaknesses in explaining some features of the network formation. It assumes that the probability that i and j become peers is independent of other links formed in the network. Thus, this model may not explain clustering (i.e. the stylized fact that two individuals who share a peer in common have a higher probability of becoming peers with each other). One should consult Chandrasekhar (2016) for a review of econometric models that are more consistent with stylized facts. Nevertheless, this simple model allows us to test for the existence of homophily effects. We also estimate the above model for our other variable of interest — the consistency of choices — by redefining y_{i1} and y_{j1} by binary variables that equal 1 if individuals i and j , respectively, made consistent choices in the first experiment and 0 otherwise. Finally, we estimate a model that includes both variables.

The three specifications are presented in Table 7. We find no evidence of homophily according to observable variables. We also do not find evidence of homophily according to unobserved characteristics that affect the number of safe choices. However, we do find significant homophily effects according to unobserved characteristics that affect

the consistency of choices.

C Peer effects estimates from pre-existing vs. new peers

As mentioned in Section 2.3, most of the social relationships we observe were developed at workshops between individuals who did not know each other previously. Participants have on average 4.54 peers they met at the workshop and 1.76 peers they knew from before the workshop. Table 8 presents separate peer effect estimates from these two types of peers. Column (a) is the homogeneous peer is the homogeneous peer effects specification — exactly the same as column (a) from our main results presented in Table 5. Column (b) shows heterogeneous peer effects from “pre-existing” and “new” peers, where “pre-existing” peers refer to those the individual already knew before the workshop and “new” peers refers to those met at the workshop. The empirical model is the same as equation (8), except that “successful” and “unsuccessful” types of peers are replaced by “pre-existing” and “new” types of peers. The results show that the significance of our peer effect estimates is mostly driven by the interactions that occurred for the first time at the workshops.

D Details about the experiments

Upon arrival to the workshop, participants answered a questionnaire about their socio-demographic characteristics. They were then gathered in a room for the first experiment. An instructor explained the instructions and verified participants’ comprehension by asking a series of questions. When he thought everyone understood, he took the box representing the first lottery and put it in front of the group. The box contained black balls (representing a high payoff) and white balls (representing a low payoff). He briefly explained again the composition of the box and asked participants to write down their first investment choice on a decision sheet. Figures 1 and 2 show the decision sheets. The first lottery corresponds to box 1.1. The box indicates the exact proportion of each ball and their associated payoffs. When participants were done

Table 7: Average marginal effects of a probit estimate - dependent variable: friendship

	(a)	(b)	(c)
Absolute value of the difference between individual variables			
Consistency of choices	-0.0046 ** (0.0020)		-0.0046 ** (0.0020)
Number of safe choices		-0.0000 (0.0006)	-0.0001 (0.0006)
Age	-0.0003 (0.0003)	-0.0003 (0.0003)	-0.0003 (0.0003)
Male	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Education	-0.0000 (0.0006)	-0.0000 (0.0006)	-0.0000 (0.0006)
Individual's variable			
Consistency of choices	0.0021 (0.0020)		0.0022 (0.0021)
Number of safe choices		0.0008 (0.0005)	0.0008 (0.0005)
Age	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)
Male	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Education	-0.0000 (0.0006)	0.0000 (0.0006)	-0.0000 (0.0006)
Potential peer's variable			
Consistency of choices	-0.0020 (0.0020)		-0.0020 (0.0021)
Number of safe choices		-0.0005 (0.0006)	-0.0005 (0.0006)
Age	0.0002 (0.0002)	0.0002 (0.0002)	0.0002 (0.0002)
Male	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)
Education	-0.0000 (0.0006)	-0.0000 (0.0006)	-0.0000 (0.0006)
Number of obs.	47,664	47,664	47,664

Notes:

1 - Dummy variables for the district in which the experiment took place are also included in the regression but are not shown.

2 - Standard errors are clustered by "two potential peers" identifiers.

*** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.1$.

Table 8: Peer effects on the number of safe choices -
heterogeneous effects between pre-existing and new peers -
Nonlinear least squares estimation

	Hom. effects (a)	Het. effects (b)
peer effect - no ambiguity θ_{na}	0.783* (0.459)	
peer effect - ambiguity θ_a	0.627*** (0.184)	
peer effect from pre-existing peers - no ambiguity θ_{na}^p		-0.109 (0.317)
peer effect from new peers - no ambiguity θ_{na}^n		2.047* (1.118)
peer effect from pre-existing peers - ambiguity θ_a^p		0.905* (0.497)
peer effect from new peers - ambiguity θ_a^n		0.575*** (0.200)
second exp. effect α_2	1.122* (0.594)	1.565*** (0.509)
1st exp payoff effect δ (in thousands of UGX)	-0.200*** (0.069)	-0.206*** (0.064)
p -value $H_0 : \theta_{na}^s = \theta_{na}^u$		0.08
p -value $H_0 : \theta_a^s = \theta_a^u$		0.54
number of observations	258	258
Ambiguity fixed effects α_2^g	Yes	Yes

*** $p \leq 0.01$; ** $p \leq 0.05$; * $p \leq 0.1$

writing their choice, the instructor took the box representing the second lottery and briefly explained the composition of the box, before participants recorded their second choice of lottery. Then the instructor went on with the third lottery and onward. All choices were made individually and in silence. Once everyone had finished recording their choices, one of the nine lotteries was randomly chosen by drawing from a bag of balls numbered from 1 through 9. Then, a single ball was randomly drawn from the selected lottery and participants were payed according to the choice recorded on their decision sheet.

Approximately 50% of participants were then randomly chosen to participate in a second experiment. Selected participants were randomly divided into two groups, with each group participating in an experiment with a different level of ambiguity (including none, low, medium and high). Only two ambiguity treatments were conducted at each workshop. Table 9 shows the number of participants assigned to each ambiguity level at each workshop. Note that there are more participants assigned to the *low* and *medium* levels. This comes from a confusion that arose in the organization of one of the workshops. Specifically, the participants of the “Kampala 2” workshop should have been assigned with *none* and *high* levels of ambiguity, but were mistakenly assigned with *low* and *medium* instead. This, however, does not invalidate our results, as we control for these differences in ambiguity levels in our estimations.

Participants assigned to *none* participated in the same experiment as the first experiment. Those assigned to treatments with ambiguity were presented a box that contained, in addition to white and black balls, balls that were wrapped in opaque bags, so that their color was unknown. The decisions sheets for the low, medium and high ambiguity treatments are presented in figures 3 to 8. The next subsections also present the exact instructions that were read and provided in written form to participants.

Table 9: Assignment of participants to the second experiment

District		1st exp. only	Ambiguity level in second experiment				Total
			None	Low	Medium	High	
Kampala 1	Obs.	53	0	0	18	19	90
	%	59%	0%	0%	20%	21%	100%
Kampala 2	Obs.	44	0	18	15	0	77
	%	57%	0%	23%	19%	0%	100%
Wakiso	Obs.	46	0	24	21	0	91
	%	51%	0%	26%	23%	0%	100%
M'bale	Obs.	50	24	0	0	26	100
	%	50%	24%	0%	0%	26%	100%
Gulu	Obs.	50	26	27	0	0	103
	%	49%	25%	26%	0%	0%	100%
M'barara	Obs.	39	0	16	24	0	79
	%	49%	0%	20%	30%	0%	100%
Total	Obs.	282	50	85	78	45	540
	%	52%	9%	16%	14%	8%	100%

Figure 1: Decision sheet for the first experiment

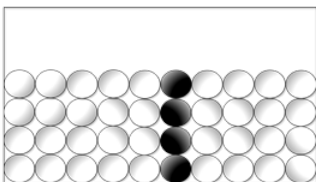




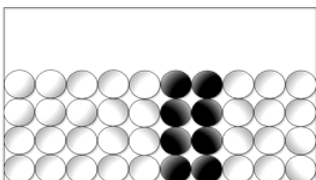




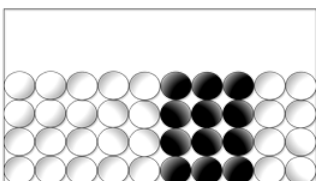




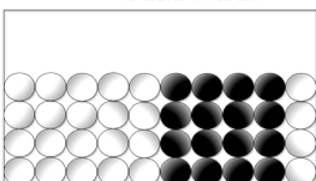




Business environment		Circle your preferred investment option	
<div>1.1.</div> <div>4 black balls 10% chance of high returns</div> <div>36 white balls 90% chance of low returns</div>	<div>40 balls in total</div> <div></div>	<div>a. Safe</div> <div> UGX 6.000</div> <div> UGX 4.000</div> <div>b. Risky</div> <div> UGX 10.000</div> <div> UGX 1.000</div>	
<div>1.2.</div> <div>8 black balls 20% chance of high returns</div> <div>32 white balls 80% chance of low returns</div>	<div>40 balls in total</div> <div></div>	<div>a. Safe</div> <div> UGX 6.000</div> <div> UGX 4.000</div> <div>b. Risky</div> <div> UGX 10.000</div> <div> UGX 1.000</div>	
<div>1.3.</div> <div>12 black balls 30% chance of high returns</div> <div>28 white balls 70% chance of low returns</div>	<div>40 balls in total</div> <div></div>	<div>a. Safe</div> <div> UGX 6.000</div> <div> UGX 4.000</div> <div>b. Risky</div> <div> UGX 10.000</div> <div> UGX 1.000</div>	
<div>1.4.</div> <div>16 black balls 40% chance of high returns</div> <div>24 white balls 60% chance of low returns</div>	<div>40 balls in total</div> <div></div>	<div>a. Safe</div> <div> UGX 6.000</div> <div> UGX 4.000</div> <div>b. Risky</div> <div> UGX 10.000</div> <div> UGX 1.000</div>	

Figure 2: Decision sheet for the first experiment (cont.)

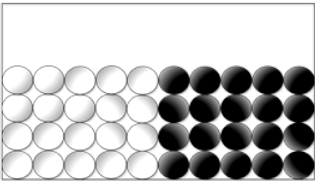
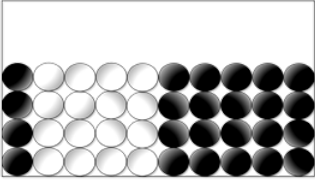
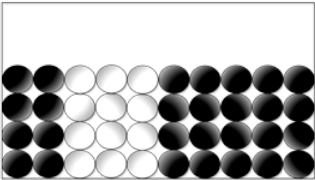
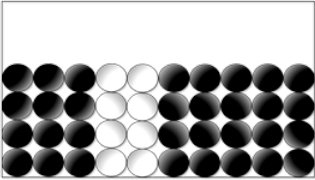
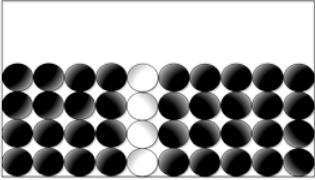
Business environment		Circle your preferred investment option	
1.1.	<p>20 black balls 50% chance of high returns</p> <p>20 white balls 50% chance of low returns</p> <p>40 balls in total</p> 	a. Safe	<input checked="" type="radio"/> UGX 6.000 <input type="radio"/> UGX 4.000
		b. Risky	<input checked="" type="radio"/> UGX 10.000 <input type="radio"/> UGX 1.000
1.2.	<p>24 black balls 60% chance of high returns</p> <p>16 white balls 40% chance of low returns</p> <p>40 balls in total</p> 	a. Safe	<input checked="" type="radio"/> UGX 6.000 <input type="radio"/> UGX 4.000
		b. Risky	<input checked="" type="radio"/> UGX 10.000 <input type="radio"/> UGX 1.000
1.3.	<p>28 black balls 70% chance of high returns</p> <p>12 white balls 30% chance of low returns</p> <p>40 balls in total</p> 	a. Safe	<input checked="" type="radio"/> UGX 6.000 <input type="radio"/> UGX 4.000
		b. Risky	<input checked="" type="radio"/> UGX 10.000 <input type="radio"/> UGX 1.000
1.4.	<p>32 black balls 80% chance of high returns</p> <p>8 white balls 20% chance of low returns</p> <p>40 balls in total</p> 	a. Safe	<input checked="" type="radio"/> UGX 6.000 <input type="radio"/> UGX 4.000
		b. Risky	<input checked="" type="radio"/> UGX 10.000 <input type="radio"/> UGX 1.000
1.5.	<p>36 black balls 90% chance of high returns</p> <p>4 white balls 10% chance of low returns</p> <p>40 balls in total</p> 	a. Safe	<input checked="" type="radio"/> UGX 6.000 <input type="radio"/> UGX 4.000
		b. Risky	<input checked="" type="radio"/> UGX 10.000 <input type="radio"/> UGX 1.000

Figure 3: Decision sheet for the second experiment with low ambiguity

Business environment		Circle your preferred investment option
<p>1.1.</p> <p>between 3 and 5 black balls 7.5% to 12.5% chance of high returns</p> <p>between 35 and 37 white balls, 87.5% to 92.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>
<p>1.2.</p> <p>between 7 and 9 black balls, 17.5% to 22.5% chance of high returns</p> <p>between 31 and 33 white balls, 77.5% to 82.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>
<p>1.3.</p> <p>between 11 and 13 black balls, 27.5% to 32.5% chance of high returns</p> <p>between 27 and 29 white balls, 67.5% to 72.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>
<p>1.4.</p> <p>between 15 and 17 black balls, 37.5% to 42.5% chance of high returns</p> <p>between 23 and 25 white balls, 57.5% to 62.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>

Figure 4: Decision sheet for the second experiment with low ambiguity (cont.)

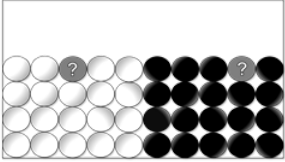




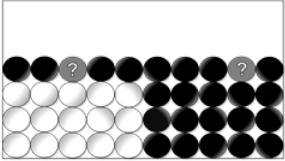




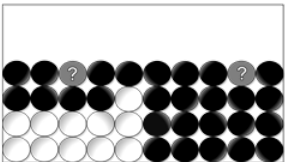




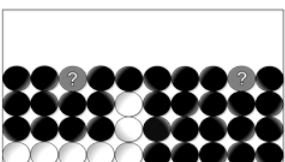




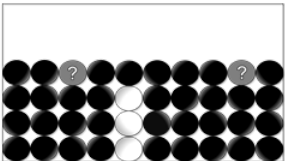




Business environment		Circle your preferred investment option
<p>1.1.</p> <p>between 19 and 21 black balls, 47.5% to 52.5% chance of high returns</p> <p>between 19 and 21 white balls, 47.5% to 52.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.2.</p> <p>between 23 and 25 black balls, 57.5% to 62.5% chance of high returns</p> <p>between 15 and 17 white balls, 37.5% to 42.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.3.</p> <p>between 27 and 29 black balls, 67.5% to 72.5% chance of high returns</p> <p>between 11 and 13 white balls, 27.5% to 32.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.4.</p> <p>between 31 and 33 black balls, 77.5% to 82.5% chance of high returns</p> <p>between 7 and 9 white balls, 17.5% to 22.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.5.</p> <p>between 35 and 37 black balls, 87.5% to 92.5% chance of high returns</p> <p>between 3 and 5 white balls, 7.5% to 12.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>

Figure 5: Decision sheet for the second experiment with medium ambiguity

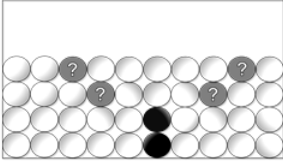




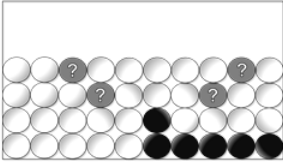




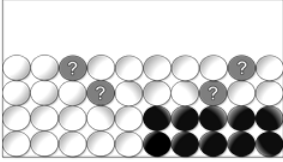




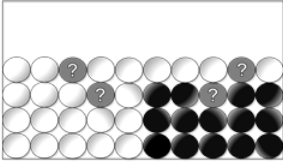




Business environment		Circle your preferred investment option
<p>1.1. between 2 and 6 black balls 5% to 15% chance of high returns</p> <p>between 34 and 38 white balls, 85% to 95% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.2. between 6 and 10 black balls, 15% to 25% chance of high returns</p> <p>between 30 and 34 white balls, 75% to 85% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.3. between 10 and 14 black balls, 25% to 35% chance of high returns</p> <p>between 26 and 30 white balls, 65% to 75% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.4. between 14 and 18 black balls, 35% to 45% chance of high returns</p> <p>between 22 and 26 white balls, 55% to 65% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>

Figure 6: Decision sheet for the second experiment with medium ambiguity (cont.)

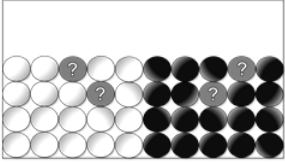




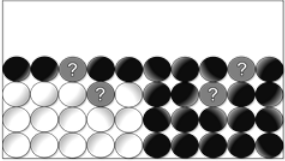




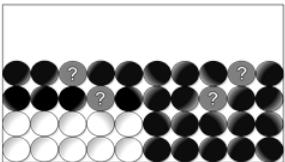




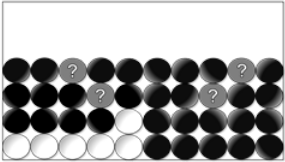




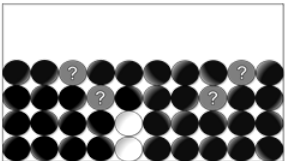




Business environment		Circle your preferred investment option
<p>1.1.</p> <p>between 18 and 22 black balls, 45% to 55% chance of high returns</p> <p>between 18 and 22 white balls, 45% to 55% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.2.</p> <p>between 22 and 26 black balls, 55% to 65% chance of high returns</p> <p>between 14 and 18 white balls, 35% to 45% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.3.</p> <p>between 26 and 30 black balls, 65% to 75% chance of high returns</p> <p>between 10 and 14 white balls, 25% to 35% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.4.</p> <p>between 30 and 34 black balls, 75% to 85% chance of high returns</p> <p>between 6 and 10 white balls, 15% to 25% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.5.</p> <p>between 34 and 38 black balls, 85% to 95% chance of high returns</p> <p>between 2 and 6 white balls, 5% to 15% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>

Figure 7: Decision sheet for the second experiment with high ambiguity

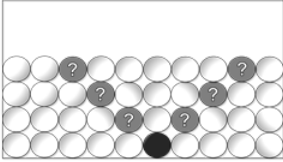




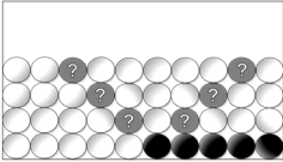




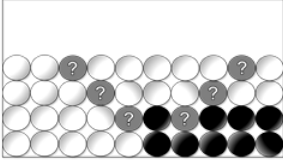




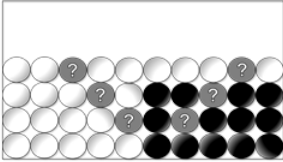




Business environment		Circle your preferred investment option
<p>1.1.</p> <p>between 1 and 7 black balls 2.5% to 17.5% chance of high returns</p> <p>between 33 and 39 white balls, 82.5% to 97.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.2.</p> <p>between 5 and 11 black balls, 12.5% to 27.5% chance of high returns</p> <p>between 29 and 35 white balls, 72.5% to 87.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.3.</p> <p>between 9 and 15 black balls, 22.5% to 37.5% chance of high returns</p> <p>between 25 and 31 white balls, 62.5% to 77.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>
<p>1.4.</p> <p>between 13 and 19 black balls, 32.5% to 47.5% chance of high returns</p> <p>between 21 and 27 white balls, 52.5% to 67.5% chance of low returns</p>	<p>40 balls in total</p> 	<p>a. Safe  UGX 6.000  UGX 4.000</p> <p>b. Risky  UGX 10.000  UGX 1.000</p>

Figure 8: Decision sheet for the second experiment with high ambiguity (cont.)

Business environment		Circle your preferred investment option
<p>1.1.</p> <p>between 17 and 23 black balls, 42.5% to 57.5% chance of high returns</p> <p>between 17 and 23 white balls, 42.5% to 57.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>
<p>1.2.</p> <p>between 21 and 27 black balls, 52.5% to 67.5% chance of high returns</p> <p>between 13 and 19 white balls, 32.5% to 47.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>
<p>1.3.</p> <p>between 25 and 31 black balls, 62.5% to 77.5% chance of high returns</p> <p>between 9 and 15 white balls, 22.5% to 37.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>
<p>1.4.</p> <p>between 29 and 35 black balls, 72.5% to 87.5% chance of high returns</p> <p>between 5 and 11 white balls, 12.5% to 27.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>
<p>1.5.</p> <p>between 33 and 39 black balls, 82.5% to 97.5% chance of high returns</p> <p>between 1 and 7 white balls, 2.5% to 17.5% chance of low returns</p>	<p>40 balls in total</p>	<p>a. Safe UGX 6.000 UGX 4.000</p> <p>b. Risky UGX 10.000 UGX 1.000</p>

D.1 Instructions provided to participants - first experiment

General instructions (read to participants)

In this game you have to make an investment decision. There is no wrong or right answer, just different preferences. Please, take your decision alone, without communicating with other participants. If you have a question, raise your hand and a supervisor will come to help you. The supervisors will cancel the game if participants communicate with each other or do not follow their instructions.

In this game, you have to take 9 investment decisions and mark your personal choice on the questionnaire. After you have made all your choices, only 1 out of the 9 questions will be randomly selected and you will be paid accordingly to its result. This means that only one of the questions will end up affecting how much you earn. However, you do not know in advance which question shall be used. Note that the 9 questions have an equal chance of being selected.

In each question there is a box with 40 balls, which represents a precise business environment. The black balls represent high returns and the white balls represent low returns. If there are few black balls in a box, there is little chance of obtaining high returns; if there are many black balls in a box, there is a big chance of obtaining high returns. In the same way, if there are many white balls in a box, there is a big chance of obtaining low returns; if there are few white balls in a box, there is a small chance of obtaining low returns.

Your decision consists of choosing between two types of investment: "safe" and "risky", which determine your potential returns.

On the safe investment: the black balls give a high return of UGX 6.000 and the white balls give a low return of UGX 4.000.

On the risky investment: the black balls give a high return of UGX 10.000 and the white balls give a low return of UGX 1.000.

A participant will randomly draw a single ball from a selected box. You will receive the returns that correspond to your choice at the end of the session. For example, if a black ball is randomly drawn: you will receive UGX 6.000 if you have chosen the safe investment, or UGX 10.000 if you have chosen the risky investment. If instead a

white ball is randomly drawn, you will receive UGX 4.000 if you have chosen the safe investment, or UGX 1.000 if you have chosen the risky investment.

Please circle only one type of investment in each one of the 9 questions. Unclear handwriting, empty questions or double choices shall not be rewarded. Once you have completed the questionnaire, please hand it in to a researcher.

Game specific instructions (read and provided to participants in written form)

Question 8.1. This box contains 40 balls in total, 4 black balls (high returns) and 36 white balls (low returns). This means that there is a 10% chance of obtaining high returns and a 90% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 8.2. This box contains 40 balls in total, 8 black balls (high returns) and 32 white balls (low returns). This means that there is a 20% chance of obtaining high returns and an 80% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 8.3. This box contains 40 balls in total, 12 black balls (high returns) and 28 white balls (low returns). This means that there is a 30% chance of obtaining high returns and a 70% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 8.4. This box contains 40 balls in total, 16 black balls (high returns) and 24 white balls (low returns). This means that there is a 40% chance of obtaining high returns and a 60% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 8.5. This box contains 40 balls in total, 20 black balls (high returns) and 20 white balls (low returns). This means that there is a 50% chance of obtaining high returns and a 50% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 8.6. This box contains 40 balls in total, 24 black balls (high returns) and 16 white balls (low returns). This means that there is a 60% chance of obtaining high returns and a 40% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 8.7. This box contains 40 balls in total, 28 black balls (high returns) and 12 white balls (low returns). This means that there is a 70% chance of obtaining high returns and a 30% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 8.8. This box contains 40 balls in total, 32 black balls (high returns) and 8 white balls (low returns). This means that there is an 80% chance of obtaining high returns and a 20% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 8.9. This box contains 40 balls in total, 36 black balls (high returns) and 4 white balls (low returns). This means that there is a 90% chance of obtaining high returns and a 10% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

D.2 Instructions read to participants - second experiment with no uncertainty

General instructions (read to participants)

You will now play the business game for a second time. You have to make an investment decision. There is no wrong or right answer, just different preferences. Please, take your decision alone, without communicating with other participants. If you have a question, raise your hand and a supervisor will come to help you. The supervisors will cancel the game if participants communicate with each other or do not follow their instructions.

In this game, you have to take 9 investment decisions and mark your personal choice on the questionnaire. After you have made all your choices, only 1 out of the 9 questions will be randomly selected and you will be paid accordingly to its result. This means that only one of the questions will end up affecting how much you earn. However, you do not know in advance which question shall be used. Note that the 9 questions have an equal chance of being selected.

In each question there is a box with 40 balls, which represents a precise business environment. The black balls represent high returns and the white balls represent low returns. If there are few black balls in a box, there is little chance of obtaining high

returns; if there are many black balls in a box, there is a big chance of obtaining high returns. In the same way, if there are many white balls in a box, there is a big chance of obtaining low returns; if there are few white balls in a box, there is a small chance of obtaining low returns.

Your decision consists of choosing between two types of investment: “safe” and “risky”, which determine your potential returns.

On the safe investment: the black balls give a high return of UGX 6.000 and the white balls give a low return of UGX 4.000.

On the risky investment: the black balls give a high return of UGX 10.000 and the white balls give a low return of UGX 1.000.

A participant will randomly draw a single ball from a selected box. You will receive the returns that correspond to your choice at the end of the session. For example, if a black ball is randomly drawn: you will receive UGX 6.000 if you have chosen the safe investment, or UGX 10.000 if you have chosen the risky investment. If instead a white ball is randomly drawn, you will receive UGX 4.000 if you have chosen the safe investment, or UGX 1.000 if you have chosen the risky investment.

Please circle only one type of investment in each one of the 9 questions. Unclear handwriting, empty questions or double choices shall not be rewarded. Once you have completed the questionnaire, please hand it in to a researcher.

Game specific instructions (read and provided to participants in written form)

Question 1.1. This box contains 40 balls in total, 4 black balls (high returns) and 36 white balls (low returns). This means that there is a 10% chance of obtaining high returns and a 90% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 1.2. This box contains 40 balls in total, 8 black balls (high returns) and 32 white balls (low returns). This means that there is a 20% chance of obtaining high returns and an 80% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 1.3. This box contains 40 balls in total, 12 black balls (high returns) and 28 white balls (low returns). This means that there is a 30% chance of obtaining high

returns and a 70% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 1.4. This box contains 40 balls in total, 16 black balls (high returns) and 24 white balls (low returns). This means that there is a 40% chance of obtaining high returns and a 60% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 1.5. This box contains 40 balls in total, 20 black balls (high returns) and 20 white balls (low returns). This means that there is a 50% chance of obtaining high returns and a 50% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 1.6. This box contains 40 balls in total, 24 black balls (high returns) and 16 white balls (low returns). This means that there is a 60% chance of obtaining high returns and a 40% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 1.7. This box contains 40 balls in total, 28 black balls (high returns) and 12 white balls (low returns). This means that there is a 70% chance of obtaining high returns and a 30% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 1.8. This box contains 40 balls in total, 32 black balls (high returns) and 8 white balls (low returns). This means that there is an 80% chance of obtaining high returns and a 20% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

Question 1.9. This box contains 40 balls in total, 36 black balls (high returns) and 4 white balls (low returns). This means that there is a 90% chance of obtaining high returns and a 10% chance of obtaining low returns. Please choose between the safe investment and the risky investment.

D.3 Instructions read to participants - second experiment with low uncertainty

General instructions (read to participants)

In this game, you have to make another investment decision. Again, there is no

wrong or right answer, just different preferences. Please, take your decision alone, without communicating with other participants. If you have a question, raise your hand and a supervisor will come to help you. The supervisors will cancel the game if participants communicate with each other or do not follow their instructions.

In this game, you have to take 9 investment decisions and mark your personal choice on the questionnaire. After you have made all your choices, only 1 out of the 9 questions will be randomly selected and you will be paid accordingly to its result. This means that only one of the questions will end up affecting how much you earn. However, you do not know in advance which question shall be used. Note that the 9 questions have an equal chance of being selected.

In each question there is a box with 40 balls, which represents a different business environment. There are 2 covered balls for which we do not know the color. They are either white or black. The black balls represent high returns and the white balls represent low returns. If there are few black balls in a box, there is little chance of obtaining high returns; if there are many black balls in a box, there is a big chance to obtain high returns. In the same way, if there are many white balls in a box, there is a big chance of obtaining low returns; if there are few white balls in a box, there is a small chance of obtaining low returns.

Your decision consists of choosing between two types of investment: “safe” and “risky”, which determine your potential returns:

On the safe investment: the black balls give a high return of UGX 6.000 and the white balls give a low return of UGX 4.000.

On the risky investment: the black balls give a high return of UGX 10.000 and the white balls give a low return of UGX 1.000.

A participant will randomly draw a single ball from a selected box. You will receive the returns that correspond to your choice at the end of the session. For example, if a black ball is randomly drawn: you will receive UGX 6.000 if you have chosen the safe investment, or UGX 10.000 if you have chosen the risky investment. If instead a white ball is randomly drawn, you will receive UGX 4.000 if you have chosen the safe investment, or UGX 1.000 if you have chosen the risky investment.

Please circle ONLY ONE type of investment in each one of the 9 questions. Unclear handwriting, empty questions or double choices shall not be rewarded. Once you have

completed the questionnaire, please hand it in to a researcher.

Game specific instructions (read and provided to participants in written form)

Question 1.1. This box contains 40 balls in total and 2 of them are covered. We know that there are between 3 and 5 black balls that give high returns. We also know that there are between 35 and 37 white balls that give low returns. This means that the chance of drawing a black ball is between 7.5% and 12.5%; the chance of drawing a white ball is between 87.5% and 92.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.2. This box contains 40 balls in total and 2 of them are covered. We know that there are between 7 and 9 black balls, which give high returns. We also know that there are between 31 and 33 white balls, which give low returns. This means that the chance of drawing a black ball is between 17.5% and 22.5%; the chance of drawing a white ball is between 77.5% and 82.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.3. This box contains 40 balls in total and 2 of them are covered. We know that there are between 11 and 13 black balls, which give high returns. We also know that there are between 27 and 29 white balls, which give low returns. This means that the chance of drawing a black ball is between 27.5% and 32.5%; the chance of drawing a white ball is between 67.5% and 72.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.4. This box contains 40 balls in total and 2 of them are covered. We know that there are between 15 and 17 black balls, which give high returns. We also know that there are between 23 and 25 white balls, which give low returns. This means that the chance of drawing a black ball is between 37.5% and 42.5%; the chance of drawing a white ball is between 57.5% and 62.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.5. This box contains 40 balls in total and 2 of them are covered. We know that there are between 19 and 21 black balls, which give high returns. We also know that there are between 19 and 21 white balls, which give low returns. This means that the chance of drawing a black ball is between 47.5% and 52.5%; the chance

of drawing a white ball is between 47.5% and 52.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.6. This box contains 40 balls in total and 2 of them are covered. We know that there are between 23 and 25 black balls, which give high returns. We also know that there are between 15 and 17 white balls, which give low returns. This means that the chance of drawing a black ball is between 57.5% and 62.5%; the chance of drawing a white ball is between 37.5% and 42.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.7. This box contains 40 balls in total and 2 of them are covered. We know that there are between 27 and 29 black balls, which give high returns. We also know that there are between 11 and 13 white balls, which give low returns. This means that the chance of drawing a black ball is between 67.5% and 72.5%; the chance of drawing a white ball is between 27.5% and 32.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.8. This box contains 40 balls in total and 2 of them are covered. We know that there are between 31 and 33 black balls, which give high returns. We also know that there are between 7 and 9 white balls, which give low returns. This means that the chance of drawing a black ball is between 77.5% and 82.5%; the chance of drawing a white ball is between 17.5% and 22.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.9. This box contains 40 balls in total and 2 of them are covered. We know that there are between 35 and 37 black balls, which give high returns. We also know that there are between 3 and 5 white balls, which give low returns. This means that the chance of drawing a black ball is between 87.5% and 92.5%; the chance of drawing a white ball is between 7.5% and 12.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

D.4 Instructions read to participants - second experiment with medium uncertainty

General instructions (read to participants)

In this game, you have to make another investment decision. Again, there is no

wrong or right answer, just different preferences. Please, take your decision alone, without communicating with other participants. If you have a question, raise your hand and a supervisor will come to help you. The supervisors will cancel the game if participants communicate with each other or do not follow their instructions.

In this game, you have to take 9 investment decisions and mark your personal choice on the questionnaire. After you have made all your choices, only 1 out of the 9 questions will be randomly selected and you will be paid accordingly to its result. This means that only one of the questions will end up affecting how much you earn. However, you do not know in advance which question shall be used. Note that the 9 questions have an equal chance of being selected.

In each question there is a box with 40 balls, which represents a different business environment. There are 4 covered balls for which we do not know the color. They are either white or black. The black balls represent high returns and the white balls represent low returns. If there are few black balls in a box, there is little chance of obtaining high returns; if there are many black balls in a box, there is a big chance to obtain high returns. In the same way, if there are many white balls in a box, there is a big chance of obtaining low returns; if there are few white balls in a box, there is a small chance of obtaining low returns.

Your decision consists of choosing between two types of investment: “safe” and “risky”, which determine your potential returns:

On the safe investment: the black balls give a high return of UGX 6.000 and the white balls give a low return of UGX 4.000.

On the risky investment: the black balls give a high return of UGX 10.000 and the white balls give a low return of UGX 1.000.

A participant will randomly draw a single ball from a selected box. You will receive the returns that correspond to your choice at the end of the session. For example, if a black ball is randomly drawn: you will receive UGX 6.000 if you have chosen the safe investment, or UGX 10.000 if you have chosen the risky investment. If instead a white ball is randomly drawn, you will receive UGX 4.000 if you have chosen the safe investment, or UGX 1.000 if you have chosen the risky investment.

Please circle ONLY ONE type of investment in each one of the 9 questions. Unclear handwriting, empty questions or double choices shall not be rewarded. Once you have

completed the questionnaire, please hand it in to a researcher.

Game specific instructions (read and provided to participants in written form)

Question 1.1. This box contains 40 balls in total and 4 of them are covered. We know that there are between 2 and 6 black balls that give high returns. We also know that there are between 34 and 38 white balls that give low returns. This means that the chance of drawing a black ball is between 5% and 15%; the chance of drawing a white ball is between 85% and 95%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.2. This box contains 40 balls in total and 4 of them are covered. We know that there are between 6 and 10 black balls, which give high returns. We also know that there are between 30 and 34 white balls, which give low returns. This means that the chance of drawing a black ball is between 15% and 25%; the chance of drawing a white ball is between 75% and 85%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.3. This box contains 40 balls in total and 4 of them are covered. We know that there are between 10 and 14 black balls, which give high returns. We also know that there are between 26 and 30 white balls, which give low returns. This means that the chance of drawing a black ball is between 25% and 35%; the chance of drawing a white ball is between 65% and 75%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.4. This box contains 40 balls in total and 4 of them are covered. We know that there are between 14 and 18 black balls, which give high returns. We also know that there are between 22 and 26 white balls, which give low returns. This means that the chance of drawing a black ball is between 35% and 45%; the chance of drawing a white ball is between 55% and 65%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.5. This box contains 40 balls in total and 4 of them are covered. We know that there are between 18 and 22 black balls, which give high returns. We also know that there are between 18 and 22 white balls, which give low returns. This means that the chance of drawing a black ball is between 45% and 55%; the chance of drawing

a white ball is between 45% and 55%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.6. This box contains 40 balls in total and 4 of them are covered. We know that there are between 22 and 26 black balls, which give high returns. We also know that there are between 14 and 18 white balls, which give low returns. This means that the chance of drawing a black ball is between 55% and 65%; the chance of drawing a white ball is between 35% and 45%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.7. This box contains 40 balls in total and 4 of them are covered. We know that there are between 26 and 30 black balls, which give high returns. We also know that there are between 10 and 14 white balls, which give low returns. This means that the chance of drawing a black ball is between 65% and 75%; the chance of drawing a white ball is between 25% and 35%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.8. This box contains 40 balls in total and 4 of them are covered. We know that there are between 30 and 34 black balls, which give high returns. We also know that there are between 6 and 10 white balls, which give low returns. This means that the chance of drawing a black ball is between 75% and 85%; the chance of drawing a white ball is between 15% and 25%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.9. This box contains 40 balls in total and 4 of them are covered. We know that there are between 34 and 38 black balls, which give high returns. We also know that there are between 2 and 6 white balls, which give low returns. This means that the chance of drawing a black ball is between 85% and 95%; the chance of drawing a white ball is between 5% and 15%. Please circle one option to indicate your choice between the safe investment and the risky investment.

D.5 Instructions read to participants - second experiment with high uncertainty

General instructions (read to participants)

In this game, you have to make another investment decision. Again, there is no

wrong or right answer, just different preferences. Please, take your decision alone, without communicating with other participants. If you have a question, raise your hand and a supervisor will come to help you. The supervisors will cancel the game if participants communicate with each other or do not follow their instructions.

In this game, you have to take 9 investment decisions and mark your personal choice on the questionnaire. After you have made all your choices, only 1 out of the 9 questions will be randomly selected and you will be paid accordingly to its result. This means that only one of the questions will end up affecting how much you earn. However, you do not know in advance which question shall be used. Note that the 9 questions have an equal chance of being selected.

In each question there is a box with 40 balls, which represents a different business environment. There are 6 covered balls for which we do not know the color. They are either white or black. The black balls represent high returns and the white balls represent low returns. If there are few black balls in a box, there is little chance of obtaining high returns; if there are many black balls in a box, there is a big chance to obtain high returns. In the same way, if there are many white balls in a box, there is a big chance of obtaining low returns; if there are few white balls in a box, there is a small chance of obtaining low returns.

Your decision consists of choosing between two types of investment: “safe” and “risky”, which determine your potential returns:

On the safe investment: the black balls give a high return of UGX 6.000 and the white balls give a low return of UGX 4.000.

On the risky investment: the black balls give a high return of UGX 10.000 and the white balls give a low return of UGX 1.000.

A participant will randomly draw a single ball from a selected box. You will receive the returns that correspond to your choice at the end of the session. For example, if a black ball is randomly drawn: you will receive UGX 6.000 if you have chosen the safe investment, or UGX 10.000 if you have chosen the risky investment. If instead a white ball is randomly drawn, you will receive UGX 4.000 if you have chosen the safe investment, or UGX 1.000 if you have chosen the risky investment.

Please circle ONLY ONE type of investment in each one of the 9 questions. Unclear handwriting, empty questions or double choices shall not be rewarded. Once you have

completed the questionnaire, please hand it in to a researcher.

Game specific instructions (read and provided to participants in written form)

Question 1.1. This box contains 40 balls in total and 6 of them are covered. We know that there are between 1 and 7 black balls that give high returns. We also know that there are between 33 and 39 white balls that give low returns. This means that the chance of drawing a black ball is between 2.5% and 17.5%; the chance of drawing a white ball is between 82.5% and 97.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.2. This box contains 40 balls in total and 6 of them are covered. We know that there are between 5 and 11 black balls, which give high returns. We also know that there are between 29 and 35 white balls, which give low returns. This means that the chance of drawing a black ball is between 12.5% and 27.5%; the chance of drawing a white ball is between 72.5% and 87.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.3. This box contains 40 balls in total and 6 of them are covered. We know that there are between 9 and 15 black balls, which give high returns. We also know that there are between 25 and 31 white balls, which give low returns. This means that the chance of drawing a black ball is between 22.5% and 37.5%; the chance of drawing a white ball is between 62.5% and 77.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.4. This box contains 40 balls in total and 6 of them are covered. We know that there are between 13 and 19 black balls, which give high returns. We also know that there are between 21 and 27 white balls, which give low returns. This means that the chance of drawing a black ball is between 32.5% and 47.5%; the chance of drawing a white ball is between 52.5% and 67.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.5. This box contains 40 balls in total and 6 of them are covered. We know that there are between 17 and 23 black balls, which give high returns. We also know that there are between 17 and 23 white balls, which give low returns. This means that the chance of drawing a black ball is between 42.5% and 57.5%; the chance

of drawing a white ball is between 42.5% and 57.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.6. This box contains 40 balls in total and 6 of them are covered. We know that there are between 21 and 27 black balls, which give high returns. We also know that there are between 13 and 19 white balls, which give low returns. This means that the chance of drawing a black ball is between 52.5% and 67.5%; the chance of drawing a white ball is between 32.5% and 47.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.7. This box contains 40 balls in total and 6 of them are covered. We know that there are between 25 and 31 black balls, which give high returns. We also know that there are between 9 and 15 white balls, which give low returns. This means that the chance of drawing a black ball is between 62.5% and 77.5%; the chance of drawing a white ball is between 22.5% and 37.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.8. This box contains 40 balls in total and 6 of them are covered. We know that there are between 29 and 35 black balls, which give high returns. We also know that there are between 5 and 11 white balls, which give low returns. This means that the chance of drawing a black ball is between 72.5% and 87.5%; the chance of drawing a white ball is between 12.5% and 27.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.

Question 1.9. This box contains 40 balls in total and 6 of them are covered. We know that there are between 33 and 39 black balls, which give high returns. We also know that there are between 1 and 7 white balls, which give low returns. This means that the chance of drawing a black ball is between 82.5% and 97.5%; the chance of drawing a white ball is between 2.5% and 17.5%. Please circle one option to indicate your choice between the safe investment and the risky investment.