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Hot hand and gambler's fallacy in teams: Evidence from investment experiments☆

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ABSTRACT

In laboratory experiments we explore the effects of communication and group decision making on investment behavior and on subjects' proneness to behavioral biases. Most importantly, we show that communication and group decision making do not impact subjects' overall proneness to the hot hand fallacy and to the gambler's fallacy. However, groups decide differently than individuals, as they rely significantly less on useless outside advice from "experts" and choose the risk-free option less frequently. Furthermore we document gender differences in investment behavior: groups of two female subjects choose the risk-free investment more often and are marginally more prone to the hot hand fallacy than groups of two male subjects.

1. Introduction

The hot hand fallacy and the gambler's fallacy are two important behavioral biases in financial markets. People who are affected by these biases misinterpret random sequences. Specifically, when prone to the hot hand fallacy, people misidentify a non-autocorrelated sequence as positively autocorrelated, generating beliefs that a run of a certain realization will continue in the future. In financial markets, for instance, this bias is observable when investors delegate decisions to experts like professional fund managers. Specifically, people mostly buy funds which were successful in the past, believing in the managers' ability to prolong the performance record (see, e.g. Sirri and Tufano, 1998; Barber et al., 2005). Rabin (2002) calls this phenomenon overinference.

With the gambler's fallacy, people expect possible realizations, even in a short sequence of events, to be represented according to the overall probabilities (Tversky and Kahneman, 1971). Expressed more formally: a non-autocorrelated random sequence is believed to exhibit negative autocorrelation. The disposition effect can be seen as an exhibition of the gambler's

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fallacy as investors (private and institutional alike) sell winners too soon and hold losers too long (Odean, 1998; Weber and Camerer, 1998; Shapira and Venezia, 2001; Rabin, 2002; Chen et al., 2007). Kroll et al. (1988) document sequential dependencies, predominantly the gambler's fallacy in a portfolio selection task.

Biased decisions can lead to unfavorable or negative consequences for the decision maker. For instance, Goetzmann and Alok (2008) document that U.S. investors who exhibit trend-related behavior – either trend chasing (hot hand) or contrarian (gambler's fallacy) – hold less diversified portfolios, implying negative risk and performance consequences. Investors' belief in hot hands of mutual fund managers (Brown et al., 1996; Chevalier and Ellsion, 1997; Sirri and Tufano, 1998) generates fund inflows that are positively related to the past rank of a mutual fund. However, given the lack of persistence in fund performance (see, e.g. Carhart, 1997; Malkiel, 2003, 2005) this behavior leads to biased decisions. In a different context, Dohmen et al. (2009) relate the hot hand fallacy and the gambler's fallacy to an increased probability of long-term unemployment and to a higher probability of overdrawn bank accounts, respectively. Suetens et al. (2015) use data on lotto gambling and find evidence for both biases. They show that players tend to bet less on numbers that were drawn in the last week (gambler's fallacy) and bet more on numbers that were frequently drawn in the recent past (hot hand fallacy).

By using investment experiments Huber et al. (2010) investigate both biases in a unified framework. Participants in their experiment are confronted with a series of independent coin tosses showing head and tail with probability 0.5 each. They can choose to (a) predict the realization of the next coin toss themselves, (b) delegate the decision to computerized random agents, called experts, or (c) take a risk-free payment. As reward subjects receive 100 Taler (the experimental currency) for a correct decision while 50 Taler are deducted for an incorrect one. Delegating the investment decision to an expert offers the same payoffs, but a fee is deducted. The risk-free option offers a reward of 10 Taler with certainty. Hence, payoffs are calibrated such that predicting for oneself is preferred to delegating the decision to an expert and the latter is preferred to the risk free alternative, for a participant who is risk neutral (with the implicit assumptions that (i) they believe the coin toss is i.i.d., (ii) they believe the coin has a 50% chance of heads, and (iii) they understand how to optimize in this environment).

Huber et al. (2010) observe both, the hot hand and the gambler's fallacy, in subjects' decisions. Specifically, experts are selected more frequently, the more successful they had been in the past. This implies that subjects expect hot hands in the computerized agents' decisions. In addition, among subjects picking head or tail themselves the authors observe the gambler's fallacy as head (tail) is chosen less frequently after streaks of heads (tails).[1,2] By using a similar framework but labelling experts differently, Powdthavee and Yohanes (2015) report strong hot hand fallacies to outside advice for the outcome of randomized coin tosses. In their paper "experts" were modelled as envelopes with predetermined advice for each period of the investment game.

Here we use the setup of Huber et al. (2010) to study the effects of team decision making on investment decisions and behavioral biases. Many, probably most, decisions of huge economic importance are made by groups rather than individuals, e.g. the "Federal Open Market Committee" of the FED consists of seven members and the "Governing Council of the European Central Bank" currently consists of 25 members that jointly decide on monetary policy. In financial markets, teams of fund managers decide on the investment strategy of a fund and which stocks to pick.[3] Ample evidence in the literature supports the positive impact of group decision making on decision quality. Irrespective of decisions being made in strategic or non-strategic situations, groups usually perform equally well or better than individuals.[4] Though group decision procedures are widely implemented, we know surprisingly little about how they affect potentially present behavioral biases in financial markets.[5]

We focus on two research questions (RQ). In RQ 1 we analyze differences in decision making between individuals and groups on the aggregate level and over time. In a second step, we split our sample to investigate potential effects originating from the gender composition of groups. The second part of RQ 1 is motivated by ample previous literature highlighting differences in decision making by gender, which we also expect to play a role in our setting.[6]

RQ 1: Do groups decide differently compared to individuals in selecting their investment or in relying on outside advice? Does the decision behavior change over time? Does the gender composition of groups play a role?

[1] In theory, the gambler's fallacy and the hot hand fallacy can arise when predicting for oneself or when delegating the decision to an expert. For more details see Section 3.

[2] Ackert et al. (2012) report that hiding information of past realizations prevents subjects in their experiment from exhibiting the gambler's fallacy in portfolio decision experiments. This approach, however, seems practically impossible, given the large amount of available financial data and the attention this data generates.

[3] Bär et al. (2011) document that teams of fund managers implement less extreme investment styles and less industry concentrated portfolios. In an experiment Rockenbach et al. (2007) find that team decisions are better in line with Portfolio Selection Theory than individual decisions, leading to a better risk-return ratio. Keck et al. (2014) demonstrate that groups are more likely than individuals to make ambiguity-neutral decisions. They attribute this to effective communication in groups.

[4] Evidence in strategic games is provided in Feri et al. (2010), Sheremeta and Zhang (2010), Cheung and Coleman (2011), Casari et al. (2012) and Sutter eta al. (2013). Evidence in non-strategic games is provided in Bone et al. (1999), Blinder and Morgan (2005), Charness et al. (2007), Rockenbach et al. (2007), Sutter (2007) and Fahr and Irlenbusch (2011). See Charness and Sutter (2012) and Kugler et al. (2012) for comprehensive reviews.

[5] Charness et al. (2010) demonstrate that the conjunction fallacy is diminished substantially when groups of two or three communicate before making a decision. In an investment game Sutter (2009) finds no difference between individual and team decisions.

[6] See Croson and Gneezy (2009) for a review of gender differences in economic experiments.