

Research Proposal Bachelor Thesis

Student Name

Risk preferences and Reference Point adjustment

The importance of time horizon and the impact of prior outcomes

The influence of prior outcomes on risky choice has been investigated with a lot of effort in recent years. Since the important paper of Johnson and Thaler (1990) and with the help of prospect theory the adjustment process in risk taking behavior with respect to prior gains or losses was observed in many different experiments. Most of them came to support the findings made by Johnson and Thaler. Prior gains led subjects to more risk taking in further games, whereas prior losses seemed to make further potential losses even more unattractive and hence lowered subjects risk taking behavior for the next decision. Furthermore, according to Thaler and Johnson, the chance of Breaking Even turned people very risk seeking. Barberis, Huang and Santos (1999) formalized this approach to explain asset pricing behavior. They introduced a measure to capture the impact of prior performance on an investor's utility and hence explain their attitude towards risk after certain outcomes. Barberis, Huang and Santos give the very simple example of a stock with certain volatility and a risk free obligation.¹ The reference point in this setting will be the outcome of an investment in the risk free obligation. When evaluating the utility of your risky stock, utility will be calculated from the difference of actual performance of the stock and the alternative risk free return. Gains or losses will now be saved on the mental account for past performance. When deciding how to invest in the next period, the potential scenarios of the stock (suppose, there is an up scenario and a down scenario) will be calculated with a utility function proposed by prospect theory. In the case of a positive "past performance account", potential losses will be cushioned by the prior gains you made. In the case of a negative "past performance account", further losses hurt even more. Hence, prior losses turn the investor to be more risk averse and prior gains turn her to be more risk seeking.

So far, there is nothing really new. However, the question arises, how to interpret the "past performance account". At some point, the reference point may be adjusted and the past performance account will be cleared. We can imagine easily that the influence of prior outcomes on risk taking behavior is closely connected with the frequency of reference point adjustment. The magnitude of a shift in risk preferences depends on the size of the past performance account. If it is cleared every year (suppose, the investor takes a one year treasury bond as reference) but the portfolio is evaluated every week, then the magnitude of the past performance effect on risk can be very large. (This is kind of a sunk cost error, because according to traditional economics, a rational investor should not care about past outcomes when evaluating future decisions.) The quicker the reference point is adjusted (meaning the quicker a person stops to think about her prior performance) the smaller will be the effect of prior outcomes on her risk taking behavior. In other words, the crucial point is the difference in the frequency of expectations being built and evaluation being done.

¹ Rabin and Köszegi (2006) propose a more differentiated concept of the reference point, which allows for stochastic outcomes and stochastic reference points. The reference point could then be a set of potential scenarios of the performance of a portfolio. Their paper is concerned with the general and very important question what a reference point is.

What factors determine the speed of this adjustment process? You may suppose, the investor defines a horizon for her investment. We take this as given. Each period until the end of this horizon she may evaluate the performance of her portfolio on the one hand and on the other hand she can update her reference point. (i.e. forget her prior performance) The frequency with which both two actions may be undertaken could be closely connected with two factors: First, the total length of the horizon. Second, from the perspective of a certain period within the horizon, the periods remaining until the end of the horizon may be a factor. I would expect a different reaction to prior outcomes when remaining time is sufficiently long than in the case of a very proximate end of this horizon. Speculation with prior gains seems to be reasonable if there is still plenty of time left. Furthermore, the mental accounting framework gives support that changes in the monetary value of a underlying are not so much taken into account until they are realized. So, if the “expiry date” of your investment is far away, money seems to be something very abstract. I expect this to be different if only few periods remain until this “expiry date”. The investor knows that gains or losses, respectively, will have to be realized, soon. Hence, an investor’s perception of money may be different to that before. As presented in a paper of Kahnemann, Knetsch and Thaler (1991), there could be something like an endowment effect in the very last periods of investment. The investor overvalues her short-term gains (as they can be realized soon in form of “real” money) and therefore she would probably not take more risk in the next period. Furthermore, the reaction to losses, with the end of horizon being proximately close, is expected to be different. Being in the gain area with her total investment (meaning that she outperformed your reference point) the investor may also turn more risk averse whereas she might turn more risk seeking after prior losses when she is still underperforming to her reference point, if more risky alternatives give her the possibility to break-even. (This could support the finding of Thaler and Johnson.)

An investigation in the impact of time on changing risk preferences could give us an interesting perspective on prospect theory in non-static gambles. I would find such an investigation particularly intriguing as there could be an explanation for a difference in the direction of an effect. (i.e. reactions to gains, as described above.) Existing literature was mostly stressing the finding that prior gains lead to more risk seeking.

As well, there has been recent literature on the general time-stability of risk preferences. (E.g. Baucells and Villasis (2010) or Zeisberger, Vrecko and Langer (2011)) It is not the specific concern of my thesis to discuss this general stability of risk preferences over time. I am interested in interim changes from a general, personal risk preference. Of course, I thereby assume that within the horizon I was introducing above there are no changes in this generally underlying attitude towards risk. (In reality this might be a concern. However, as I will propose in the next section, for an experimental study with single periods being very short and a total length of horizon (=sum of all periods) that takes around one hour we can neglect this fact.) The concept of a reference point and a prior performance measure would get really complicated when introducing another measure for general risk instability. To keep it easy we do have to assume that after adjusting the reference point and thereby clearing the mental account for prior performance, the investor still has her original set of risk preferences. However, the findings of the mentioned papers shall be included and discussed, as well.

Hypothesis:

H1: Time has a relevant influence on the (interim) changes of risk preferences with regard to prior outcomes.

H11: There is a change in the direction of the effect if the end of a given horizon is proximate.

H12: The strength of the risk seeking effect after prior gains diminishes with less periods remaining.

H0: There is no effect of time on the change of risk preferences with regard to prior outcomes.

H1: There is no permanent change in the general (underlying) risk preferences an individual has.

H0: Attitudes toward risk change permanently after the experience of a certain performance.

Empirical Method and Structure of the Thesis

The first part of the Thesis should introduce the reader to existing empirical research and give a survey over the findings made so far on this field. The particular interest of my work shall be discussed on the background of existing literature as well as with regard to personal interest and intuition.

The main part shall consist of the analysis of an experimental study. I could imagine doing a simulated investment game. Subjects are endowed with some play money and are given information about the available strategies they may choose. The information set contains the variance and expected return for the different strategies and the number of periods within which the subject can choose how to invest her money. After each period, the subjects are informed about the outcome of their strategy and they are told the number of periods remaining until the game is finished. Afterwards, they can decide again how to invest their money. There shall be no transaction cost, if they want to change from one strategy to another. Depending on the number of subjects participating, it could be interesting to divide subjects in two groups, where only one group is told the number of remaining periods every round. This could make it easier to isolate the particular effect of remaining time on decision in my analysis. The number of periods played in total has to be sufficiently long. It will only be possible to make sound findings if there is a real difference for subjects between a long time remaining and a short time remaining.

The final part should integrate the thesis in the existing research. It should discuss the quality, as well as the relevance of the findings. Which pending questions can be answered? What has to be clarified in future research? Are the results only of a theoretical nature or could they be applied to practice?

Of course, I am not sure if it is appropriate for a Bachelor Thesis to conduct an own experimental study. There would be more simple ways to get data (i.e. questionnaires...) or maybe make use of data that has already been collected, as far as this might be possible.

However, I find it absolutely worthwhile to conduct an own experiment on this topic as it could give interesting findings for our understanding of risk preferences.

Relevant Literature

Barberis, N. and Ming Huang and Richard Thaler (2006), "Individual Preferences, Monetary Gambles, and Stock Market Participation: A Case for Narrow Framing.", *The American Economic Review*, Vol. 96 No. 4, 1069-1090

Barberis, N. and Ming Huang and Tano Santos (1999), *Prospect Theory and Asset Prices*, NBER Working Paper No. 7220

Baucells, M., & Villasís, A. (2010). Stability of risk preferences and the reflection effect of prospect-theory. *Theory and Decision*, 68(1-2), 193–211.

Camerer, C. and Martin Weber (1996), "The disposition effect in securities trading: an experimental analysis", *Journal of Economic Behavior and Organization*, Vol. 33, 167-184

Kahneman, Daniel, Amos Tversky and Richard Thaler (1991): Experimental Test of the endowment effect and the Coase Theorem. *Journal of Political Economy*

Rabin, M. (1997), "Risk aversion and Expected-Utility Theory: A Calibration Theorem", *Econometrica*, Vol. 68, 1281-1292

Rabin, M. and Botond Köszegi (2007), "Reference-Dependant Risk Attitudes", *American Economic Review*, Vol. 97 No. 4, 1047-1073

Thaler, R. and Eric Johnson (1990), Gambling with the house money and trying to Break Even: The Effects of Prior Outcomes on Risky Choice, *Management Science*, Vol. 36, No. 6, 643-660.

Weber, M. and Heiko Zuchel (2001), How Do Prior Outcomes Affect Risky Choice? Further Evidence on the House-Money Effect and Escalation of Commitment", *JEL*

Zeisberger, S. and Dennis Vrečko and Thomas Langer (2010), Measuring the time stability of Prospect Theory preferences, *Springer*, 359-386