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Prospect Theory in Mutual Funds

Effects on mutual funds' performance and cash flows

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UNIVERSITY OF VAASA**School of Accounting and Finance****Author:** Anniina Kikari**Title of the thesis:** Prospect Theory in Mutual Funds: Effects on mutual funds' performance and cash flows**Degree:** Bachelor of Science in Economics and Business Administration**Discipline:** Finance**Supervisor:** John Kihn**Year:** 2026 **Pages:** 40

ABSTRACT:

The purpose of this thesis is to investigate whether the prospect theory can explain fund flows and performance of mutual funds. Through a literature review, this thesis finds that, especially with retail investors, prospect theory is noticed through their loss aversion and overweighting of small probabilities of extreme results. These lead to cash flows to funds that are considered valuable by prospects to investors, and cash flows out of funds that are not. Financial professionals are less susceptible to extreme loss aversion, but this thesis still finds evidence of portfolio managers behaving according to certain aspects of prospect theory.

KEYWORDS: Prospect Theory, Mutual Funds, Decision making, Risk-taking

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TIIVISTELMÄ:

Tämän opinnäytetyön tarkoituksena on selvittää, voiko prospektiteoria selittää sijoitusrahaston rahavirtoja ja sijoitusrahastojen suorituskykyä. Kirjallisuuskatsauksena tämä tutkielma toteaa, että etenkin yksityissijoittajien kohdalla prospektiteoria huomataan heidän tappiovastemielisyydestään ja äärimmäisten tuottojen pienten todennäköisyyksien ylipainotuksesta. Nämä lisäävät rahavirtoja rahastoihin, joita sijoittajat pitävät arvokkaina mahdollisuuksien puolesta, ja pois rahastoista, joita sijoittajat eivät koe arvokkaina. Rahoitusalan ammattilaiset ovat vähemmän alttiita äärimmäiselle tappioiden vastenmielisyydelle, mutta tämä tutkielma löytää silti todisteita siitä, että salkunhoitajat käyttäytyvät prospektiteorian tiettyjen näkökulmien mukaisesti.

AVAINSANAT: Prospect Theory, Mutual Funds, Decision making, Risk-taking

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1 Introduction

Open-ended mutual funds, hereafter also referred to as mutual funds, are a type of investment company. This means that investors can buy shares of such a fund to receive ownership and therefore profits. Mutual funds combine investments into a money pool, which then invests the money according to its investment goals and restrictions, which are outlined in its prospectus. Open-ended mutual funds are the most common way to invest among individual investors in the United States (Holden et al., 2024). Funds are easy to invest in, there are many of them, and they are usually well diversified, lowering the risk in the investment. There are also many fund types to choose from. Index funds offer approximately the same return as the index with low costs. On the other hand, active mutual funds can offer the possibility for excess returns compared to an index and could be more suited for investors' preferences, but they come with higher costs. This study focuses on actively managed open-ended mutual funds.

With mutual funds being popular, especially with retail investors, they are subject to different types of psychological effects caused by different external and internal factors. These effects can make investors act irrationally, namely acting against the logic of normative theories, which determine how one should act logically. As all standard normative textbook theories assume that investors always act rationally (i.e., expected utility theory, efficient market hypothesis, modern portfolio theory), Kahneman and Tversky (1979) notice that people tend to act irrationally when it comes to losing or gaining money. They create prospect theory to better model this asymmetrical behavior.

As risk, the uncertainty of returns that is often measured with the standard deviation of historical returns, is present in every decision in financial markets, there are many theories to observe it. This study mentions different risk and returns models, but when focusing on investors' behavior when facing risk, I have decided to limit my research to prospect theory, a theory about the disequilibrium between the value of gains and losses. I am especially interested in how investors proceed with their investment portfolio after a gain or a loss. I focus on how investors actually behave when they are faced with risky

decisions regarding their portfolio. Prospect theory is interesting because everyone has their own risk tolerance, and no theory can ever fully take that into consideration. However, with prospect theory measuring the prospect related to the current state of assets, it could better account for that than other measures do.

1.1 Purpose of the study

The purpose of this thesis is to examine whether prospect theory can be used to explain fluctuations in fund flows and the performance of mutual funds. More specifically, if mutual fund counterparties (i.e., investors and portfolio managers) strengthen the effects of prospect theory with their behavior.

Hence, my hypotheses are

H1: Fund flows react to funds' past performance asymmetrically.

H2: Fund performance is driven by investors' behavior.

I am assuming that investors' behavior follows the assumptions of prospect theory. Assuming the effect of losses to be bigger than that of gains, I believe investors' investment decisions will depend on previous success. Positive returns will attract greater inflow. Following that hypothesis, I also hypothesize that prospect theory's key aspects will affect future fund performance. This will be mostly due to investor behavior, but fund managers are also partly responsible.

The point of this study is to bring more attention to the irrational behavior of investors. Also, to note how prospect theory can explain such behavior when examining mutual funds, but also what it misses. It is important for fund managers to realize that their decisions aren't the only thing affecting the fund and that their decisions can be very easily affected by investors. For investors, it can be eye-opening to realize how much

irrationality is in their investment decisions, and after that, if the irrationality of others could be used to their benefit.

Keeping in mind that prospect theory pictures the average of people's utility and not the exact utility of a certain person. Hopefully, this thesis could inspire investors to study their risk tolerance and find out their own utility curve, notice where the utility is too deeply decreasing, so that the risk is no longer worth it. Then investors could find the most suitable investment strategy for themselves.

This thesis doesn't take into deep consideration the different types of funds, and passive funds are only explained. For clarity, this thesis focuses on funds that invest mainly in stocks, because the majority of earlier studies on prospect theory focus on stocks. Also, this study focuses on the theoretical idea of prospect theory and not on the calculations in it. This is because the prospect theory is created descriptively, focusing on actual examined behavior, and then adjusted into a normative theory, trying to explain by math how people behave.

1.2 Structure of the study

The first chapter of this thesis is an introduction to the topic and hypothesis, as well as the purpose of the study. In chapters 2 and 3, the study covers the theoretical background, focusing on actively managed funds and prospect theory. Chapter four is a literature review on how the prospect theory assumptions affect actively managed funds from the perspective of investors and fund managers. Finally, in the last chapter is the conclusion of this thesis.

2 Mutual funds

Mutual funds have grown more and more popular over the years (European System of Central Banks, 2025). Mutual funds' ease of investment, accessibility, and diversification benefits have certainly attracted investors.

2.1 Active vs. Passive Funds

By combining investors' money into a shared money pool, mutual funds can offer efficient diversification that the investor couldn't achieve themselves. Mutual funds can also offer investors customer services, low transaction costs, and professional management (Gruber, 2024). From these, professional management is the one differentiating actively and passively managed mutual funds. Passive funds try to follow the performance of a benchmark index, whereas active funds try to outperform their benchmark, which is often a market index or a combination of indices that better match the fund. The excess return over the benchmark is called the fund's alpha, which can be negative or positive.

By the nature of active funds, it is a common belief that professional management creates higher returns. Reinforcing this, Chauhan (2023, pp. 1202–1204) argues that a fund's alpha could be the result of managerial skill or luck, but possibly it is the result of both. The factors that create alpha are, according to Cremers & Petajisto (2009, p. 3329), most effective for actively managed funds as the managers have freedom on the content of the fund and the timing of transactions. These give active funds an opportunity to outperform the benchmark and therefore also outperform passive funds. That is also why active funds are reactive to changes in economic situations and can allocate securities based on forecasts. When, in contrast, passive funds follow the benchmark, no matter whether markets are rising or falling. Chauhan (2023, p. 1023) confirms that, especially in winner funds, managers' ability to allocate securities is better than their benchmarks. This thesis focuses on active mutual funds to best account for behavioral effects, even though, in recent years, passive funds have gained investors at the expense of active funds (Sotes-Paladino & Zapatero, 2022).

Portfolio diversification enables allocation in different securities. Managers are trying to find an efficient portfolio that follows the goals of the fund, for example, specialization in certain segments or in ESG responsibility. Managers freedom in transactions can bring its own risk as managers forecasts can differ from reality. Passive funds don't share the same risk. Cremers and Petajisto (2009, p. 3330) remind that there are also differences between active funds regarding their activity. Passive funds are also managed slightly to update the portfolio composition to match the index, but not so much that managers would have an effect.

The differences between active and passive funds are the reason for the difference in their costs. Passive funds have lower fees than active funds, and active funds can have extra fees if they are performing better than their benchmark (Sotes-Paladino & Zapatero, 2022, p. 2). Especially with costs rising higher in active funds, investors are expecting a bigger profit for the risk they take with a fund.

2.2 Performance and fund flows

A mutual fund's performance is often an element that investors look at before making an investment decision. Gruber (1996) even states that performance is one of the biggest reasons why investors choose mutual funds. Performance, however, can be measured in different ways. Next, this thesis will introduce some ways to measure portfolio performance, and after that, some studies on how actively managed mutual funds actually perform.

2.2.1 Theories for mutual funds' performance

Modern Portfolio Theory (MPT), created by Markowitz (1952a), is the base theory for portfolios and therefore funds. MPT is based on diversification, which is the core factor

for funds and may be the reason that funds are such a big part of financial markets, especially among retail investors. Diversification can decrease risk without decreasing returns. In MPT, Markowitz suggests an *expected returns-variance of returns (E-V) rule*, which simply means that one should create a portfolio that maximizes return while minimizing the variance (i.e., risk) of a portfolio. Such a portfolio is called efficient. An efficient portfolio is usually created by diversification, because with a well-diversified portfolio, an investor can cancel out any idiosyncratic risk, leaving only the market risk. From efficient portfolios, an efficient frontier can be created, which identifies the best portfolios at each risk level. MPT doesn't necessarily offer a calculation for performance, but helps to compare portfolios. MPT and efficient portfolios are a common assumption in portfolio studies. Nevertheless, according to Ballesterro & Pla-Santamaria (2004, p. 386), often actual funds use inefficient portfolios.

MPT was the base for **the Capital Asset Pricing Model (CAPM)**, which is probably the most used theoretical model for asset pricing. It is developed through studies by Markowitz (1952a), Sharpe (1964), Lintner (1965), and Mossin (1966). CAPM provides the expected return based on market risk. The formula for the CAPM is

$$R_P = R_f + \beta_P(R_M - R_f), \quad (1)$$

where R_P = expected return of a portfolio, R_f = risk-free rate, β_P = beta (i.e., volatility (risk) relative to market) of a portfolio, and R_M = expected return of the market. It is the first model on market equilibrium, which means that the portfolio's beta is the only relevant measure of risk (Maiti, 2020, p. 176). CAPM has assumptions, which, for example, cancel out taxes and transaction costs, making the theory disconnected from reality. However, as mentioned before, it is the most used theory and almost all the other theories for portfolio performance measurement follow CAPM, making it significant.

Creation of CAPM inspired risk-adjusted performance measures such as the **Treynor Ratio**, the **Sharpe Ratio**, and **Jensen's Alpha**. The Treynor ratio calculates market risk-adjusted performance by using systematic risk instead of total risk (Treynor, 1965):

$$\text{Treynor ratio} = \frac{R_P - R_f}{\beta_P}. \quad (2)$$

Sharpe (1966) extends the study from Treynor and creates a ratio to calculate extra return per unit of total risk:

$$\text{Sharpe ratio} = \frac{R_P - R_f}{\sigma} \varepsilon, \quad (3)$$

where σ = standard deviation of portfolio return.

Jensen's alpha uses the CAPM most from these measures as it compares the return of the portfolio with the expected return calculated by CAPM (Khan et al., 2016):

$$\alpha = R_P - (R_f + \beta_P(R_M - R_f)). \quad (4)$$

Jensen's (1968, p. 390) performance measure is absolute; informing if the portfolio performs well compared to its expected return, whereas Sharpe and Treynor ratios are relative; informing if the portfolio performs better compared to other portfolios or benchmarks.

From the CAPM began also the development of **Multi-Factor Asset Pricing Models**. Whereas CAPM is a risk-measuring model, multi-factor models explain returns. The base for multi-factor models is the Fama & French three-factor model. Fama & French (1993) created a model that extends from CAPM's market risk premium with size and value factors:

$$R_P = R_f + \beta_P(R_m - R_f) + s(SMB) + h(HML) + \varepsilon \quad (5)$$

where SMB = size factor (small minus big) and HML = value factor (High minus low), to better explain where alpha comes from.

Their objective for the model was to improve asset-pricing for bonds, stocks, and funds. The model's functionality is based on size and value factors that are important drivers in fund performance, as Chauhan (2023, p. 1203) states that the consistent gains in funds come from the ability to predict size and value factors well. Fama and French (1993, p. 9) open SML and HML more and explain that the size factor represents the risk that returns related to size have. It's calculated by subtracting monthly changes in big-stock portfolio returns from small-stock portfolio returns. In value factor returns are related to book-to-market equity, and the value factor is created by calculating the monthly difference between high return and low return portfolios. The three-factor model has been upgraded by adding new factors that explain returns. An example of these is the Four Factor Model, which Carhart (1997) created by adding the momentum factor. Momentum is a strategy proposed by Jegadeesh and Titman (1993) that suggests that winners from the past will perform better in the coming year.

2.2.2 Evidence on actively managed mutual funds' performance

Although there are many theories for where the returns come from, according to numerous studies, actively managed mutual funds don't seem to create excess returns as they have been underperforming compared to their indices (Chauhan, 2023, p. 1204; Fama & French, 2010, p. 1923; Gruber, 1996). As this thesis finds that most of the studies seem to have that conclusion, the studies themselves differ a lot due to different performance measures and data selections.

Gruber (1996) finds that mutual funds in the United States underperformed the market by 1,94% annually in the years 1985-1994 when only unadjusted returns were considered. However, when the sample was examined with the risk-adjusted four-index model, the underperformance was only 0,65% per year. His study excludes funds that didn't

have consistent data or were registered foreign, specialized, or balanced, and it eliminates the survivorship bias, by a “follow the money” approach that assumes in a case of policy change or merging of funds, the money would go to the surviving fund. From this, we can see that every study isn’t comparable as the examination method affects the results. Every study doesn’t necessarily cancel possible biases in the data. Gruber (1996) also states that at different times, mutual funds will prefer certain strategies. In his sample, growth-oriented smaller stocks were popular. All of these bring their own challenge for comparing the results of different studies.

Momentum-based strategies in mutual funds, however, seem to be an exception. Carhart (1997, p. 73-81) states that funds that follow a momentum strategy in stocks might overperform consistently. He found an 8 percent yearly profit in buying last year’s top-decile funds and selling last year’s bottom-decile. This brings him to suggest that the best performing funds in the past have a better expected return the next year, but this momentum doesn’t pass on into longer periods than that. Chauhan (2023, pp. 1206-1210) studies Carhart’s theory and provides evidence to back it. He emphasizes the momentum strategy’s short-term effect as he finds that momentum is allocated weakest for the strong momentum winner funds after one year. He also finds that when funds are sorted into quintiles, both the winner and loser quintiles have significantly more exposure to momentum. Meaning that the best and worst funds take more risk in predicting the momentum. Even if a momentum strategy can provide funds with overperformance, there is also the risk that momentum is falsely predicted. It shows that even momentum isn’t foolproof, and it provides mixed performance.

Gruber (1996) finds momentum in his study on performance persistence and presents evidence from it as he finds that past performance explains future performance to some extent. Gruber (1996) finds that annual cash flows for the following year are highest for the best performing portfolio and lowest for the worst performing. This indicates that investors are looking for past returns and investing according to them. Choi and Robertson (2020) find that retail investors especially choose funds with high previous

performance, because they believe it to be a good indicator of the portfolio manager's asset picking skill. This adds cash flows into funds, making it necessary for fund managers to make new transactions, which can cause underperformance, especially with extreme inflows and outflows (Zhu & Woltering, 2021, p. 545). Fund's cash flows are affected by many things, and there might be speculation on how certain factors truly affect it. Some factors that can affect funds' cash flows are distribution channels, marketing effort, reputation, and other biases.

There might also be speculation on what affects what. One of these is the distribution channel of a fund. For example, Stoughton et al. (2011, p. 950) find a connection between the variety of distribution channels and the fund performance. They find that underperforming funds are sold only indirectly (by intermediaries), and active funds with equal or higher performance to passive funds are sold simultaneously through direct and indirect channels. Guercio and Reuter (2014, p. 12) come across a similar effect as they find that direct-sold actively managed funds outperform broker-sold actively managed funds, on average, by 12 basis points per month. This could be because top-ranked funds are more easily available in many channels. Gruber (1996) also states that top-ranked funds have lower fees compared to poorly performing funds, which could be a partial explanation for the difference in performance between channels. However, it could also be that broker expenses are too high.

Expenses seem to affect the performance of funds. Sharpe (1991) also notices this and creates a theory that before costs, the returns of active and passive portfolios are the same on average, and after costs, the return on an average actively managed portfolio will be less than a comparable passive portfolio's. The study also suggests that the active portfolios don't often match the indices they are compared to, as active managers can hold assets from outside the index market. Fama and French (2010, p. 1915) prove Sharpe's (1991) theory as they research fund performance from a symmetrical view and find that the estimated investors' net return is negative by the amount of expenses. Fama and French (2010, p. 1932) estimate by the three-factor model that only 3 % of

small fund (below 5 million dollars) managers are skilled enough to cover their costs. Carhart (1997) has come to the same conclusion that the short-term mutual fund returns are not created by the skill of mutual fund managers but by common factors (i.e., four-model factors) in stock return and differences in expenses and transaction costs. Gruber (1996) also reasons the same result: even if actively managing funds could provide value on average, the fees will lower the performance to a negative level. From underperformance in mutual funds, one could reason that active management doesn't create excess return. Even Chauhan's (2023, p. 1023) study notes that fund managers' ability to choose better securities doesn't differ much from others. When the observations take expenses into account, the results are even worse.

2.3 Investors, managers, and intermediaries

Ballesterro & Pla-Santamaria (2004, pp. 391-392) note in their study that in mutual funds, the investors seldom get the perfect portfolio for themselves as their preferences for profitability and risk differ. The reason that investors are still drawn to active funds is that they often specialize in certain dimensions. That way, investors can speculate in the market as they choose which types of funds they invest in, or they can choose not to speculate at all and invest in nearly everything. For example, investing in fixed-income funds shows the risk level that the investor is willing to take, but it also shows what their general idea of the market is. Therefore, investors' fund flows shift the fund market to focus on the coming trends (Vidal et al., 2025).

But as mentioned previously, investors seek professional management in active funds and could therefore be more accepting of not having all their preferences met. However, performance is usually the thing that investors are most interested in (Andreu et al., 2020, p. 254). So, as investors might be fine with not having their expectations met with other things, such as certain categories or sectors, they are not ready to risk their profits. If the fund doesn't perform on the level that is expected, investors will redirect their investments (Vidal et al., 2025). This tells about investors' behavior and their motives.

On the other side are fund managers who are responsible for managing the funds. Their output depends a lot on what type of funds they manage. Hedge funds, which seek profit at every stage of the economy, for example, are a lot more labor-intensive than index funds that must be updated to match the index when it changes, most often in major index funds quarterly. Fund managers are in charge of deciding which instruments are invested in and when the transactions are made. However, as mentioned previously, fund managers won't be successful if they don't follow investor preferences, as outflow can eventually result in the fund being abolished.

Investors aren't often in contact with the actual fund manager but rather with an intermediate dealer such as a financial adviser, broker, consultant, or feeder funds (Stoughton et al., 2011, pp. 947–948). Stoughton et al. (2011) show data that 80% of households that invest in mutual funds have done so through professional advisory services, which makes them an important part of the fund market. The use of intermediaries can be both a positive and a negative for the markets. They connect investors and funds, but the way they do it can be controversial. Stoughton et al. (2011, p. 948) note that intermediaries get compensated in different ways. One way is for intermediaries to be “fee-only” advisers who get the compensation only from their clients, and on the opposite side of that are intermediaries who get their compensation from fund manager companies as rebates. The latter could cause favorable treatment towards certain funds. It is important to notice this effect when looking at the big picture, as this affects the fund flows and could therefore distort the fund markets.

Stoughton et al. (2011, pp. 949-951) find in their study that advisers increase the elasticity of investor demand and reduce management fees, creating a better environment for investors, if investors are rational and the advisory industry is competitive. However, as investors aren't always rational, this is hardly possible even if kickbacks, undisclosed commissions from mutual fund companies to intermediaries for steering investors' money into specific funds, would not be considered (Inderst & Ottaviani, 2012). However,

kickbacks do exist, and according to Stoughton et al. (2011), those are creating price discrimination and higher portfolio management fees and therefore negatively affect fund performance.

3 Prospect theory

3.1 Evidence behind prospect theory

Expected utility theory (EUT) is a decision-making theory based on maximizing utility by making rational choices. It is a simple calculation of the probability-weighted average of utilities. EUT assumes that the decision maker acts according to the expected value. Statman (2017, pp. 116–117) summarizes that EUT measures wealth utility, the life evaluation, or sustained happiness derived from wealth. This is the second assumption of EUT, as it assumes utility based on the amount of final assets (Bernoulli, 1954, pp. 25–26). This means that if one person loses 100 units of money and ends up with 1000 units, that person will be happier than someone who gains 100 units and now has 500 units. EUT also assumes that everyone is risk-averse, meaning the utility function is concave, as shown in Figure 1.

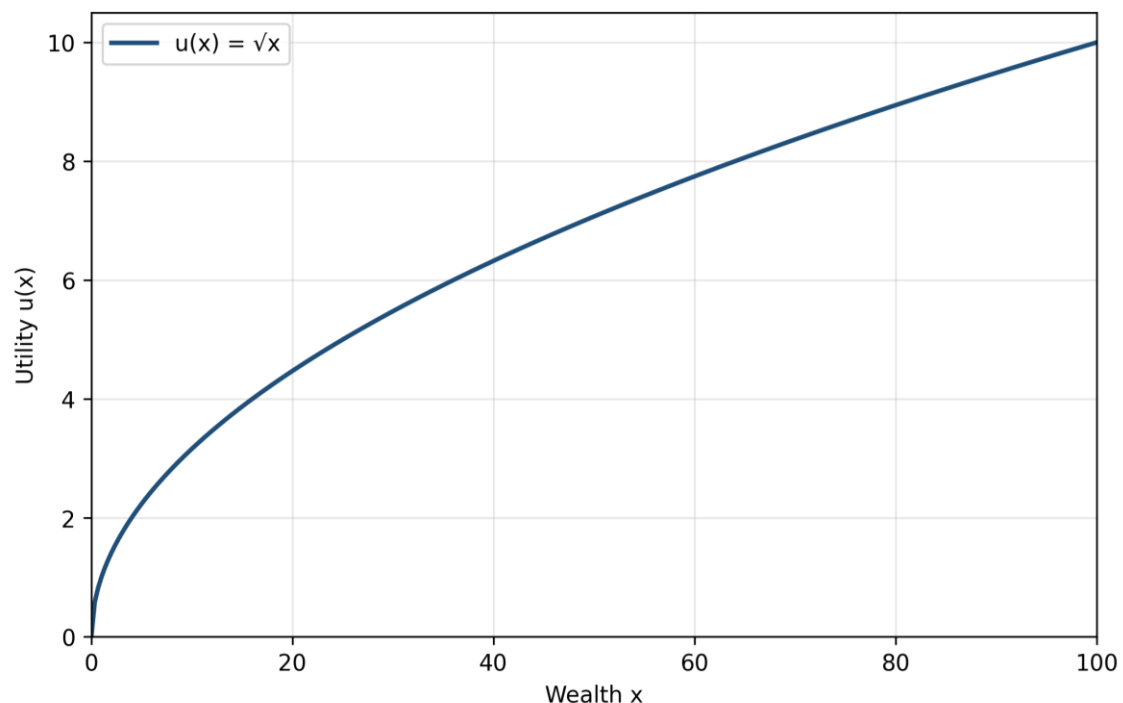


Figure 1. Expected utility value function. Figure created by the author.

EUT has been the most common model for decision-making under risk for centuries, as it dates to the eighteenth century and to Bernoulli's (1738) theory for measuring risk. However, it was really adopted to use in the nineteenth century and is still widely taught and used (Moscati 2016). Additionally, the publication of *Theory of Games and Economic Behavior* by Von Neumann and Morgenstern in 1944 reinforced EUT's status as a model to measure risky utility, as they provided a series of axioms about an individual's preferences with risk that follow EUT (Moscati, 2016).

Many academics, on the other hand, have a consensus that EUT's basic principles are systematically violated, which is why it started to get more and more criticism in the 1930s–1950s (Moscati, 2016, p. 220). Friedman and Savage (1948) test decision-making behavior under risk and note that risky choices with alternatives can't be measured by maximization of expected utility, as EUT does, but should rather be measured by marginal utility, which is the amount of additional satisfaction that can be received from having one more unit of a good.

Friedman and Savage (1948, pp. 279–287) discuss that people often choose certainty over uncertainty, as can be seen from consumer insurance. However, the same people who buy insurance for safety also gamble, which would show inconsistency in consumer behavior if the utility were to increase at a constant rate with income. That's why Friedman and Savage (1948, pp. 293–297) construct their own utility function, pictured in Figure 2.

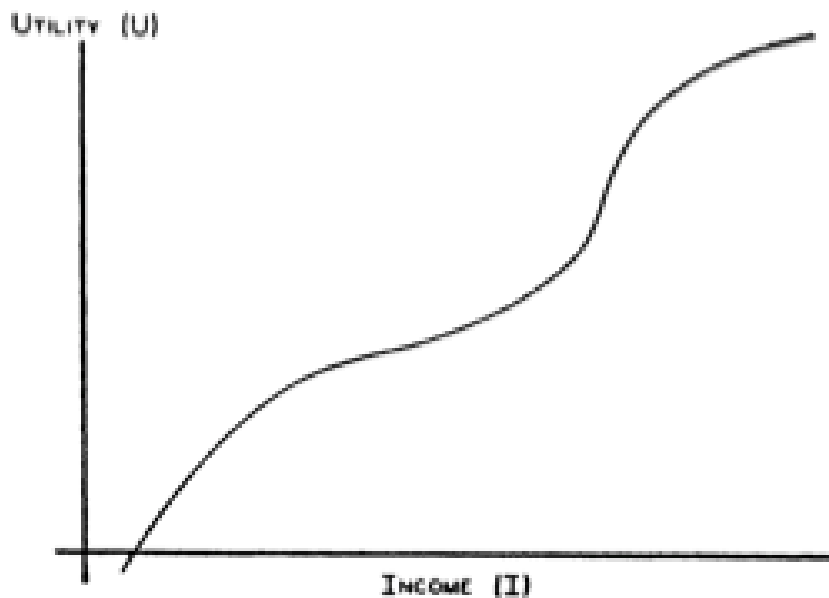


Figure 2. Illustration of the typical shape of the utility curve (Friedman & Savage, 1948)

Friedman and Savage (1948, p. 301) divide the utility function by income and therefore make the assumption that people would behave based on their income level. According to their theory, low-income and high-income consumers would be more risk-averse and would rather take insurance to protect their income than gamble with lottery-like instruments, and the intermediate-income consumers would be willing to take more risk. This illogicality is discussed more by Markowitz (1952b, p. 153) as he notes that generally, poor and wealthy people do gamble, but in different ways. Markowitz also extends Friedman and Savage's analysis by making the value function individual rather than explaining the utility for all consumers. He also introduces *customary wealth*, which would be another point of inflection for the utility function resulting from unexpected gains or losses of wealth.

The problem with some of the theories is that they assume the risk tolerance and utility in terms of current assets or current income level. It would be hard to know where exactly one is on the curve. Kahneman and Tversky (1979) tackle this challenge with

prospect theory (PT). As the EUT supposes that utility is defined by final asset position, PT, as well as Markowitz (1952b), defines utility as gains and losses.

3.2 Prospect theory

As mentioned above, PT is not the first to critique EUT, but it has gained a lot of attention, and it has combined the most realistic features of decision-making (van Bilsen & Laeven, 2020, p. 225). Kahneman & Tversky (1979) find that when people are presented with choice problems, they often choose against the EUT, which presumes that people would always make the rational choice. Because of that, they introduced their own model, prospect theory, that would better account for people's actual behavior. They divide the process of risky choice into two phases: editing and evaluation. In the editing phase, the prospects are made more easily comprehended, and in the evaluation phase, the decision maker will analyze every prospect and choose the one with the highest value for them personally. This follows that while making decisions, people might distort the actual probabilities and possible gains or losses.

In PT, people's emotions regarding losing and gaining money are recognized, and their value is estimated. The value discussed in PT is not actual utility but the personal psychological value that the decision maker gives to their gains and losses. These values create a hypothetical value function, pictured in Figure 3, which comes from a series of observations from Kahneman & Tversky (1979). First, they notice a phenomenon labeled as the *certainty effect*, meaning that when people are offered a chance of winning something, they overweight the outcomes considered certain compared to outcomes that are probable. The second observation is the *reflection effect*. When the question is changed from chance of gaining something to a chance of losing something, the outcomes are mirrored. By the reflection effect, they imply that people are risk-averse with gains and risk-seeking with losses. The third observation that Kahneman and Tversky make is that the marginal value of gains and losses decreases with size, meaning that a change from 100 to 200 is considered greater than a change from 1100 to 1200. The last observation

leading to the value function is that the harm from losing a sum of money is greater than the pleasure of gaining that same exact sum. This results in the value function being steeper for losses than gains.

In addition to the observations above, the value function is affected by the reference point. This means that, unlike theories prior to PT, it focuses on gains and losses for a specific decision rather than the current asset position. In PT, the reference point is an asset position that has been expected to obtain (Kahneman & Tversky, 1979, pp. 286–287). So, it is also affected by the amount one could gain. This can be seen in Kahneman & Tversky's (1979, pp. 266) research results, as people would rather choose a certain 3000 units of money rather than 4000 units of money with a chance of 80%. The latter has an expected value of 3200 units of money, having higher utility. The sure gain of 3000 shifts the reference point higher, and losing the other option would mean a loss of 3000 units of money, even if the subject has not received the amount.

These observations are the base for four assumptions, which the theory is built upon; 1) value is measured as gains or losses, not final wealth, 2) value function is s-shaped, concave for gains and convex and steeper for losses, 3) probabilities are nonlinear, with small probabilities overweighted and large probabilities are underweighted, and 4) isolation effect: decision making depends on framing of the prospect (Kahneman & Tversky, 1979).

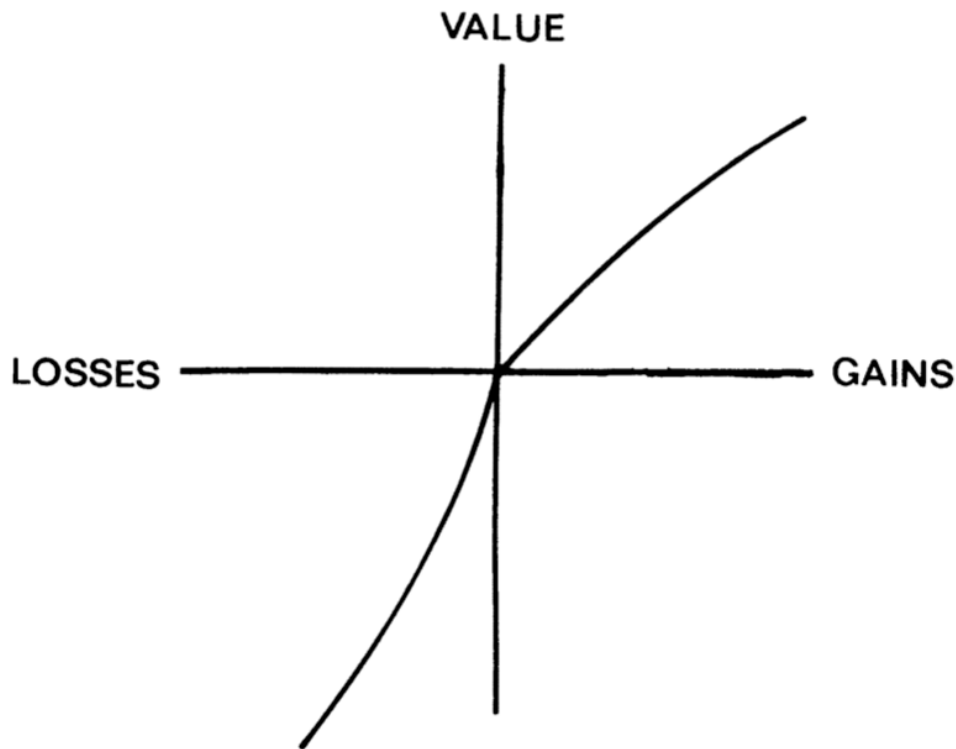


Figure 3. A hypothetical value function (Kahneman & Tversky, 1979)

The hypothetical value function represents the core of PT as it shows that losses are valued more heavily than gains. Based on the above-mentioned observations, loss aversion (i.e., being more sensitive to losses than gains) and probability weighting are the key concepts of PT. It is estimated that the mean loss-aversion parameter, which determines the weighting of losses compared to gains, is between 1.82 and 2.11, meaning that the losses are given twice the weight of equal gains (Yechiam & Zeif, 2025). In addition, probability weighting, the tendency to overweight small probabilities and underweight large probabilities, has a huge role in both the editing and evaluation phase. Wang and Han (2023) note that this can be seen especially with lottery-like situations, because when the returns are extreme, for example, winning millions in a lottery, people tend to overestimate small probabilities. They confirm that such overestimation can be seen in investments also, as it represents investors' speculative preferences towards assets with high previous returns.

PT is a good theory to examine people's choices in risky situations. Even though the initial evidence is from a laboratory setting, it has been proven to work in real life too (Dolder, Vandenbroucke, 2024, p.1). It considers well the fact that people don't act rationally and often make decisions based on their risk tolerance. It gives a realistic insight into human behavior. However, as it mimics people's choices and was created by empirical research, the function it offers to calculate the prospects is complicated, because it forces descriptive information into normative theory. However, it has probably received as much attention as it has because it offers a way to calculate the values.

The weaknesses in PT have encouraged other studies that create adaptations or substitutes for it, and Tversky & Kahneman (1992) even updated their theory themselves into cumulative prospect theory (CPT) by including cumulative functional and extending the theory to different possibilities with any number of outcomes rather than the original two outcomes. CPT offers more assumptions, making the theory more specific. For clarity, this thesis doesn't differentiate PT and CPT but rather observes the assumptions that both of them use.

4 Prospect theory in mutual funds

As PT explains people's choices in risky decisions, it can also be seen in funds, as loss aversion and probability weighting affect both investors and managers. For investors, investment decisions in mutual funds can be complex, as there are many to choose from. Because of that, the effects strengthen, as with many possibilities, comes the uncertainty that the investment decision is not the right one. Managers, however, are affected through investors' actions and by the pressure to manage a well-performing fund. PT could explain fund performance and cash flows, and understanding its effects from both perspectives can bring more awareness to both managers and investors regarding their decisions.

4.1 Investor view: Do fund flows follow past returns?

Investors' behavior can be demonstrated with PT, as it describes the values for gains and losses for investors. Gupta et al. (2022, p. 18) find that loss-aversion and overweighting of small probabilities, the key components of PT, are significant in explaining the investment decisions of mutual fund investors and therefore the fund flows.

4.1.1 Loss aversion

Past performance affects the PT value of a fund (Barberis et al. 2016). Prior studies have noted that investors can overweight the past performance when considering new investments (Barberis et al., 2016, p. 3070; Sirri & Tufano, 1998, p. 1589). As investors see good past performance, they believe that future performance will also be good, even without finding any actual drivers for great future performance. Barberis et al. (2016) base their study mainly on the idea that prior returns from investments create expectations for

future returns and shape the investors' behavior in accordance with loss aversion. Investors create personal PT values for possible investments by forecasting future expectations from prior returns. Gupta et al. (2022, p. 8) notice that funds with prior negative returns have lower fund flows in the future. This could be because investors' loss aversion cancels out the potential that those funds have for the future. Investors will rather navigate their assets to funds that have shown prior success.

Loss aversion can also lead to investors not wanting to realize losses from investments. That's why PT is believed to result in the disposition effect, the tendency to sell winning investments and hold losing investments. Li and Yang (2013, p. 716) specify that gains boost investors' risk aversion, making them unwilling to take risks, and therefore, the urge to sell is higher. On the contrary, losses boost risk-seeking behavior, and investors are more willing to risk already losing shares. Although it isn't so simple, as Barberis and Xiong (2009, pp. 765-770) find that even with PT explaining disposition effect with realized gains or losses, it can also predict the opposite of disposition effect with annual gains or losses. With this, the reference point becomes important. The realization of an investment at a loss is unpleasant, and therefore, an investor might not want to do it. Then again, if the investor follows the fund's annual profits and sees that it is negative, they might want to sell and change to another fund in the belief that other funds will perform better than that one.

As investors are expecting a certain gain from funds (could be from the risk of the fund or the assumption from a previous alpha), they have mentally set the reference point at that certain point. If the fund fails to meet or exceed the expected return, investors could see the return as a loss, even if it would be profitable to them. This could make the fund a poor investment for them, and therefore, they could find other substitute investments in the future. These count towards the fact that negative returns cause outflows from funds and positive returns cause inflows to funds.

4.1.2 Probability weighting

Making investment decisions based on past performance is highly linked to the probability weighting aspect of PT. Barberis et al. (2016, p. 3071) find that probability weighting is a significant part of PT value's predictive power for returns. The probability of extreme performance in a fund after already having extreme performance is likely lower than investors believe. As discussed earlier in this thesis, momentum only lasts for one year. Gupta et al. (2022) find a positive and significant correlation between a fund's past performance and future fund flows. This affirms that PT can explain future fund flows.

Investors follow high PT value, even to the extent of overweighting it. Barberis et al. (2016, p. 3071) study the effects of PT on stock returns and find that the overweighting of high PT values, especially on stocks, leads them to become overpriced, as when PT values rise, risk-adjusted returns are lower. Gu and Yoo (2021) apply this to funds, and their findings support Barberis et al.'s theory. They find that fund flows are more sensitive to extreme performance measures, as a 1-standard-deviation increase in PT value results in a 0,184-standard-deviation increase in next month's fund flows.

With mutual funds, a good sign about the investor's PT value of the fund is the fund flows in and out of the fund. Han et al. (2021, p. 14) note that PT and fund flows have a strong positive relationship. This leads to inflows into high-performing funds, even if there isn't any rational reason for the fund's good performance. Accordingly, outflows from low-performing funds are also due to investors' low prospect value towards those funds. Gupta et al. (2022) find that an increase in the standard deviation in the PT value increases fund flows by 31 basis points in the following quarter. Wang and Han (2023, p. 10-11) study the PT value and fund flows' positive relationship and find it to be due to fund visibility and PT preference. Their data suggests that unsophisticated investors make their investment choices with limited skill and time, and therefore, they overly highlight the extreme results of funds.

4.1.3 The difference between retail and institutional investors

As the end of the last chapter suggested, there is a difference between retail and institutional investors. Retail investors are non-professional individuals who invest their own money, whereas institutional investors are professionals who invest pools of money. The unsophisticated retail investors are more likely to be affected by speculative characters, and they follow PT values more intensely compared to institutional investors. Institutional investors aren't impacted by PT values as much as retail investors, so past returns don't affect them as much, according to Gupta et al. (2022, p. 10-12). They find that with a standard deviation increase in CPT value, retail investors' fund flows could increase 2.99 %. Retail investors' fund flows are therefore significantly impacted by PT values, which again are impacted by the historical return of a fund. This indicates that retail investors are seeking more speculative funds and even lottery-like funds, as the performance is a major part of the investment decision.

Gupta et al. (2022, p. 10) offer explanations for the difference between retail and institutional investors, especially in young funds, where retail investors may find it hard to assess fund manager skills, so they are influenced by speculative characteristics of historical returns. By this, it can be seen that knowledge about investments, funds, and PT helps investors make more rational investment decisions. However, the difference between them could also be highlighted by their different investment strategies, but that also evolves with knowledge. For strategies, Gupta et al. (2022, p. 12) note that for institutional investors that show better style-adjusted performance, the marginal impact on CPT values is negative. This implies that institutional investors would rather invest according to their plan than according to PT value.

Andreu et al. (2020, p. 254-255) state that, based on various prior studies, institutional investors have a weaker disposition effect than retail investors. This can be explained by retail investors having their own money in line, when institutional investors don't.

4.1.4 Other reasons for fund flows

As mentioned before, high returns lead to high PT value and, according to previous studies, high PT values bring more attention to funds. However, these previously discussed studies don't prove that the PT value itself was the reason for future fund flows. Funds can have similar attention for other reasons or, most likely, for the sum of many reasons. For example, marketing of funds can also create attention to them even if the prior returns aren't high compared to other similar funds. Sirri & Tufano (1998, p. 1620) find that funds that can spend more on marketing have stronger performance based on fund flows. The ability to spend on marketing is driven by fees, meaning that higher fees bring more visibility to funds and therefore could lead to higher inflows. They also point out that often the better performing funds are marketed more than the poorly performing, reinforcing the inflows to high-performance funds.

Because retail investors are easier to influence, the above-mentioned marketing and other factors influence them much more than institutional investors. Therefore, other things than just the PT value affect their investment decisions. However, Gupta et al. (2022, p. 9) find evidence that PT represents certain features of fund return distribution that are not captured by other proxies. This is direct proof of PT preferences being strong drivers for mutual fund investors' decisions.

However, it can't be expected that only PT would explain fund flows, so Gupta et al. (2022) list some of the other significant factors that are affecting the fund flows. Firstly, they notice that fund size and age seem to have a negative coefficient on fund flows. Meaning that smaller and younger funds attract greater flows. With young funds, Gupta et al. (2022, p. 12) notice that it could be due to young funds typically having high historical returns. Secondly, on their list, they point out that higher fund ratings cause

higher fund flows. They find that especially 4 and 5-star rated funds, on the Morningstar rating scale, seem to attract more fund flows (Gupta et al, 2022, p. 12).

Gupta et al. (2022) also find that active management can attract more fund flows. As this thesis only considers active funds, it is important to remember that there are differences in how active the funds are. Very active management could be attractive because investors value the ability to adapt to changing economic states smoothly. Related to that, Gupta et al. (2022, p. 19) find that global crises can affect investor behavior overall. Crises can result in a temporary shift in investors' strategies to be more conservative and risk-averse. Lastly, Gupta et al. (2022, p. 14) note country-specific differences with cultural dimensions. They notice that high individualism and short-term orientation cause greater and more flexible fund flows.

4.2 Portfolio manager view: How investors' behavior impacts performance?

This thesis discusses the difference between institutional and retail investors as buyers of mutual fund shares. Extending on that, this thesis will now examine how portfolio management follows PT and if there are differences for investors.

As mutual funds are managed by people, it is only rational that they also face behavioral biases. Khare and Kapoor (2024) study how behavioral biases, such as disposition effect, impact the rational decisions of financial professionals. They notice that financial professionals do indeed act according to different behavioral biases, and most importantly, they are also subject to the disposition effect, the same as investors. They are reluctant to realize losses in funds, holding on to poorly performing assets and selling winning assets. This could limit the possible profits of mutual funds.

Abdellaoui et al. (2013) examined whether PT explains financial professionals' decision-making, and their hypothesis was confirmed. They note that professionals are risk-averse

with gains and slightly risk-seeking with losses, in accordance with PT. Also, the value function for financial professors is similar to one pictured by Kahneman and Tversky (1979) in Figure 3. However, Abdellaoui et al.'s (2013) study shows weaker loss aversion than the original study from Kahneman and Tversky. Their findings are also in line with previous studies that research the same topic but with different methods. Abdellaoui et al. (2013) find that professionals are also affected by probability weighting. Their data suggests that, on average, underweighting of probabilities for gains but not for losses. This would indicate that the value function for losses would be almost linear. Portfolio managers, therefore, should be only slightly risk-seeking for losses but more risk-averse for gains. Their risk aversion for gains, on average, would suggest that profits will be more limited due to their behavioural biases.

As Abdellaoui et al. (2013) measured every financial professional's exposure to PT individually, they came to notice that a significant part of them were not loss-averse at all but gain-seeking. Focusing more on gains and restraining the possibility of losses. This highlights that professionals may have major differences, and some can set aside behavioural biases and create alpha for mutual funds. However, on average, professionals' decisions can be explained by PT. Glode (2011, p. 547) bases his study on the idea that active fund managers who can generate state-specific returns will do so when investors are willing to pay more for it. However, higher fees are reducing the true returns investors receive. Therefore, Glode suggests that investors want insurance-like performance from funds when the economic state is bad. Glode (2011, p. 547) emphasizes that this can also be considered as a rational decision from the investor, but it doesn't cancel out PT.

The finding of Barberis et al. (2016) about stocks becoming overpriced can affect the performance of mutual funds that invest in stocks. The value is driven higher by high demand, and the returns are decreasing, affecting the future performance of a fund. Funds are therefore affected indirectly through stocks, as fund managers tend to allocate more speculative stocks to attract greater fund flows, as Gupta et al. (2022, pp. 15–16)

suggest that mutual fund managers' investment decisions follow prior cumulative PT values. This then affects the fund performance, as risk-adjusted returns aren't as high anymore. Gupta et al. (2022, p. 16) find that funds that have high CPT values will have lower returns in the future, according to Barberis et al.'s (2016) study. They also note that Goldie et al.'s (2019) and Agarwal et al.'s (2020) studies report underperformance of approximately 34 basis points per month for higher lottery-like holdings.

Portfolio managers seem to make decisions following high PT values. This is seen by Gupta et al. (2022, p. 16) as a sign of investor irrationality, as investors' decisions are based on speculative characteristics. However, this can be seen as a PT's effect on fund managers, who keep adding investments they believe will attract more flows to their fund. However, it is good to note that also the extreme inflows into mutual funds compel fund managers to make more transactions – to keep the liquidity requirement at its preferred value – and therefore lead to costly transactions that will lower the profit of the fund. So even a positive effect can turn negative.

Conclusions

This thesis examines PT's ability to explain mutual fund flows and the performance of mutual funds. The primary purpose is to determine whether mutual fund counterparties enforce PT-related biases that could affect mutual funds. This thesis covers the theoretical background on mutual funds and their performance measures, as well as on the PT and the theories behind it. In addition, the performance of actively managed mutual funds is studied in order to better understand in what measure the PT can explain such performance. The structure of this study is built to answer the hypotheses orderly, which are refined from the idea that behavioral biases affect everyone in the markets.

Previous studies provide evidence that investors' behavior towards mutual funds follows the narratives of PT and the assumptions with it. Investors let PT's key aspects, loss aversion, and probability weighting influence their decisions, resulting in biases that weaken the overall returns from investments. It is noted that the effects are stronger among retail investors, who are less educated in financial markets and therefore value irrelevant information more highly. They forecast utility value from simplistic factors, such as mutual funds' previous returns, and focus their cash flows to and out of funds based on them. I find support for the first hypothesis as fund flows follow PT with higher PT values attracting more fund flows. However, it is noticed that there are other drivers for the fund flows, and therefore, it can't be said that PT would be the sole explanatory factor for them.

Whereas retail investors were noticed to be easily influenced by biases, institutional investors, and especially mutual fund managers, were noticeably less influenced. However, this thesis found evidence of financial professionals overweighting probabilities of gains and increasing the possession of speculative assets, which have high PT value. As is noted that professionals themselves are less biased than investors, they cater to the needs of investors to attract cash flows. However, at least extreme cashflows affected by investors'

PT biases affect fund performance as the managers are forced to make costly transactions that decrease the returns. This supports the second hypothesis.

This study's practical relevance for investors is to notice how their behavior is seldom based in fundamental information. This thesis suggests that investors educate themselves more on the prospects and risks before making risky decisions. It is noticed that with more knowledge, behavioral biases can be reduced, and investors can avoid being misled by traders and portfolio managers.

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