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The lure of illusory luck: How much are people willing to pay for random shocks☆

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ABSTRACT

We investigate whether people are influenced to make investment decisions based on random shock signals and to what extent they do so by exploiting a unique data set from a popular Chinese lottery game with over one million observations. We first present evidence that people, as individual investors in the field, not only systematically commit the hot-hand fallacy in chasing the winners who happen to pick the lucky numbers in the latest round of the lottery game, but are also willing to bear a cost in doing so although winning the lottery is merely a random shock. We then propose a simple model to account for the observed market behaviors. We further estimate the lottery players' willingness to pay for the random shock signals, and find that the market value of such illusion is significantly high.

1. Introduction

Will people be influenced to make investment decisions based on random shock signals and even willing to pay for such useless information? By exploiting a unique rich dataset of an actual lottery game played in China with over one million observations, we demonstrate with solid evidence that people, as individual investors in the field, not only systematically commit the hot-hand fallacy in chasing the winners who happen to pick the lucky numbers in the latest round of the lottery game, but are also even willing to bear a cost in doing so although winning the lottery is merely a random shock.

In the literature of financial markets, there is a related long debated yet unsettled question: do investors make their choice of mutual funds based on their past performance even though the past performance of funds may have very low predictive power on their future return? There has been much evidence that investors chase mutual funds with good past performance (see Chevalier and Ellison, 1997; Sirri and Tufano, 1998). However, there are still debates on the persistence of mutual funds performance (see Hendricks et al., 1993; Carhart, 1997; Wermers, 2000; Kosowski et al., 2006).[1] The key

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[1] Similar findings also exist in hedge funds. See Ding et al. (2008) and Fung et al. (2008).

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empirical challenges which prevent a clear test for this question are the complicated probability structure and the difficulty to control for the unobserved heterogeneity in the stock market to achieve a conclusive econometric estimation.

To overcome these empirical challenges, researchers have mainly conducted experiments in the lab or run surveys to study whether and to what extent people utilize essentially useless signals, such as entirely random shocks, to guide their financial decisions (see Choi et al., 2010; Anufriev et al., 2013; Huber et al., 2010; Powdthavee and Riyanto, 2014). However, there is still no clean test in the field to examine this issue. In this study, we exploit a unique data set from a popular Chinese online peer-to-peer lottery game. Fortunately, the probability structure associated with the lottery business actually played in China is fairly clean and simple, and winning the lottery is completely random. Thus, it enables us to present clear-cut evidence of people's biases using the field data and to help to illuminate the nature of the often puzzling behavior observed in the financial markets.

In this game, some of the lottery players (named the followers) are willing to pay an expected commission fee to others (named the proposers) to pick numbers for them.[2] We specifically examine the relationship between the commission fee and the past rate of return for the proposers, which is a random shock. Based on a data set of 1 million observations, we propose a method to test the alphabetic preference over commission fees and the return rates of the proposers. We show that people are not only making decisions based on irrelevant random shocks, but also willing to bear a cost to chase the illusory luck. Inspired by this empirical evidence, we follow the framework of Rabin and Vayanos (2010) and propose a simple model to account for how the cognitive system, which underlies the choices made by a lottery investor under uncertainty, shapes her actual behavior in the field. We then further quantify the lottery buyers' willingness to pay for the hot hand illusion, and find that the market value of such illusion is significantly high. We find that if the past return rate of a proposer increases from 0% to 300% in the previous round, the followers are willing to pay 1% more out of their original spending to follow her.

In the literature, it has been well documented that people display fallacy behaviors (see Clotfelter and Cook, 1993; Terrell, 1994; Gilovich et al., 1985; Camerer, 1989; Guryan and Kearney, 2008; Anufriev et al., 2013). From the theoretical perspective, theorists have pointed out that the hothand effect may play an role in people's decision making in the financial market. Rabin (2002) and Rabin and Vayanos (2010) outline a general model in which investors are assumed to believe "law of small number" (Kahneman and Tversky, 1971) so that they tend to hold the gambler's fallacy: the mistaken belief that random sequences should exhibit systematic reversals. Based on this, they show that these investors may form a belief of hothand fallacy about a financial expert's future performance because they over-infer the ability of the financial expert after observing a streak of her successful performances in the past.

However, to the best of our knowledge, there are only two lab experiment papers: Huber et al. (2010) and Powdthavee and Riyanto (2014), which also investigate how people make financial decisions in a setting with pure i.i.d. random shocks, and therefore stand close in spirit to our study. The subjects in the experiment of Huber et al. (2010) are asked to bet on the coin tosses themselves, or rely on randomized "expert" predictions, or choose a risk-free option. The authors find evidence of both the hot hand fallacy and the gambler's fallacy, contingent upon how the participants subjectively conceive of the role played by human skills and intentions relative to that by inanimate chance mechanisms. In an ingeniously designed and skillfully conducted experimental study, Powdthavee and Riyanto (2014) take one step further, showing that the experiment participants (undergraduate university students in Thailand and Singapore), of their own volition, opt to pay an upfront fee for "expert" predictions on the outcomes of an apparently random event. What makes their study all the more interesting is that they show that the participants in their experiment are challenged to switch from having the correct prior belief "outcomes are determined by chance" to the fallacy belief.

Our study differs from the experimental investigations of irrational behavior, and the aforementioned survey and experimental studies of the financial markets as well, in several aspects. First of all, our evidence of people's biased behavior in financial decisions is based on field data that is generated from the actual market, and the decision making is based on real financial incentives. Secondly, it is simply unimaginable to have a dataset generated from experiments or surveys comparable in size to ours. Over one million observations render the estimation quite solid and robust. No less important to emphasize, the probability structure and the rules of the Taobao lottery business in China are quite simple and clean, and therefore allow a clean analysis of the issue, not merely affording tests of hypotheses on biased beliefs, but giving rise to useful theorizing and clean estimation of the market value of the biased beliefs as well.

The rest of the paper is organized as follows: Section 2 describes in detail the lottery business played in China and the dataset used in this paper. A remarkable feature of this lottery game is that some players (called the followers) conditionally pay a proportionate commission fee to others (called the proposers) who pick lottery numbers for them. Section 3 sets up the testable hypothesis and presents clean evidence that people not only make decisions based on irrelevant random shocks, but are willing to bear a cost to chase the illusory luck. In Section 4, inspired by the findings in Section 3, we then present a theoretical model that is modified from the theoretical framework of Rabin and Vayanos (2010) to account for the observed

[2] In this Chinese lottery game, proposers collect commissions conditional on that their lottery wins money. That is, the lottery-package proposers collect ex post part of the gains of the investors from their investment as opposed to the upfront fee. The payment structure of investors in this lottery business in China has a strong affinity with the fee structure of numerous funds, including most hedge funds in both the United States and Europe, and mutual funds in Europe. In these markets of funds, the investment agencies also only collect ex post part of the investors' gains from their investment in the name of asymmetric performance fees. See Ehm and Weber (2013) for a detailed description on asymmetric performance fee.