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How do beliefs about skill affect risky decisions?

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ABSTRACT

Beliefs about relative skill matter for risky decisions such as market entry, career choices, and financial investments. Yet in most laboratory experiments risk is exogenously given and beliefs about relative skill play no role. We use a laboratory experiment without strategy confounds to isolate the impact of beliefs about relative skill on risky choices. We find that low (high) skill individuals are more (less) willing to take risks on gambles where the probabilities depend on relative skill than on gambles with exogenously given probabilities. This happens because low (high) skill individuals overestimate (underestimate) their relative skill. Consequently, the wrong people may engage in risky activities where performance is based on relative skill while the right people may be crowded out.

1. Introduction

In most laboratory experiments, risk is exogenously given and individuals' beliefs about relative skill play no role in their decisions. In the real world, however, beliefs about relative skill matter for many decisions. Examples include, entering a market where post-entry payoffs depend on relative skill (e.g., opening a restaurant) versus staying out and earning a certain amount (e.g., working as a waiter); following a career path where performance is highly dependent on relative skill (e.g., being a lawyer, or a musician) versus choosing a career path where performance does not depend much on it (e.g., taking a public sector job); or managing your own financial portfolio versus delegating this to an asset manager depends on one's perception of relative skill at picking financial assets.

This paper uses a laboratory experiment to investigate how beliefs about relative skill affect risky decisions. To answer this question, we elicit certainty equivalents (CEs) of luck and skill gambles. Both types of gambles are binary as they involve two possible prizes. In a luck gamble, the probability of getting the higher prize is given while in a skill gamble it corresponds to the subject's relative skill, measured by relative performance in a cognitive ability test. Consequently, behavior in the luck gambles only depends on preferences towards risk whereas behavior in the skill gambles depends on preferences towards risk as well as beliefs about relative skill.

We begin with a model free analysis showing that low (high) skill subjects have higher (lower) CEs of skill gambles than of luck gambles that offer the same prizes and winning probabilities. This indicates that low (high) skill subjects are more (less) willing to take risks on gambles where the probabilities depend on relative skill than on gambles with exogenously given probabilities. In contrast, we find that intermediate skill subjects have similar CEs of skill gambles and luck gambles that offer the same prizes and winning probabilities.

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Next, we investigate how these results relate to subjects' beliefs about relative skill. We do so by relying on two types of beliefs: stated and revealed. For eliciting the stated beliefs, we ask subjects to report the complete belief distribution about their relative performance in the cognitive ability test. This allows subjects to demonstrate their degree of confidence in their self-placement and sidesteps recent methodological concerns associated with previous research (Benoît et al., 2015; Merkle and Weber, 2011). We incentivize the stated beliefs with a quadratic scoring rule (QSR) which is valid under linear utility and the absence of probability weighting. The advantage of the stated beliefs is that they do not rely on a specific model. However, they may be biased if subjects are either risk averse or weight probabilities non-linearly.[1] In contrast, the revealed beliefs are directly estimated from the subjects' choices via a structural model and do not rely on the QSR.

Stated beliefs about relative skill display three main patterns. First, on average, there is a slight tendency towards overplacement, i.e. overestimation of relative skill. Second, however, the majority of subjects has biased beliefs: 70.8% of them state a belief which is more than one standard deviation away from their actual relative skill; 31.7% of them display a belief distribution which does not contain the actual relative skill. Third, the biases in stated beliefs correlate with relative skill: low skill subjects overplace themselves while high skill subjects underplace themselves. This suggests that subjects' beliefs about relative skill drive differences in behavior in the skill and luck gambles.

Next we estimate a structural model based on Cumulative Prospect Theory (Kahneman and Tversky, 1979; Tversky and Kahneman, 1992).[2] The structural model has three advantages over the model free analysis. First, it allows us to disentangle the different components of risk preferences – utility curvature, likelihood sensitivity, and optimism/pessimism. Second, it allows us to rule out that potential correlations between the subjects' risk preferences and relative skill confounded our results. Finally, it provides us with estimates of the subjects' revealed beliefs about relative skill which do not rely on the QSR. Instead, the revealed beliefs are directly estimated from the subjects' choices. The identifying assumption is that subjects apply the same utility and probability weighting functions for evaluating the luck and skill gambles.

The structural model provides us with joint estimates of revealed beliefs and risk preference parameters. To model utility curvature, we use the power utility function, and to model probability weighing we use the two-parameter probability weighting function in Goldstein and Einhorn (1987). The estimated parameters tell us that subjects display moderate degrees of concavity in the utility function, pronounced likelihood insensitivity, and a slight degree of pessimism. These estimates are plausible given the existing laboratory evidence on individual risk preferences (see Wakker, 2010). The revealed beliefs confirm the patterns obtained with the stated beliefs: overall, there is a slight tendency towards overplacement, the majority of subjects has biased beliefs about relative skill, low skill subjects overplace themselves while high skill subjects underplace themselves. However, the correlation between revealed and stated beliefs is just 0.46, and biases in revealed beliefs predict differences between CEs of luck and skill gambles better than biases in stated beliefs. This indicates that relying exclusively on stated beliefs may be misleading.

Our paper directly adds to the understanding of the observed low returns to entrepreneurship as documented by Hamilton (2000) and Moskowitz and Vissing-Jørgensen (2002).[3] The observed low returns to entrepreneurship stand in contrast to the predictions of the benchmark occupational choice model between paid employment and entrepreneurship by Lucas Jr (1978). In this model, subjects differ in their ability as entrepreneurs and choose between working for a wage or operating a firm. In equilibrium, those with low skills select into paid employment and those with high skills select into entrepreneurship. Our main result suggests that excess entry into entrepreneurship of low skill subjects due to overplacement and under entry of high skill subjects due to underplacement leads to a misallocation of talent which drives down the returns to entrepreneurship. For theoretical papers discussing similar mechanisms see De Meza and Southey (1996), Manove (1995), Fraser and Greene (2006), and Rigotti et al. (2011). In these models, excess entry into entrepreneurship of low skill subjects drives up input prices, which lowers the returns to entrepreneurship and, ultimately, crowds out high skill subjects.

The remainder of the paper is organized as follows. Section 2 discusses the paper's contribution to the literature. Section 3 describes our experimental design. Section 4 presents the model free results. Section 5 introduces the structural model and Section 6 presents its results. Finally, Section 7 concludes.

2. Literature

In this section, we outline the strands of literature to which our paper contributes. Regarding terminology, we follow Moore and Healy (2008) and distinguish among three different types of biases in subjects' beliefs about skill: (i) overestimation of absolute skill, (ii) overplacement (overestimation of relative skill or the "better-than-average effect"), and (iii) excessive confidence in the precision of ones beliefs (overprecision or miscalibration). Our paper focuses mostly on overplacement but also measures overprecision.

2.1. Market entry

The first strand of literature the paper contributes to is about the decision whether or not to enter a market. Evidence gained from observational data indicates that overplacement might play an important role behind the low returns from

[1] Schlag et al. (2015) discuss the most prominent elicitation methods, their underlying assumptions, and provide theoretical comparisons.
[2] Since we only consider gambles in the gain domain, Cumulative Prospect Theory coincides with Rank Dependent Utility introduced by Quiggin (1982).
[3] For better readability, we use the term entrepreneurship to also refer to self-employment.

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