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Different investors–different decisions: On individual use of gain, loss and interest rate information

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ABSTRACT

This study investigated how accumulating gains and losses, described as annual interest rates, influenced investment behavior. Investments after gains were on average greater than after losses regardless of the gain and loss interest rates. However, greater variance of interest rates gave some weight to that variable for gains but not for losses. We also analyzed the influence from different information cues on each participant's investments. This revealed that interest rates influenced participants very differently, some invested more with increasing gains, or with increasing losses, while others invested less. This finding explained why interest rate was a weak predictor on the group level. Furthermore, our individual analyses showed an increased sensitivity to interest rates and judged future asset accumulations when the interest rate variance was greater. Finally, subjective reports of the importance of different cues for the participants' own investments showed only some understanding of the cues influence on the investments.

1. Introduction

Sometimes, decision makers have to decide whether to withdraw their assets from an ongoing investment or not. In the present study, we investigated decisions to withdraw or invest assets in risky prospects. The available assets had been accumulated during 5 years with a given interest rate, and the decision that the investor had to make was to invest or not to invest in a risky prospect lasting for the next 5 years.

Maximizing expected value is generally assumed to be the best course of action from an economic point of view, but people often do not to act according to this principle. For example, many non-expert investors have difficulties understanding percentages. To illustrate, after a 50% loss of your assets you need a 100% gain to compensate for that loss. Unfortunately, many non-experts assume that a 50% gain is sufficient (Newall, 2016). The problem with percentages becomes even more difficult when interest rates accumulate over time. When accumulations are judged intuitively, gains and losses are mostly underestimated (Benzion et al., 2004; Doerr, 2006; Timmers and Wagenaar, 1977; Wagenaar and Sagaria, 1975). This is relevant for comparisons between actual investment decisions and normative investments following expected value, EV, when interest rates are involved.

In stock markets, investors tend to put too much weight on past performance and become too optimistic in bull markets and too pessimistic in bear markets (Shiller, 2005). This has been shown experimentally (De Bondt, 1993; Mussweiler and Schneller, 2003) and in field studies (Greenwood and Shleifer, 2014). The high reliance on the past also applies to mutual fund investors who, when predicting future performance, tend to overweigh the relevance of past performance and ignore additional and more relevant information (Choi et al., 2010; Gonzalez and Svenson, 2014; Newall and Love, 2015; Wilcox, 2003). Gonzalez and Svenson (2014) investigated fund investors' use of interest rate information about the past and specific interest rate predictions about the future. The investors invested more after gains compared to losses, showing a direct reliance on past performance. However, the investments were not influenced by the size of past gain and loss interest rates. Furthermore, information about predicted future interest rates and judgments of future accumulated asset could not be reliably related to investment decisions. Neglect of such information is problematic for an investor who wants to make well informed decisions. However, the Gonzalez and Svenson (2014) data was analyzed only on a group level. The present experiments aim to follow up these results and investigate individual investment strategies based on numerical information. The experiments also aim to investigate if the limited influence of interest rates and judged accumulated assets in the previous study could depend on a restricted range of interest rates.

1.1. The problem

The investment information in the problems was interest rate history and future interest rates (Gonzalez and Svenson, 2014). Fig. 1 illustrates a fund prospect used in the present investigation.

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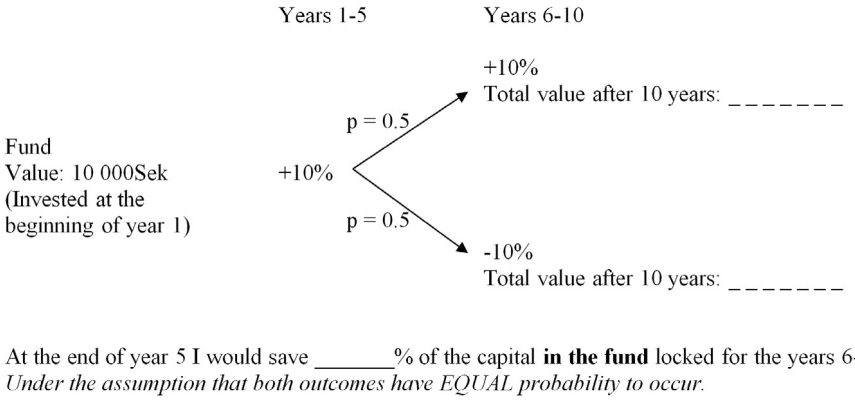

Fig. 1. Illustration of an investment problem.

The problems included the investment fund history (gain or loss) during the 5 years up to the present (years 1–5). For the future 5 years (years 6–10), for which the investments were made, there were two alternative outcomes with equal probability, $p = 0.5$. There was always one gain outcome and one loss outcome. The interest rates were constant during the first 5-year period, for each problem. During the second period the interest rate was numerically the same as during the first period but with different signs for the two different outcomes. The problems included also participants' own judgments of the accumulated assets at the end of year 10 under the assumption that all available assets had been reinvested.

The EV of an investment is determined by the probability P_i and value V_i of the predicted outcomes ($i = 1, \ldots, n$). When the probability of every possible outcome is known, $\sum P_n = 1$, EV $= P_1V_1 + P_2V_2 + \cdots + P_nV_n$. If the annual percentage gain is constant, for each consecutive year of gain the marginal gain will increase. The accumulated assets after several years of gain are calculated by:

$$V_t = V_0(1+g)^t. \quad (1)$$

V_t denotes the accumulated assets after a given time t, V_0 denotes the assets before any value change and g denotes the numerical interest rate for each time unit. As opposed to gains, if the annual percentage loss is constant, for each consecutive year of loss the marginal loss will decrease. The accumulated assets after several years of loss are calculated by:

$$V_t = V_0(1-g)^t. \quad (2)$$

For both gain and loss it is assumed that $V_0 > 1$, $g > 0$ and $t > 1$.

The numerical annual interest percentages of the second 5-year period were the same, but with different signs, for gain and loss outcomes (see Fig. 1). Therefore, EV was always maximized by reinvesting all the assets accumulated during the first 5 years for the second 5 years.

We wanted to investigate if the investment decisions for the future 5 years could be related to information cues in the investment prospect. We also wanted to investigate the relationship between participants' own judgments of the accumulated assets after $5 + 5$ years and their investment decisions.

For the investment problems described above there is no need for complex calculations from a normative point of view, because investing all available capital would maximize EV. However, it is well known that the EV rule is not always followed. Therefore, we wanted to study how participants use the information in this kind of investment decisions.

We also wanted to extend our knowledge about cognitive processes in investment decision making beyond analyses of only numerical responses. Therefore, we included subjective reports of the participants' strategies in the analyses of investment decisions.

1.2. Research questions

This study is focused on how numerical information influences decisions to invest in risky prospects. The information cues described investment funds' *past* 5-year development up to the present (years 1–5) and predicted future 5-year development from the present (years 6–10, see Fig. 1). The information cues about the past 5-year development in a fund included (1) gain or loss and (2) annual interest rate. The information cues about the future investment period (years 6–10) included (3) annual interest rate of possible gain and loss outcomes and (4) the investors' own judgments of accumulated assets after the complete 10 year period for both possible gain and loss outcomes of the future 5 years (years 6–10).

We also wanted to explore to what extent the participants were aware of their own investment strategies. To find out about how the participants thought about their use of the information for their own investments we analyzed judged subjective importance of different information cues.

2. Study 1

2.1. Method

2.1.1. Participants

A total of 45 students from Stockholm University participated. There were 13 male and 32 female participants. Average age was 24.69 years, (SD = 5.64), ranging from 19 to 50.

2.1.2. Procedure

After signing an informed consent to participate in the study the participants filled out a questionnaire at their own convenience in a quite classroom. All instructions were included in the questionnaire but the participants could ask the experimenter to clarify the task at any time during the experiment. The participants were awarded course credits for their participation.

2.1.3. Problems

All problems concerned funds with two consecutive 5-year periods of annual asset gain or loss (Fig. 1). During the first 5-year period, up to the present, there was a constant percentage of annual gain or loss for each investment prospect. The annual interest rate percentages of loss and gain were −15%, −10%, −5%, +5%, +10%, and +15%. During the future 5-year period, from the present and on, there were two possible investment outcomes,