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Lab and life: Does risky choice behaviour observed in experiments reflect that in the real world?☆

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ABSTRACT

Risk preferences play a crucial role in a great variety of economic decisions. Measuring risk preferences reliably is therefore an important challenge. In this paper we ask the question whether risk preferences observed in economic experiments reflect real-life risky choice behaviour. We investigate in a sample representative for a rural region of eastern Uganda whether pursuing farming strategies with both a higher expected profit and greater variance of profits is associated with willingness to take risks in an experiment. Controlling for other determinants of risk-taking in agriculture, we find that risky choice behaviour in the experiment is correlated with risky choice behaviour in real life in one domain, i.e. the purchase of fertiliser, but not in other domains, i.e. the growing of cash crops and market-orientation more broadly. Our findings suggest that economic experiments may be good at capturing real-world risky choice behaviour that is narrowly bracketed.

1. Introduction

For adoption of new technologies and thereby economic growth to take place in society, risky investments need to be undertaken. Reward for risk-taking typically comes in the form of a higher return on investment, which is necessary to induce risk-averse investors to put up with larger variation in possible outcomes. One component of research on risky investment decisions is therefore the appropriate measurement of risk aversion, for which economic experiments are often used.[1] The idea is that by stripping away from real-life investment all incidental features, so that only the pure decision task of trading off variation against return remains, risk aversion can be observed in isolation and therefore measured precisely. The assumption is that risk preferences observed in the lab reflect those in real life.

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[1] See Harrison and Rutström (2008) and Charness et al. (2013) for recent surveys.

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We test this assumption using a lab-in-the-field experiment. For a representative sample from a farming region in eastern Uganda, we examine whether subjects' risk-taking in a Gneezy and Potters (1997) type investment game is associated with their risk-taking in agriculture. Farmers, more than most other groups in society, are used to dealing with uncertainty in their livelihoods decisions due to the numerous factors that cause fluctuations in yields and in the prices of inputs and outputs: the weather, pests, soil fertility, and so forth. Farmers' attitudes to risk have been extensively studied in lab-in-the-field experiments, both in developed and in developing countries.[2] We consider livelihoods decisions that in developed countries would probably not be considered as risk-taking in agriculture: fertiliser purchase and commercialisation more broadly. However, as we show in the paper, in our context, the decisions we consider, which increase participation in inputs and outputs markets, raise both the expected value and the variance of profits compared to the traditional, semi-subsistence agriculture that is still common in the region.[3]

The Achilles' heel of any research that links real-life and experimental behaviour is the potential influence of confounding factors, which gets at the heart of why we do experiments in the first place. If this risk could be eliminated, there would strictly speaking not be any need for experiments, so it needs instead to be minimised as best one can. We have attempted to do so by selecting an area that is homogeneous in terms of culture and agricultural conditions and practices, so that these do not represent confounding factors. Moreover, to minimise the risk of omitted variables bias, we control in the econometric analysis for the other factors that previous literature on risk-taking in agriculture in sub-Saharan Africa identifies as determinants (Heltberg and Tarp, 2002; Knight et al., 2003; Vargas Hill, 2009); we collected data on these variables through a tailor-made questionnaire.

We selected through implementing a multistage cluster sampling design, a representative sample of 1803 farmers: among all of these the questionnaire was administered (including a hypothetical investment question) and a randomly selected 872 participated in the investment game (the second number is lower than the first for reasons of resources). Controlling for other determinants of risk-taking in agriculture, we find that risk-taking in the experiment is associated with the relatively straightforward investment decision of fertiliser purchase. However, for more involved livelihoods strategies that call not only on willingness to take risks but also on other attributes of entrepreneurship, viz. moving away from subsistence farming to growing crops for the market (measured in two alternative ways), we find no evidence of an association with risk-taking in the experiment. By contrast, a hypothetical willingness to take large-scale risks, elicited through a questionnaire, is associated with both fertiliser purchase and growing crops for the market (however measured), suggesting that this is a better proxy for entrepreneurship broadly defined.

We see our main contribution to the literature as follows. We link risk-taking investment in the lab to risk-taking investment in real life: unlike in previous studies, both the expected value and variance of profits are greater in the risky alternatives than in the safe one, in the real-life application and in the experiments. We show that this holds for the agricultural investment measures we consider compared to the traditional agriculture that is still common in the study area. We thus see the main contribution of our paper as comparing real-life and lab behaviour that *a priori* is expected to be similar.

To the best of our knowledge, previous studies do not compare risk-taking behaviour in the lab and in real life in which the expected value and the variance of profits are greater in *both* situations. Strictly speaking, like is therefore not compared with like. Whereas variance of profits and expected profits are always greater in the risky option in the lab, this does not tend to be the case in the real-world behaviour that it is compared with, in previous studies.

Sometimes, the real-world behaviour compared with risky choice in the lab is behaviour that is unsafe but does not unambiguously have a higher expected value than the safe alternative: gambling (Lejuez et al., 2003; Hardeweg et al., 2013), cigarette smoking and heavy drinking (Anderson and Mellor, 2008), or the consumption of food that entails a health risk (Lusk and Coble, 2005). In other studies, risky choice in the lab is linked to real-world technology adoption that reduces the variance of profits: Bt cotton by Chinese farmers (Liu, 2013) or GM corn and GM soy by Midwestern grain farmers in the USA (Barham et al., 2014). In yet other studies, the real-world behaviours studied have ambiguous effects: Chinese farmers' (often excessive) use of pesticides (Liu and Huang, 2013) and self-employment in rural Thailand (Hardeweg et al., 2013) may reduce both the expected value and the variance of outcomes, increase both, or reduce one and increase the other.

Instead, we consider *risk-taking investment* both in the experiment and in real life. We see our main contribution as linking experimental and real-world behaviours that are conceptually comparable: for taking risk, a higher expected return is offered both in the lab and in life. Our advantage on previous studies is thus that we do not compare risk-taking investment in the lab with gambling, unsafe behaviour or risk-reducing investment: the absence of a correlation in such comparisons does not reliably inform us whether the behaviour in the lab conforms to that in real life, since the behaviours are not strictly speaking comparable. For example, there is no good reason why somebody willing to take risk for the sake of a higher return

[2] Examples include farmers in Chile (Henrich and McElreath, 2002), China (Liu, 2013), Ethiopia (Humphrey and Verschoor, 2004b; Yesuf and Bluffstone, 2009; Harrison et al., 2010), France (Reynaud and Couture, 2012), India (Binswanger, 1980, 1981; Humphrey and Verschoor, 2004b; Harrison et al., 2010), Tanzania (Henrich and McElreath, 2002), Thailand (Hardeweg et al., 2013), Uganda (Humphrey and Verschoor, 2004a; Harrison et al., 2010; Tanaka and Munro, 2014), the USA (Herberich and List, 2012) and Vietnam (Tanaka et al., 2010).

[3] Consistent with what we show for Ugandan farmers, Duo et al. (2008, p. 486) show for Kenyan farmers that buying fertiliser is profitable on average but leaves them worse off in some circumstances. Studies of risk-taking in agriculture in developing countries often focus on reliance on the market for inputs or outputs: see e.g. Engle-Warnick et al. (2007), Heltberg and Tarp (2002), Knight et al. (2003) and Vargas Hill (2009).