DISPOSITION EFFECT IN MUTUAL FUNDS' INVESTMENT DECISIONS: AN ANALYSIS OF ISTANBUL STOCK EXCHANGE

Seçil VARAN

Danışman

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YEMIN METNI

Yüksek Lisans Tezi olarak sunduğum "**Disposition Effect in Mutual Funds' Investment Decisions : An Analysis of Istanbul Stock Exchange**" adlı çalışmanın, tarafımdan, bilimsel ahlak ve geleneklere aykırı düşecek bir yardıma başvurmaksızın yazıldığını ve yararlandığım eserlerin kaynakçada gösterilenlerden oluştuğunu, bunlara atıf yapılarak yararlanılmış olduğunu belirtir ve bunu onurumla doğrularım.

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ABSTRACT

Master with Thesis

Disposition Effect in Mutual Funds' Investment Decisions: An Analysis of Istanbul Stock Exchange

Seçil Varan

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Disposition effect, which refers to the investors' reluctance to realize losses and tendency to realize gains, too soon, has become one of the conspicuous focal points of the recent researchers of Behavioral Finance. Recent empirical evidence indicates that the disposition effect is an irrational behavior which leads to lower profits.

Mutual funds are the prefential investment choice of the particularly small investors in the last two decades. The demand for the mutual funds grows explosively throughout the world fuelled by the ascending globalization of the financial markets.

The aim of this study is to prove empirically that the individual investors can eliminate the disposition effect in their investment decisions by investing in mutual funds. To achieve this purpose, the theoretical and empirical studies are analyzed about the disposition effect in individual and mutual funds' investment decisions, and a sample mutual fund of Turkish Capital Markets is examined in terms of the stock transactions in Istanbul Stock Exchange (ISE).

To determine the existence or non-existence of the disposition effect in the sample mutual fund's investment decisions, the widely accepted methodology of Odean (1998) is followed. The empirical findings of this study indicate that the professional management of the sample fund does not exhibit the disposition effect in its stock investment decisions; hence the individual investors of ISE may choose to invest in this mutual fund to eliminate the disposition effect.

Key Words: 1) Disposition Effect, **2)** Mutual Funds, **3)** Behavioral Finance, **4)** Behavioral Heuristics and Biases, **5)** Prospect Theory

ÖZET

Yüksek Lisans Tezi

Yatırım Fonlarının Yatırım Kararlarında Mizaç Etkisinin Rolü:

İstanbul Menkul Kıymetler Borsası' nın Analizi

Seçil Varan

Dokuz Eylül Üniversitesi
Sosyal Bilimler Enstitüsü
İngilizce İşletme Ana Bilim Dalı
İngilizce Finansman Programı

Yatırımcıların zarar eden yatırımlarını realize etmedeki isteksizliği, ancak kazananları hızla elden çıkarma eğilimi olarak tanımlanan mizaç/yatkınlık etkisi, günümüz Davranışçı Finans araştırmacılarının dikkatini çeken odak noktalarından biri haline gelmiştir. Güncel ampirik bulgular, mizaç/yatkınlık etkisinin karlılığın azalmasına yol açan irrasyonel bir davranış türü olduğunu ortaya koymaktadır.

Yatırım fonları, özellikle son yirmi yılda, bilhassa küçük yatırımcıların öncelikli tercih ettiği bir yatırım türüdür. Yatırım fonlarına olan talep, finansal piyasalarda artan küreselleşmenin de etkisiyle hızla artmaya devam etmektedir.

Bu çalışmanın amacı, bireysel yatırımcıların, yatırım fonlarına yatırım yapmak suretiyle, mizaç/yatkınlık etkisini bertaraf edebileceklerini ampirik olarak kanıtlamaktır. Bu amaçla, bireysel yatırımcılar ve yatırım fonlarının yatırım kararlarındaki mizaç/yatkınlık etkisi ile ilgili teorik ve ampirik çalışmalar incelenmiş ve Türkiye Sermaye Piyasaları'nda işlem gören örnek bir yatırım fonunun, İstanbul Menkul Kıymetler Borsası (İMKB)'ndaki hisse senedi işlemleri tetkik edilmiştir.

Örnek yatırım fonunun yatırım kararlarındaki mizaç/yatkınlık etkisinin varlığının ya da yokluğunun belirlenmesinde, literatürde en çok kabul gören Odean (1998) yöntemi izlenmiştir. Bu araştırmanın ampirik bulguları, örnek yatırım fonunun profesyonel yöneticilerinin, hisse senedi yatırım kararlarında mizaç/yatkınlık etkisi bulunmadığını işaret etmektedir. Bu nedenle, İMKB'nin bireysel yatırımcıları, mizaç/yatkınlık etkisini bertaraf etme amacı ile örnek yatırım fonuna yatırım yapma kararı almayı tercih edebilirler.

Anahtar Kelimeler: 1) Mizaç/Yatkınlık Etkisi, **2)** Yatırım Fonları, **3)** Davranışçı Finans **4)** Hevristikler ve Bilişsel Önyargılar, **5)** Beklenti Teorisi

DISPOSITION EFFECT IN MUTUAL FUNDS' INVESTMENT DECISIONS:
AN ANALYSIS OF ISTANBUL STOCK EXCHANGE

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LIST OF ABBREVATIONS

CBOT	Chicago Board of Trade
CMB	Capital Markets Board
CRSP	Center for Research in Security Prices
DE	Disposition Effect
DS	Disposition Spread
EMH	Efficient Markets Hypothesis
EUT	Expected Utility Theory
ICI	Investment Company Institute
IPO	Initial Public Offering
IRS	Internal Revenue Service
ISE	Istanbul Stock Exchange
PG	Paper Gains
PGR	Proportion of Gains Realized
PL	Paper Losses
PLR	Proportion of Losses Realized
RG	Realized Gains
RL	Realized Losses
SEC	Securities and Exchange Commission
S&P	Standard and Poor's
TSE	Taiwan Stock Exchange
UN	United Nations
US	United States of America
YTL	New Turkish Lira

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INTRODUCTION

Traditional economists assume that the financial investors have access to all available information and have the ability to act rational for their wealth and utility maximization while decision making under risk. The scholars of Behavioral Finance (Kahneman and Tversky 1973; Thaler 1980; Bondt and Thaler 1985; Samuelson and Zeckhauser 1988) however, prove empirically that people consistently behave irrationally in their investment decisions leading to inefficient markets. Their empirical findings are in contrast to the Efficient Markets Theory (EMH) of Fama (1970) which states that the security prices in the financial markets fully reflect all available information; the investors of the financial markets are rational and the prices are equivalent to their fundamental value. As Sewell (2007) points out, Behavioral Finance is the study of the influence of psychology on the behavior of financial agents and the subsequent effect on the financial markets; helping to explain why and how markets might be inefficient.

Due to the recent empirical evidence indicating that the disposition effect which refers to the investors' reluctance to realize losses and tendency to realize gains, too soon; is an irrational behavior which leads to lower profits (Odean 1998; Grinblatt and Keloharju 2001). This concept has become one of the conspicuous focal points of the recent researchers of Behavioral Finance. There is a growing literature aiming to answer the question of how the disposition effect can be eliminated.

Mutual funds are the prefential investment choice of the particularly small investors in the last two decades. A mutual fund represents a collection of investments that is managed by professionals in which the pooled money source comes from many investors where each investor owns shares of the fund.

This study asks whether mutual funds may act as a shield for the investors to avoid the negative effects of the disposition effect by their professional management. The aim of this study is to prove empirically that the individual investors can

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eliminate the disposition effect in their investment decisions by investing in mutual funds. To achieve this purpose, the theoretical and empirical studies are analyzed about the disposition effect in individual and mutual funds' investment decisions, and a sample mutual fund of Turkish Capital Markets is examined in terms of the stock transactions in Istanbul Stock Exchange (ISE).

To determine the existence or non-existence of the disposition effect in the sample mutual fund's investment decisions, the widely accepted methodology of Odean (1998) is followed. The empirical findings of this study indicate that the professional management of the sample fund does not exhibit the disposition effect in their stock investment decisions; hence the individual investors of ISE may choose to invest in this mutual fund for the elimination of the disposition effect.

In this study, the stock trades of the sample fund are examined in order to determine whether the fund management is disposition prone or not. The data from February 2004 to February 2008 is employed and the stock trades of the fund management are analyzed monthly.

The method used to measure the disposition effect is based on Odean (1998) methodology which analyzes the frequency with which investors sell winners and losers relative to their opportunities to sell each. F and T-tests are applied to test the statistical significance of the empirical findings.

This study is consisted of three chapters. The purpose of the first two chapters is to present the theoretical and empirical basis of the disposition effect and disposition effect in mutual funds' investment decisions. The third chapter provides the empirical study of the stock transactions of a sample fund and aims to prove empirically that no disposition effect is exhibited.

In the first chapter of this study, the origins and the main subjects of Behavioral Finance are discussed. This chapter provides the paces of Behavioral Finance topics leading towards to the disposition effect. Firstly, Market Efficiency

and the Expected Utility Theory are explained aiming to understand the origins of Behavioral Finance. Then the topics of Behavioral Finance are presented in detail. The last part of this chapter provides the wide definition of the disposition effect followed by the literature review on the empirical studies concerning the concept.

The second chapter of this study aims to link the disposition effect with the mutual funds. At first, the definition and a brief historical review of mutual funds are given. Then the mutual funds of Turkey are examined with the discussion of the advantages and disadvantages of mutual funds investments. Lastly, a detailed literature review is given on the disposition effect in mutual funds.

In the last chapter of this study, the empirical study is presented of the measurement of the disposition effect in the management of the sample fund's stock investment decisions. Firstly, the data and the limitations of the data are described. Then the methodology of Odean (1998) is explained and how it is applied to the study is described. The last part of the third chapter presents the empirical findings of the study. In the conclusion part, the empirical results, the contribution to the literature and suggestions for further research are discussed.

CHAPTER I

BEHAVIORAL FINANCE AND THE DISPOSITION EFFECT

Traditional framework of finance is formed by two major components that are the Efficient Markets Hypothesis of Fama (1970) and the Expected Utility Theory of Neumann and Morgenstern (1944). From the framework's foundations' perspective, agents of the financial markets are fully rational, while attempting to maximize their financial utility, thus achieving efficient markets.

However in the mid 1960s, concurrently with these two major components argued by financial economists, the actuality of the homo economicus agents of the efficient markets that were deprived from human emotions was criticized; developing a new field in finance with the contribution of cognitive psychology. This new field known as "Behavioral Finance" aims to fill in the deficiency of the traditional framework, to analyze the anomalies and inefficiencies in the financial markets.

In this chapter, I present some brief information about the Efficient Markets Hypothesis of Fama (1970) and the Expected Utility Theory of Neumann and Morgenstern (1944), then I try to range the building structure of Behavioral Finance leading towards to the empirical studies on the disposition effect.

1.1 MARKET EFFICIENCY

In 1900, Louis Bachelier, a thirty years old French mathematician, published his PhD thesis "The Theory of Speculation", going down in history as the founder of the mathematical finance (Davis and Etheridge, 2006). The thesis was also accepted as the first document presenting the Random Walk Theory and the Efficient Markets Hypothesis (EMH). Unfortunately until the 1950s, his work could not attract much attention in financial circles. Samuelson (1965) inscribed the basis for the Random Walk Theory enhancing the theory which states that it is not possible to outperform

the market without taking on additional risks. With Eugene F. Fama (1970) the EMH gained publicity and functionality. EMH states that the security prices fully reflect all available information; investors of the financial markets are rational and the prices are equivalent to their fundamental value. "A market in which prices always fully reflect available information is called efficient" (Fama, 1970:1). "The EMH argues that competition between investors seeking abnormal profits drives prices to their correct value" (Ritter, 2002:2).

Fama (1970) also introduced the three forms of market efficiency. Weak form of efficiency defines the price as the reflection of the past prices and trading history of the security; while the semi-strong form states that the price of the security fully reflects all publicly available information. However, the price reflects all information that is available and unavailable publicly in the strong form of efficiency. So although prices can cause arbitrage opportunities occasionally, beating the market continuously would be a utopia because the rational investors of the markets would be correcting the prices especially in the strong form of the efficient markets.

As the EMH turned into theory in the 1970s, critisms also began to rise; in the light of the market inefficiencies and mispricings empirically tested in the financial markets proving that the strong form efficiency must be rejected. Fama (1991) extended his weak form market efficiency to subsume predicting future returns by accounting or macroeconomic variables. As Russel and Torbey (2002:2) points out "Researchers repeatedly challenged the studies based on EMH by raising critical questions such as: Can the movement in prices be fully attributed to the announcement of events? Do public announcements affect prices at all? And what could be some of the other factors affecting price movements?". Barberis and Thaler (2002) suggest that when a mispricing occurs in the stock prices, strategies designed to correct it can be both risky and costly, thereby allowing the mispricing to survive. So, they believe that arbitrage is a risky process and its' effectiveness should be limited.

1.2 EXPECTED UTILITY THEORY

The expected utility theory (EUT) of Neumann and Morgenstern (1944) states that when making decisions under uncertainty, agents make their decisions based on the outcomes and their probabilities. Neumann and Morgenstern (1944) postulates that a rational agent should choose outcome "a" to outcome "b" if: a, b $\in$ [0, 1] and a > b. People are also considered risk averse when making decisions under uncertainty; they tend to choose the less risky alternative.

Autor (2004) expresses the utility function as U: £ → R has an expected utility form if there is an assignment of numbers (u1, ...uN) to the N outcomes such that for every simple lottery

$$L = (p1, ..., pN)\quad £\ we\ have\ that$$

$$U\ (L) = u1p1 + ... + uN\,pN$$

A utility function with the expected utility form is called a von Neumann Morgenstern (VNM) expected utility function. A person with a utility function with the expected utility property flips a coin to gain or lose one dollar. The utility of that lottery is:

$$U\ (L) = 0.5U\ (w + 1) + 0.5U\ (w − 1)$$

Where w is initial wealth.

According to the expected utility theory, risk aversion is equivalent to the concavity of the utility function (Kahneman, Tversky, 1979:2) as shown in Figure 1. Shumway (2004) points out that people with concave utility functions are risk averse and this result is expressed with an oft-used inequality Jensen's Inequality: If f(x) is a strictly concave function (like a risk-averse utility function) then E[f(x)] < f(E[x]).

Figure 1: The utility function

Source: http://www.gametheory.net/Mike/applets/Risk/
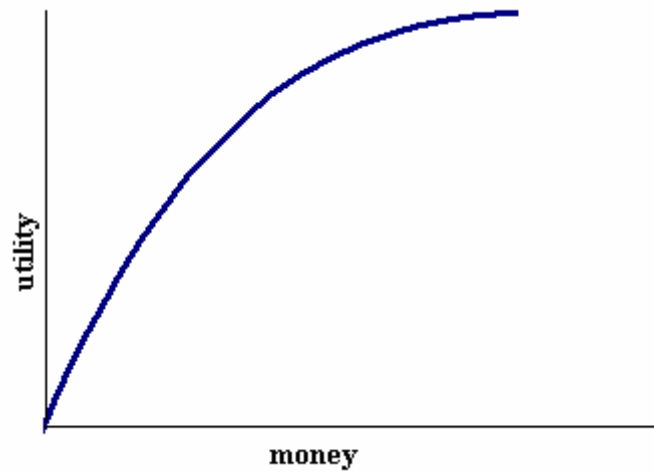
Hedesström (2006) implies that EUT is the foundation of standard economic models of how people make choices with the assumption that individuals have stable and coherent preferences; they know what they want and their preference for a particular option does not depend on the context. However, in psychology there is a growing consensus that people's preferences are constructed. (Ariely, Loewenstein, Prelec, 2003; Hoeffler and Ariely, 1999; Slovic, 1995).

In 1979, Daniel Kahneman and Amos Tversky developed an alternative theory to the EUT for decision making under risk, the "Prospect Theory".

1.3 BEHAVIORAL FINANCE AGAINST EMH AND EUT

1.3.1 Heuristics and Biases

Kahneman and Tversky (1974) replied to the dilemma of decision making under uncertainty and presented three main heuristics plus framing was added by Kahneman and Tversky (1981). They also noted that although these heuristics are functional for decision making, they lead into faulty beliefs, systematic and predictable biases.

1.3.1.1 Representativeness Heuristic

People tend to categorize events as representatives of some particular classes and make judgments based on similarities. Montier (2002) describes the representativeness heuristic as the tendency to evaluate how likely something is with reference to how closely it resembles something rather than using probabilities. As Döm (2003) points out, in stock markets, the investors may choose to buy the stocks of major companies because of their tendency to believe that the stocks of the major and successful companies would be profitable.

Harless and Peterson (1998) suggest that investors mind past mutual fund returns as representative of fund performances while choosing which fund to invest, but they ignore the other risks and expenses. Kahneman and Tversky (1974) specify that the representativeness heuristic leads to serious errors because it is not influenced by several factors that should affect judgments of probability. One of their evidence is the following test they conducted among their students (Kahneman and Tversky, 1974:2):

"For a period of 1 year, each hospital recorded the days on which more than 60 percent of the babies born were boys. Which hospital do you think recorded more such days?
The larger hospital (Chosen by 21 students)
The smaller hospital (Chosen by 21 students)
About the same (Chosen by 53 students)"

As can be emerged, although the sampling theory states that the expected number of days on which more than 60 percent of the babies are boys is much more greater in the small hospital rather than the big one, because a large sample is less likely to stray from 50 percent, the majority of the students were under the illusion of the representativeness heuristic.

1.3.1.2 Availability Heuristic

According to Kahneman and Tversky (1974), while decision making, what comes to our mind easily may be chosen or correlated, according to our personal past or recent experiences, vividness of objects and media factor which leads to predictable biases. For example, if an investor gained profit by buying stocks of a company from the cement industry, she may be biased to continue buying stocks of the same industry, rather than examining other alternatives. Nooteboom (2002) noted that people pay attention only when objects are emotion laden and this helps people to apply filters to their consciousness to avoid overloading. Kahneman and Tversky (1974) listed the biases which may be caused by the availability heuristic as:

- Biases due to the retrievability of instances
- Biases due to the effectiveness of a search set
- Biases of imaginability and
- Illusionary correlation

1.3.1.3 Adjustment and Anchoring

"An experimenter spins a 'Wheel of Fortune' device as you watch, and the Wheel happens to come up pointing to (version one) the number 65 or (version two) the number 15. The experimenter then asks you whether the percentage of African countries in the United Nations is above or below this number. After you answer, the experimenter asks you your estimate of the percentage of African countries in the UN" (Yudkowsky, 2006:11).

In their above demonstration of the adjustment and anchoring heuristic, Kahneman and Tversky (1974) demonstrated that the subjects whose wheel showed the number 15 had lower percentage estimates than the subjects whose wheel showed the number 65. The number showed played an important role in the estimations even though the estimators were aware that it was a random instrument. The adjustments to the wheel's numbers were insufficient.

According to Kahneman and Tversky (1974), people make estimates by starting from an initial value that is adjusted to yield the final answer which is named as anchoring and adjustment heuristic. Epley and Gilovich (2006) applied two tests to the university students in order to identify the origins of insufficient adjustments. They concluded that the adjustments tend to be insufficient because people tend to stop adjusting after reaching a satisfactory value and to eliminate this heuristic, motivation and longer thinking process would help.

1.3.1.4 Framing

While decision making under risk, people rely on how information is presented. Kahneman and Tversky (1981:1) presented this heuristic as framing and illustrated it with the following example.

Problem: Imagine that the US is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

If Program A is adopted, 200 people will be saved.
If Program B is adopted, there is 1/3 probability that 600 people will be saved, and 2/3 probability that no people will be saved.
Which of the two programs would you favor?

Program A was chosen by 72% of subjects. However when the frame of the question changed as:
If Program C is adopted 400 people will die.
If Program D is adopted there is 1/3 probability that nobody will die, and 2/3 probability that 600 people will die.
Which of the two programs would you favor? (Kahneman, Tversky, 1981:1)

Although the two problems are actually identical, interestingly, "when people read the word 'death' within the sentence, they refused to choose it" and this time, program D was chosen by 78% of the subjects. The disturbance of the word 'death' can be explained by the Prospect Theory Framework which states that people are risk averse if the choice involves gains, but risk taking if the choice involves losses.

Wilson (2001) constructed two pairs of sets opposing each other among the students and the academic staff of a business school to analyze the framing effect in financial decisions as shown below.

Question 1)) Which of the following two alternatives would you prefer?
Option X: A certain gain of £250.
Option Y: A 25% chance of gaining £1,000 (with a 75% chance of gaining nothing).
Please tick one to indicate your choice: X or Y
Question 2)) Which of the following two alternatives would you prefer?
Option X: A certain loss of £250.
Option Y: A 75% chance of losing £1,000 (with a 25% chance of losing nothing).
Please tick one box to indicate your choice: X or Y

Wilson (2001) demonstrated a positive version of framing in question 1 and a negative version in question two; however the same outcomes applied to each choice.

22 of 24 subjects chose option X for the first question and 20 of 27 subjects also chose X for the second question indicating the tendency towards the positive framing effect. So he concluded that the different forms of wording might be chosen to direct investors to the desirable investments.

1.3.2 Mental Accounting

Thaler (1985) introduced the financial circles with mental accounting to clarify the reasons for the decision making anomalies in the stock markets by combining cognitive psychology and microeconomics. Related to mental accounting,

Ritter (2002) states that people may separate decisions that should in principle are combined.

Thaler (1985:1) exampled mental accounting as follows: "Mr. and Mrs. J. had saved $15000 for a dream home which they hope to buy in five years. The money earns 10% in a money market account. However, they just bought a new car for $11000 which they financed with a three year loan at 15%." Mr. and Mrs. J. chose to separate entirely the concept of buying of a car and saving for a dream home. As a result they act irrationally in the market which is against EMH and EUT.

Karlsson (1998) states that mental accounting serves as a self control strategy where the future expenditures are tied to the use of current assets whereas only short term preferences are considered while spending a current income. He applied two experiments among Göteborg University students with choices between buying or not buying a desirable good while having future expenses. The subject should choose current assets or current income to pay. He found that the impact of the future expenses were greater when current assets should be used than when current income could be used. His results also showed that people react differently to future expenditures depending on which mental account they use money from.

1.3.3 Overreaction and Underreaction

Investors may overreact to unexpected positive and negative news or underreact to news announcements. Overreactions result in exaggerated stock prices that are followed by corrections. Baytas and Cakici (1999) point out that a large body of recent research has found that observed anomalous movements in stock prices, particularly the long-term reversals of extreme past stock price changes, can be explained by the corrections of initial overreactions to new information. This "stock market overreaction" hypothesis maintains that a stock decreases (increases) too far in price because of recent bad (good) news associated with the stock, but eventually returns to its fundamental value as investors realize that they had overreacted.

Bondt and Thaler (1985) found evidence of over and under reactions, plus that overreaction to news by investors can be predictive, thus creating substantial

weak form inefficiencies in stock markets. In other words, the Overreaction Hypothesis simply opposed the EMH. Spyrou, Kassimatis and Galariotis (2005) found empirical evidence that medium and small size stocks in terms of market capitalization underreact to information in extreme events especially positive shock news.

Amir and Ganzach (1998) found tendency towards overreaction in forecast changes and underreaction in forecast revisions; also overreaction to positive forecast modifications and underreaction to negative ones. Daniel, Hirshleifer and Subrahmanyam (1998) developed a theory stating that investors overreact to private information signals whereas underreact to public information signals. Kaestner (2006) suggests that investors show short term underreaction to earnings announcements, but long term overreaction to past highly unexpected earnings. He also connected overreaction to the representativeness heuristic.

1.3.4 Anomalies

As Thomaidis (2004:2) states "Over the last thirty years, plenty of empirical studies on individual stocks or the aggregate stock market revealed phenomena of seasonability or predictability that contradict the efficient markets hypothesis. Those phenomena are often referred to as financial anomalies, since they can hardly been explained by economic theories assuming rational agents. These so-called anomalies, and their continued existence, directly violate modern financial and economic theories, which assume rational and logical behavior." Kahneman, Knetsch and Thaler (1991) designated three major anomalies as: The endowment effect, Loss Aversion and Status Quo Bias.

- **Endowment Effect:** The actuality of the endowment effect in real estates may be illustrated by the following example: A family is looking for a summer house in Cesme. When they complain about the irrationally of overvalued prices, they hear the following sentence over and over again from the owners of these houses: "But my house is the best house in Cesme…"

The endowment effect presents the tendency of individuals to value their endowments irrationally higher than others. Thaler (1980) called this behavior endowment effect which is the fact that people often demand much more to give up an object than they would be willing to pay to acquire it.

- **Status Quo Bias:** The rational agents of EMH and EUT should make rational choices by choosing the highest expected utility. 'Should' is the key word here. In the real world however, when agents are faced with alternatives, they always have the right 'not' to choose any of them. Samuelson and Zeckhauser (1998) drew attention to this fact, stating that in real world decisions, agents have a status quo alternative meaning as doing nothing or maintaining the current or previous decision.

- **Loss Aversion:** Numerous studies have shown that people feel losses more deeply than gains of the same value (Kahneman and Tversky 1979-1991). So the concept of loss aversion is against the homo economicus agents of EMH and EUT who are risk averse. The tendency of agents towards loss aversion leads to the curvilinear shape of the prospect theory utility graph in the positive zone as shown in Figure 2.

Figure 2: A hypothetical Value Function
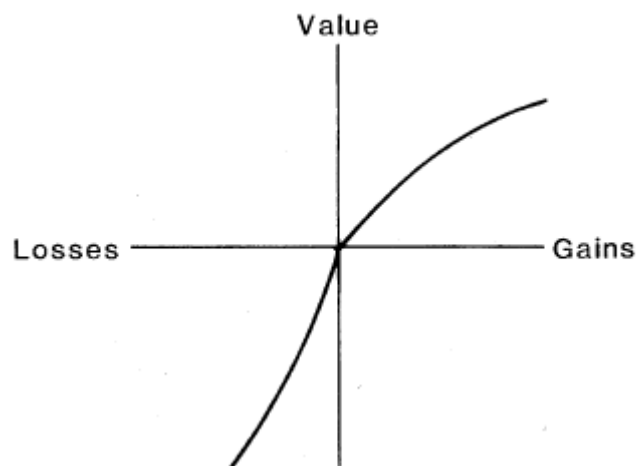
Source: Kahneman and Tversky (1979)

1.3.5 Prospect Theory

Cognitive psychologists Daniel Kahneman and Amos Tversky with the economist Richard H. Thaler are the three originators of the Prospect Theory. The theory brought in Daniel Kahneman the Nobel Memorial Prize in Economic Sciences in 2002 as an award for outstanding contributions in the field of economics. Daniel Kahneman rewarded "for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty." (www.nobelprize.org). Kahneman and Tversky (1979) presented their prospect theory as an alternative to the EUT, after their demonstration proving that the EUT can not be considered as a descriptive model for decision making under risk. The demonstrations were based on the answers of students and university faculty to hypothetical choice problems.

1.3.5.1 Certainty Effect

Kahneman and Tversky (1979) proved that people overweight outcomes that are certain, relative to outcomes that are solely probable which they stated as the certainty effect. They asked the following question to the faculty, indicating results supporting the effect of certainty.

PROBLEM 1:   *Choose between A or B:*

A) Winning 2500 pounds with probability 33%
Winning 2400 pounds with probability 66%
Winning 0 with probability 0.01%

B) Winning 2400 pounds with certainty

82% of the subjects preferred alternative B, while 18% preferred alternative A.

Kahneman and Tversky (1979) diversified this problem to ask among students; in fact their results were likewise. The results were not compatible with the EUT in which the utilities of outcomes are weighted by their probabilities.

1.3.5.2 Reflection Effect

Kahneman and Tversky (1979) noted that when the probability of winning (gaining) is replaced by probability of losing, the subjects showed risk seeking behavior which was still inconsistent with the EUT.

PROBLEM 2:   Choose between A or B:

A)   Losing 4000 pounds with probability 80%
B)   Losing 3000 pounds with certainty
92% of the subjects preferred alternative A, while 8% preferred alternative B.

In the light of the results, Kahneman and Tversky (1979) stated that "the overweighting of certainty favors risk aversion in the domain of gains and risk seeking in the domain of losses".

The value function then would be concave over gains, while it is convex over losses. The curve at the origin represents the sensitiveness to losses by agents as seen in Figure 2.

1.3.5.3 Isolation Effect

In the decision making process, people sometimes isolate or eliminate some parts of the alternatives for simplification. Kahneman and Tversky (1979) analyzed this effect by questions such as the following:

PROBLEM 3: Consider the following two-stage game.

In the first stage, there is a probability of 75% to end the game without winning anything, and a probability of 25% to move into the second stage. If you reach the second stage you have a choice between

A) Winning 4000 pounds with probability 80 %

B) Winning 3000 pounds with certainty

Your choice must be made before the game starts, i.e., before the outcome of the first stage is known.

In results, people isolated the first stage of the game, whose outcomes are shared by both prospects, and considered Problem 3 as a choice between (3,000) and (4,000, .80), as in Problem 2 above. By listing these effects and considering that they proved that EUT can not be considered as a descriptive model for decision making under risk, they developed their model "Prospect Theory" as an alternative.

To understand the prospect theory, consider a gamble as Barberis and Xiong (2006:6) states:

(x, p; y, q), representing:

Gain x with probability p

Gain y with probability q

x ≤ 0 ≤ y or y ≤ 0 ≤ x, and p + q = 1.

EUT states that an agent with utility function U(·) evaluates this risk by the function of :

$$pU(W + x) + qU(W + y)$$

W: wealth

Prospect Theory, an agent evaluates this risk by the function of:

$$\pi(p)v(x) + \pi(q)v(y)$$

Where v(·) and π(·) are known as the value function and the probability weighting function, respectively. These functions satisfy v(0) = 0, π(0) = 0, and π(1) = 1.

Kahneman and Tversky (1981) states that according to the expected utility theory, the utility of an uncertain outcome is weighted by its probability; while in prospect theory the value of an uncertain outcome is multiplied by a decision weight π (p), which is a monotonic function of p but is not a probability. Prospect Theory distinguishes the decision making process by two parts which are editing and evaluation. In the editing part, agents make four basic operations which are:

- Coding outcomes as gains and losses
- Combination of identical outcomes
- Segregation of the riskless and risky components
- Cancellation or Isolation

In the evaluation part, agents evaluate the editing process and choose the prospect of the maximum value.

So, as stated by Sewell (2007), under Prospect Theory, value is assigned to gains and losses rather than to final assets; also probabilities are replaced by decision weights.

1.3.6 Disposition Effect

The up growth of behavioral finance literature and the evolution of the prospect theory followed by the mental accounting framework, inspired Shefrin and Statman to introduce the "Disposition Effect" to financial circles in 1985. The tendency of investors to ride losses too long and realize gains too soon is defined as the "Disposition Effect (DE)" by Shefrin and Statman (1985), in light of Kahneman and Tversky (1979) and Thaler (1985). The basic principle of the disposition effect is the 'S' shaped value function of Kahneman and Tversky as exhibited in Figure 2 pointing out the risk aversion for gains and risk seeking for losses. The role of mental

accounting is that investors abstract different types of gambles into different accounts before the application of the value function of the prospect theory.

Suppose an investor "S" of Istanbul Stock Exchange: "S" buys 10.000 shares of Garanti Bankasi (GARAN) Stocks for 8,10 ytl/share by February 2008. Unfortunately, by March 2008, GARAN is selling at 7,05 ytl/share. Because S has not realized her loss yet, the current loss is only a paper loss. So which alternative below would S choose according to the Prospect Theory?

      a)   Realize the loss

      b)   Hold the shares until April 2008

The prospect theory predicts that S is risk seeking for losses and would choose alternative "b" due to the 'S' shaped value function. If S chooses "a", the loss would be certain, however if "b" is chosen, gaining or losing more is probable. In other words, "S" has a disposition to sell winners and hold losers. According to Shefrin and Statman (1985), choosing alternative "a" would also be a tougher decision for investor "S" because it would mean that "S" failed, and they imply that the reasons of "S" to choose "a" could also be: mental accounting, regret aversion, self control and tax considerations.

"Investors who accept losses can no longer prattle to their loved ones, "Honey, it's only a paper loss. Just wait. It will come back." Investors who realize losses must admit their folly to the IRS, when they file that itemized tax return. For all those reasons and more, investors as a whole are reluctant to take losses, even when they feel that to do so is the right course of action . . ." (Shefrin, Statman, 1985:5)

The interpretation of Montier (2002) to disposition effect is because people dislike losses much more than they enjoy gains, and people are willing to gamble in the domain of losses, investors will hold onto stocks that have lost value (relative to the reference point of their purchase) and will be eager to sell stocks that have risen in value which is the disposition effect. Shefrin and Statman (1985) empirically proved that investors show tendency to sell winners too soon and hold losers too long

by analyzing the monthly data from January 1961 through December 1981 on private accounts in banks in the US. They also discussed evidence which suggested that solely tax considerations cannot explain the observed patterns of loss and gain realizations, and that the patterns are consistent with a combined effect of tax considerations and mental accounting, regret aversion or self control. In addition, they specify that the concentration of loss realizations in December is not consistent with fully rational behavior, but is consistent with their theory.

1.4 EMPIRICAL STUDIES ON THE DISPOSITION EFFECT

Ferris, Haugen, and Makhija (1988) analyzed thirty smallest stocks by equity that were listed on the Center for Research in Security Prices-CRSP from December 1981 to January 1985 by their trading volume at year-ends. Their aim was to specify the dominant factor which determined the trading volume increases and decreases at the end of the years. The first possible factor was the "Tax Loss Selling Hypothesis" which stated that at year ends, the trading volume of poorly performed stocks (through out the year) will increase as investors sell to realize the losses before the end of the tax year and the trading volume of well performed stocks (through out the year) will decrease as investors suspend to sell to avoid being taxed. The second possible factor was the Disposition Effect which opposed the Tax Loss Selling Hypothesis. The investors that are reluctant to realize losses would avoid selling poorly performed stocks despite the tax advantages. They found strong evidence that supports Disposition Effect as a determinant of trading volume levels throughout the year.

Shiller and Case (1988) made interviews with house buyers in places where houses had risen in value. Their interviews pointed out that the owners tend to sell at a profit which showed significant disposition effects.

Starr-McCluer (1995) empirically proved that 15 percent of the stock-owning households interviewed by the 1989 and 1992 Surveys of Consumer Finances have paper losses above 20 percent. She states that in the majority of households, the tax

advantages of realizing these losses would more than cover the trading and time costs.

Weber and Camerer (1995) put people in a portfolio decision situation as subjects of an experiment. In their experiment, subjects had to make portfolio decisions before the deadline as they could buy / sell risky assets. They endowed each subject 10.000 DM at the beginning of the experiment and analyzed their trading behavior. By this experiment, they reported substantial evidence of the disposition effect. The subjects showed tendency to sell fewer shares when the prices decreased than when they increased. They also tent to sell less when the prices were below their purchase price. They also noted that the disposition effect would lead to not profitable portfolios because statistically, stocks are likely to have a downward trend and shares should be sold; conversely, increasing prices imply a stock has an upward trend and should not be sold. Weber and Camerer's results sustained the results of Shefrin and Statman (1985).

Odean (1998) also tested the disposition effect. To test whether investors sell winners sooner while holding losers, Odean (1998) used 10.000 randomly selected customer accounts of a brokerage house that are active by 1987 to 1993, as data. Thorough out the trading records of the accounts, he analyzed the rates at which investors realized gains and losses, also the tax motivated trading at the year ends. First, he chronologically ordered each account's trading records and constructed a portfolio for each date consisting of securities which the purchase dates and prices are certain. When selling takes place in the portfolios, the selling price was compared with the purchase price to specify the gains and losses. The stocks that remained in the portfolios considered to be "paper gains" if, both its daily high and low prices are higher than the purchase prices; and "paper losses" if both its daily high and low prices are lower than the purchase prices. Then he calculated two ratios below to measure the disposition effect:

$$\text{Proportion of gains realized (PGR)} = \frac{\text{Realized Gains}}{\text{Realized Gains + Paper Gains}}$$

$$\text{Proportion of losses realized (PLR)} = \frac{\text{Realized Losses}}{\text{Realized Losses + Paper Losses}}$$

Disposition effect is confirmed when there is a positive difference between PGR and PLR, meaning that the investors choose to realize gains more than losses. In conclusion, the investors showed a strong tendency for realizing winners rather than losers; however December transactions demonstrated tax motivated selling behavior. Odean also pointed out that this tendency leads to lower returns in portfolios.

Odean (1999) also focused on the trading volume, asking the reasons of the excessive trading. He stated that the trading volume on the world's markets seemed higher than can be explained by models of rationality. He found strong evidence that trading caused decrease in returns, even after discarding most trades that might be caused by liquidity demands, portfolio rebalancing, tax loss selling, or translating to lower risk securities.

In parallel with Odean (1999), Grinblatt and Keloharju (2001) used the shareholdings and trading records of all Finnish investors from December 1994 to January 1997 from Finnish Central Securities Depository, to solve the puzzle of why excessive trading occurs. They applied logit regressions to determine the factors of the trading activities and found evidence that the disposition effect and the tax loss selling are the two major factors of the selling activities of the Finnish investors. Barber and Odean (2000), explained the excessive trading which resulted poor performance in returns, by overconfidence by using a unique data set including the trading activity for 78,000 households at a large brokerage firm between 1991-1997. They pointed out that even "trading is hazardous", these overconfident individual investors continued trading.

Ranguelova (2001) analyzed the daily trading records of the clients of a discount brokerage house over six years ending in December 1996 which was consisted of 1,594,051 trades. She provided new evidence on individual investor trading behavior by documenting that individual beliefs rather than preferences are causing the disposition effect. She found empirical evidence that the disposition effect among investors concentrated on stocks among the top 60 percent of the market capitalization distribution. So the market capitalization of the firm was a strong factor to disposition to sell winners and hold losers. Conversely, in the small capital firms, representing the 40 percent of the market capitalization distribution, disposition effect completely reversed itself, meaning that investors kept their winners and sold their losers. She challenged the view of Shefrin and Statman (1985), Odean (1998) and Grinblatt and Keloharju (2001) that the disposition effect is a direct implication of mental accounting (Thaler, 1985) and individual preferences as in the Prospect Theory of Kahneman and Tversky (1979), by stating that investors react differently to large and small capital securities.

Grinblatt and Han (2001) state that the disposition effect creates a spread between a stock's fundamental value (value without the presence of the disposition effect) and its market-equilibrium price, plus causes price underreaction to information. Grinblatt and Han (2001) analyzed the mutual interactions of the disposition effect and momentum which is one of the major anomalies in finance as the persistence in the stock returns over time. Momentum strategies suggest purchasing stocks that have performed well in the past and sell the others, so that high returns over three to twelve month holding periods would be gained. Grinblatt and Han (2001) pointed out that the spread convergence leads to predictable market prices.

Jegadeesh and Titman (1993) found empirical evidence that the volatility of the stock prices over the period of six to twelve months can be used to predict future movements. Their evidence showed that past well performed stocks, as measured by returns over six months, outperform past poorly performed stocks by twelve percent a year. Grinblatt and Han (2001) developed a model of equilibrium prices based on the disposition effect. When they tested the model, Jegadeesh and Titman (1993)'s

momentum effect vanished, showing that the correlation between past returns and variables related to the disposition effect can be causing momentum in stock returns. Grinblatt and Han (2002) developed a theoretical model to analyze the disposition effect and stock pricing interactions and found strong evidence that large-capital US stocks have higher expected returns and the disposition factor of the individual investors should be priced.

Brown et al (2002) analyzed daily Australian Stock Exchange data for investors in IPO and index stocks between 1995 and 2000, and found that the disposition effect is widespread upon investors for the whole year except June which is the last month of the Australian tax year; so that the disposition effect is diminished by tax loss selling. However, larger investment traders are less affected by the disposition bias.

Goetzmann and Massa (2003) aimed to measure the impact of behavioral biases on asset prices. They worked with a database of individual investor decisions on over 100,000 accounts for around 86,000 households who exhibit disposition biases between 01/01/1991 and 28/11/1996, and by constructing factors from the trade decisions; they tested whether these factors were related to the market prices, stock returns, volume and volatility of the market. Their results showed that disposition-prone investors influence stock prices, volume and volatility.

Coval and Shumway (2005) focused on the same objective with Goetzmann and Massa (2003). They applied a series of tests to specify the significance of behavioral biases in the price determination process. They used the trading behavior of market makers in the Treasury Bond Futures Contracts at the Chicago Board of Trade (CBOT). They found empirical evidence that CBOT traders are significantly loss averse, plus they prefer to take additional risks in the afternoon sessions, if they had losses in the morning sessions. For the evidence of price impact, they applied three hypotheses. First for analyzing the morning performances of traders to their probability of determining prices in the afternoons as they buy or sell when the prices move up and down, second for the continuance of the prices determined by traders with morning losses, and third for relating total morning losses to afternoon

volatility. Coval and Shumway (2005) concluded that morning sessions with losses lead to volatility increases in the afternoon sessions, but no increases in the long run, so that the price impacts that are resulted from the traders' behavioral biases fade away rapidly by the traders in the market.

Kaustia (2004) focused on the originators of the disposition effect and suggested that risk aversion over gains and risk seeking over losses are not the only factors, but mental accounting (Thaler,1985) and self justification (Festinger,1957) also give rise to the disposition effect. He used the trades of Finnish household investors as data, between January 1995 to May 2000, relative to Grinblatt and Keloharju (2000), but covering a longer time period. Cognitive Dissonance Theory (Festinger, 1957) including self justification concept is stated as inconsistency between any two conditions and it is most powerful when the decisions threaten our self image. Kaustia (2004) applied self justification hypothesis to the disposition effect, pointing out that the investors avoid realizing losses, so that they are saved from admitting that their purchasing decisions were wrong.

Hens and Vlcek (2005) argue that the Prospect Theory (Kahneman and Tversky 1979) can not be a determinant of the disposition effect. They present a two period for portfolio choice in a stylized financial market consisting of two assets for trading, a riskless asset as the bond and a risky asset as the stock, where the preferences of the investor are described by the prospect theory. They analyze the hypothetical investor's risk taking behavior following a rise and a fall, in the price of the risky asset. Their results showed that an investor who weighs gains with their objective probabilities, who is risk averse over gains and risk seeking over losses, never invests in the risky asset, showing that the investor can not be prone to the disposition effect. So they conclude that the Prospect Theory can not be the originator of the disposition effect, because those investors who sell winning stocks and hold losing ones would in the first place not have invested in stocks. Hens and Vlcek (2005) declare that the Prospect Theory is ex-post, assuming that the investment has taken place, but not ex-ante, requiring that the investment is made in the first place.

Relative to Hens and Vlcek (2005), Barberis and Xiong (2006) examined the trading behavior with prospect theory preferences and found that the relationship between the disposition effect and these preferences is significant in many cases, in some cases however, prospect theory predicts the opposite of the disposition effect. Barberis and Xiong (2006) used the Prospect Theory value function of Kahneman and Tversky (1992) to analyze the trading behavior of a hypothetical investor who buys shares of a stock at the beginning of the year, trades the stock throughout the year, and receives Prospect Theory utility based on her profit. They divided the year into T ≥ 2 trading periods and for any T, they derived an analytical solution for the optimal trading strategy of the investor to inspect whether prospect theory predicts a disposition effect. As the first result they demonstrate a Prospect Theory investor buying a stock for $50. They supposed that over the first period, the stock rises to $60. So even if the stock falls to $55 in the next period, she will still break even:

$$\$10 + 2(\$55 - \$60) = 0$$

Due to the Prospect Theory value function which is mildly concave over gains, the investor should be risk neutral in this state. Barberis and Xiong (2006) then supposed that over the first period, the stock falls to $45. But because the prospect theory value function is convex over losses, she will also break even in this state, waiting for making back her initial loss:

$$-\$5 + 0.5\ (\$55 - \$45) = 0$$

By this example, they demonstrate that after an initial gain, the allocation of the investor rises to two shares and after a loss the allocation should be reduced to 0.5 shares. So she should sell after a loss, not after a gain, which is the opposite of the disposition effect. The reason is that the initial buying decision of the investor is sidelined by the prospect theory. If the initial buying decision is considered, then the expected return on the stock must be higher than the initial loss ($5), so it takes a larger share allocation to break even after a gain.

Dhar and Zhu (2006) analyzed the trading records of 50,000 individual investors of a discount brokerage firm between 1991 and 1996, to determine whether

they exhibit the disposition effect in their trades or not. They also aimed to modify the differences in the disposition bias among the investors. They found empirical evidence that wealthier and professional individuals exhibit a lower disposition effect and trading frequency decreases the disposition effect. Dhar and Zhu (2006) performed a regression analysis as below:

$$DE = \gamma D + \beta X + \mathcal{C}$$

Where the dependent variable DE stands for the disposition effect, D for the demographic variables consisting of high, low, professional and non-professional incomes; X for the trading patterns and portfolio characteristics consisting of the logarithm of the number of trades, realized gains and losses, plus the number of trades; and $\mathcal{C}$ for the error term. The result of their regression analysis showed that the disposition effect decreases by 0.06, 30 percent from the mean DE, in each increase of ten trades indicating that trading frequency leads to more realized losses in the portfolios. The high income group shows 10 percent lower disposition effect than the low income group and the professional group exhibits 20 percent lower disposition effect than the non-professional group, plus older investors showed smaller disposition effect than younger ones.

Shumway and Wu (2005) empirically proved that a large majority of Chinese investors are disposition-prone by analyzing 13,460 Chinese investors from a Shanghai brokerage firm. They also tested whether the disposition effect drove stock price momentum or not. To measure the disposition effect among investors, they developed a Cox proportional hazard model (Cox and Oakes, 1984) with time varying covariances that included daily observations on capital gains and losses. Their model as shown below, allowed them to compare the selling versus the holding decisions for each trading day.

$$\lambda(t) = \varphi(t) \, [exp \, (x(t)'\beta)]$$

where $\varphi(t)$ stands for the hazard rate, and *exp* $(x(t)'\beta)$ is used to allow the expected holding time to vary across accounts due to their covariances $x(t)$. By testing their model, the data showed significant disposition effect among the Chinese investors where the more disposition-prone investors were less financially sophisticated and had worse performance than other investors. By these results, Shumway and Wu (2005) stated that the disposition effect was a costly behavioral bias. They also determined that past returns do not predict the future returns; however the unrealized gains and losses of the investors were good predictors of future returns. Shumway and Wu (2005) found that the best predictor of future returns was to construct the unrealized gain variables with the trades of disposition-prone investors. They concluded that the disposition effect is costly to investors and drives momentum.

Frazzini (2006) suggests that the disposition effect generates underreaction to news among the investors which leads to return predictability. He gives an example of Stock XYZ, trading at $13 and has an aggregate cost basis as $16 which means that majority of the current shareholders has a purchase price around $16. When bad news reveals a valuation of $11, the price should adjust to $11, if the frictions are excluded. However, if the shareholders are reluctant to realize their losses, Frazzini (2006) states that the price will only fall to a point between $13 and $11 as shown in Figure 3. This reluctance would hamper price discovery when negative news release about such securities. So that the bad news would travel slower among the assets trading at capital losses, leading to negative post event return predictability.

Figure 3: An Example of Stock Price Response to Negative News
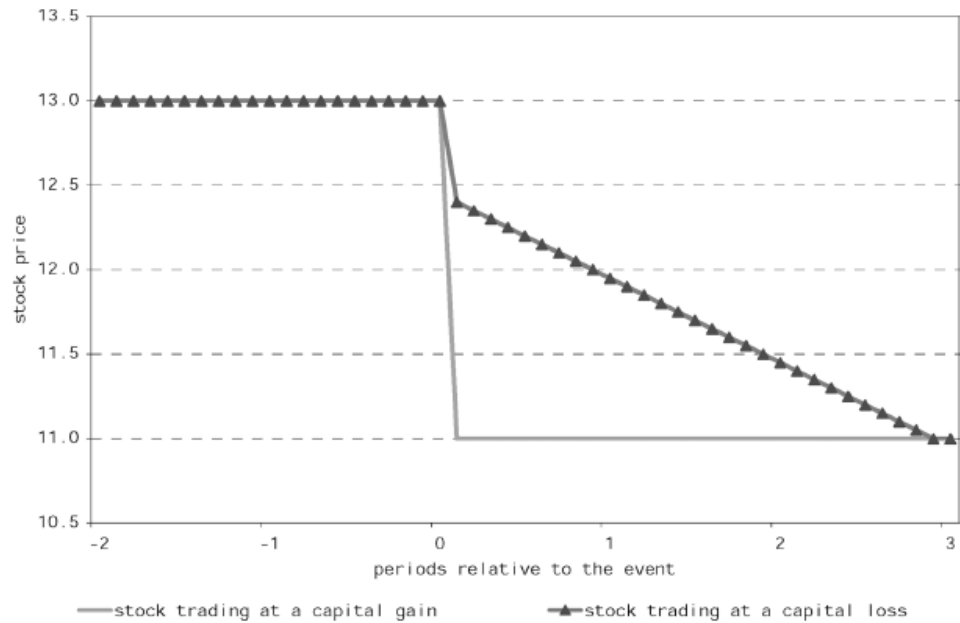
Source: Frazzini, 2006:5

Conversely, if the shareholders of Stock XYZ are trading at large paper gains rather than losses, then their disposition to sell would generate excess supply causing an underreaction to good news as shown in Figure 4. So that the good news would travel slower among the assets trading at capital gains, leading to positive post event return predictability.

Figure 4: An example of Stock Price Response to Positive News
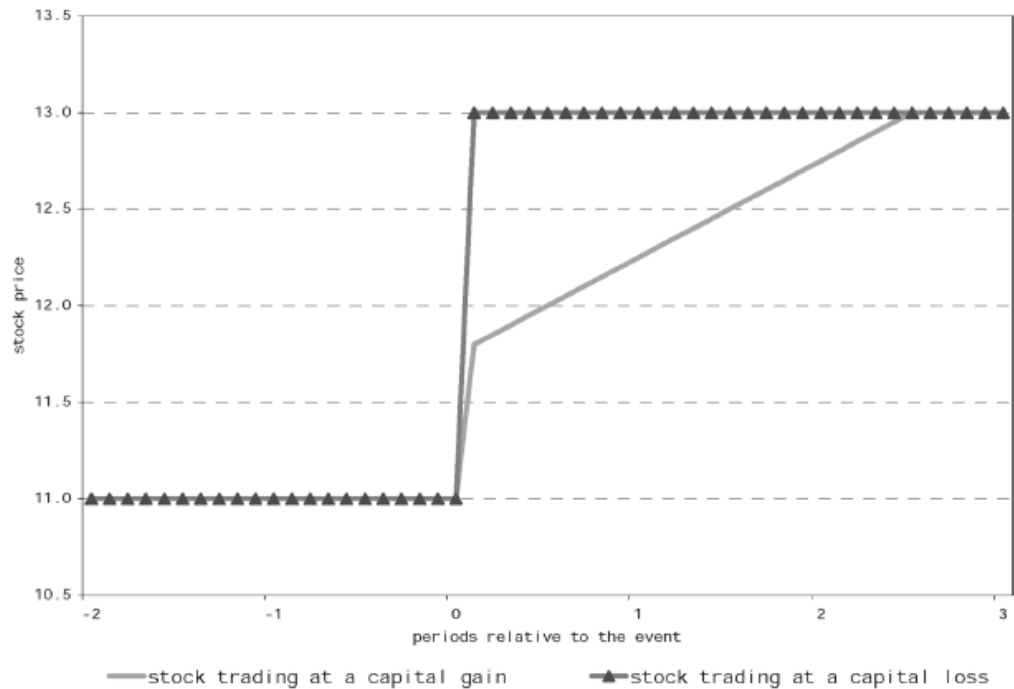
Source: Frazzini, 2006:5

Choi (2007) tested the short term price impact of the disposition effect by a microstructure model where only a small percentage of traders have firm specific information. Different than Frazzini (2006), he found that disposition-prone investors cause good news to travel quickly with lower price volatility and bad news to travel slowly with higher volatility.

Krause, Wei, and Yang (2006) found evidence for the disposition effect for buy strategies, but a reverse disposition effect for sell strategies, working with a database from a Chinese brokerage company that contains information of 4,619 investors' trade records and personal characteristics between September 1999 and April 2003. They considered that any long or short positions of traders relative to some benchmark holding that they would choose at the beginning of trades; defining the sell strategy as holding below this benchmark and corresponding to selling shares. They defined the buy strategy as holding exceeding this benchmark, so corresponding to buying additional shares as shown in Figure 5.

Figure: 5 Buy and Sell Strategies
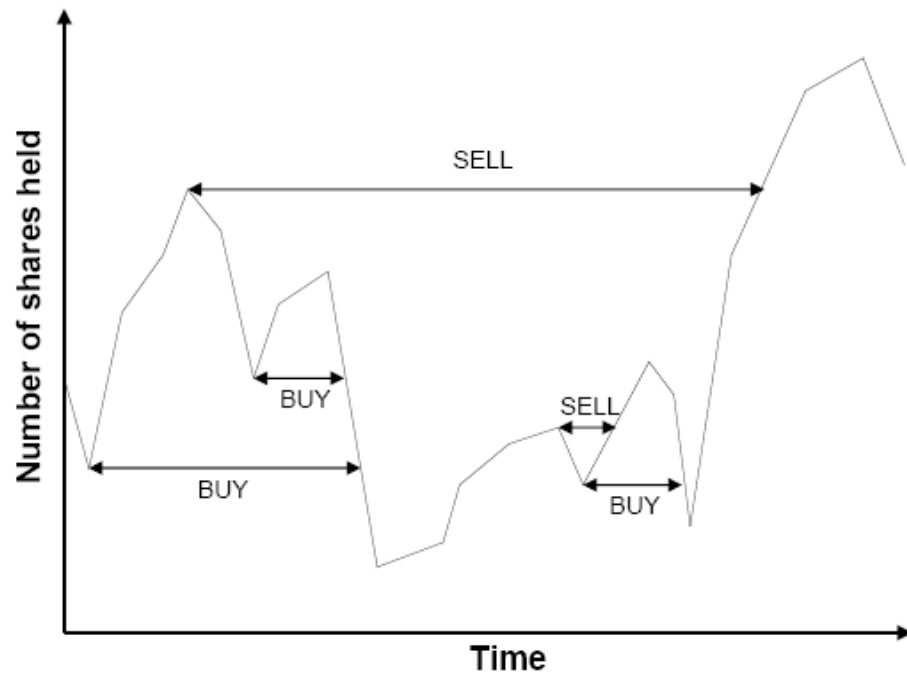
Source: Krause, Wei, and Yang (2006:30)

To measure the disposition effect, Krause, Wei, and Yang (2006) used the following equation:

$$DISPO = 2\frac{(D-)-(D+)}{(D-)+(D+)}$$

where (D-) stands for generating losses and (D+) for generating gains.

The larger the result, the more disposition effect is measured, and if the result is negative, then reverse disposition effect is found. They also stated the length of the trading strategy as an important factor for the disposition effect.

Barber et al (2007) worked with a unique dataset containing over one billion trades and about four million traders whose identities were known. They had the opportunity to analyze all trading activity on the Taiwan Stock Exchange (TSE) between 1994 and 1999 and empirically proved that eighty four percent of all traders

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exhibited the disposition effect. On each day, they broke up an investor's portfolio into stocks held for gains and losses, and followed the method of Odean (1998) to measure the disposition effect by calculating the difference of the proportion of gains realized (PGR) and the proportion of losses realized (PLR). They calculated paper gains and losses of portfolios every day in contrast with Odean (1998) however, who did the calculation only for the days of sales. They measured the disposition effect for long and short positions, plus men and women.

Muermann and Volkman (2006) constructed a portfolio choice model which indicates that the disposition effect can be caused by "avoiding regret" and "seeking pride" in the choices of the investors. They used a risk free asset as bond and a risky asset as stock in their model. The investor who was endowed with initial wealth 'w$_o$' could only invest all of his wealth in one of the two assets. Muermann and Volkman (2006) applied two periods in their model. At time zero (T=0), the investor chooses to invest in the bond or the stock. At T=1, according to his wealth w$_1$, the investor once more chooses which asset to invest. At T=2 liquidation of w$_2$ takes place. They assume that the investor who is inclined to avoiding regret and seeking pride, invests into the stock at T=0. They argue that the optimal decision of the investor at T=1 would be selling the stock indicating the disposition effect if there is a stock return over the first period assuming that the investor bought the stock in the first place relative to Hens and Vlcek (2005).

Weber and Welfens (2006) aimed to analyze the individual differences, stability, learning and the determinants of the disposition effect. They obtained their data from a German online broker consisting of the stock trades of about 3,000 individual investors between January 1997 and April 2001. The data also provided some personal characteristics of the investors such as age, gender, investment experience, income, and investment strategy. In addition to the field data, they also worked with an experimental data such as Weber and Camerer (1995), consisting of two parts by a four weeks lasting test among 113 student subjects faced with two different individual choice tasks. By counting investors' sells for a gain or loss, they related sales to selling opportunities very similar to Odean (1998). They calculated

the proportions of winners realized (PWR) and the proportions of losers realized (PLR) and stated that the disposition effect (DE) is found by the difference as demonstrated below:

$$PWR = \frac{\textit{Number of sales at gain}}{\textit{Number of selling opportunities at gain}}$$

$$PLR = \frac{\textit{Number of sales at loss}}{\textit{Number of selling opportunities at loss}}$$

$$DE = PWR - PLR$$

The results showed that the majority of the subjects exhibited positive individual level disposition effects, however they also noted that disposition effect causes subjects to "leave money on the table" by comparing the pay outs. They also applied a regression analysis using their field data, and regressed individual disposition effects on personal characteristics. Subsequently they found that experienced traders exhibit lower disposition effect.

CHAPTER II

DISPOSITION EFFECT IN MUTUAL FUNDS

In the first section of this chapter, historical information on mutual funds, with the analysis of Turkish mutual funds will be projected. The advantages and the disadvantages of mutual fund investment decisions will be discussed. The second section includes a literature review on the disposition effect in mutual funds.

2.1 Mutual Funds

A mutual fund represents a collection of investments that is managed by professionals in which the pooled money source comes from many investors where each investor owns shares of the fund. (Bodie, Kane, Marcus, 2005:108)

2.1.1 A Brief History of the Mutual Funds

The Dutch Merchant and Broker Abraham van Ketwich is considered as the originator of the concept of pooling sources and spreading risk by many researchers (Rouwenhorst, 2004; Simeneuskas, Kucko 2004; Farnik 2005) by creating the first mutual fund "Eendragt Maakt Magt" (translated as unity creates strentgh) in 1774 aiming to present new diversification opportunities for the smaller investors. Rouwenhorst (2004) states that as the world's first mutual fund, Eendragt Maakt Magt was consisted of foreign government bonds and plantation loans; with two thousand shares allowing the investors to trade on the secondary market.

According to the Investment Company Institute Factbook (2008), in 1868, the precursor to the US investment fund model was formed in London by the Foreign and Colonial Government Trust. Bruce (1995) states that the trust was established by Lord Westbury who was a former British Lord Chancellor and the originator of the tradition among British investors for buying overseas assets. The trust bought foreign government bonds in countries such as Argentina, Brazil, Egypt, Italy, Turkey and

the US. Rouwenhorst (2004:16) states that due to the prospectus of the trust the aim was to provide "the investor of moderate means the same advantages as the large capitalist, in diminishing the risk of investing in foreign and government stocks, by spreading the investment over a number of different stocks".

The growth of the mutual funds around the world accelerated after the foundation of Eendragt Maakt Magt and the Foreign and Colonial Government Trust; however these two foundations which originated the world's mutual funds were consisted of limited number of shares, unlike the majority of the present time. The actively managed funds which are publicly traded with fix number of shares are called close end funds. (Bodie, Kane, Marcus, 2005:109) These funds are traded on the secondary markets just like common stocks, and their prices are determined by the supply and demand of the market. The majority of the funds nowadays are open end funds which have unlimited number of shares and can be purchased and sold by their net asset values that are determined once a day. The issuers of the open end funds continue to sell shares and buy back from the investors whenever they want to sell.

In 1924, the first open ended fund was established in Boston / US as the Massachusetts Investment Trust which is still in business today (Simanauskas, Kucko, 2004:2), but close end funds were more popular around the world until the 1929 crisis. Gabelli (2002) points out that before 1929, close end funds assets totaled $4.5 billion in the US Merriman (1999) clarifies that in 1920s close end funds were sometimes traded at premiums of thirty percent or more than their net asset value.

Long and Shleifer (1990) state 1929 crisis as the most striking episode in the history of American financial markets, diminishing the S&P composite index thirty three percent in just one month. In response to the 1929 crisis and melted reliability on the close end funds, The Securities Act of 1933 passed from the Congress of US which regulated the close end fund registrations and shares, followed by The Securities Exchange Act of 1934 which authorized US Securities and Exchange Commision (SEC) for the securities markets, the Revenue Act of 1936 which

organized the regularities of the tax treatments of the mutual funds, and The Investment Act of 1940 which organized the regulatory framework of the investment companies.

Maeve (2005) states that with the 1940 act the investment companies are subject to custodial requirements for holding assets, restrictions on transactions with affiliates, restrictions on the granting of stock options, required to have at least sixty percent independent directors, and various limitations on capital structures and investment policies. In addition to this act, the National Association of Investment Companies (NAIC) was established which was the origin of the Investment Company Institute (ICI). After these regulations which benefit the investors, the demand for the mutual funds continued to increase in the U.S. by its foundation, the NAIC started to gather the statistical information about the investment companies. ICI points out that in 1944, the statistics were consisted of 68 mutual funds with $882 million assets, in 1951 the total number of mutual funds surpassed 100 with over one million shareholders and by 2004, ICI's statistical collection included 8,042 mutual funds with $8 trillion assets.

Reid (2000) states that assets of mutual funds in the U.S. grew at an annual rate of 21.4 percent in the 1990s. This growth of the mutual funds carried fund assets to $6.8 trillion at 1999 making mutual funds the largest type of financial institution as shown in Figure 6 below.

Figure 6: Total Net Assets of US Mutual Funds 1990-2003
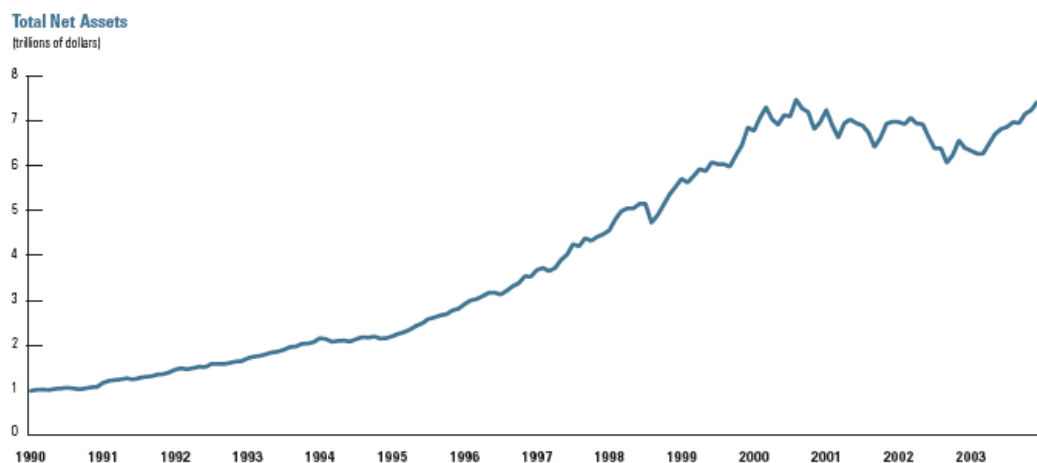
Source: Reid, Sevigni, Silli, Investment Company Institute, 2004

Fernando et al (2003) points out that the growth of mutual funds in the 1990s was also true in many other countries around the world. The mutual fund assets of the European Union countries increased from $ 1 trillion in 1992 to $ 2.6 trillion in 1998. Fernando et al (2003) determine the reasons of this global growth as the increasing globalization of finance, expanding of large multinational financial groups, and investor's search of safer and liquid financial instruments.

2.1.2 Mutual Funds in Turkey

In Turkey, the capital markets law was put into effect in 1981, and the developments on the financial markets caused the formation of the mutual funds after 1986 with new regulations on the law. Banks, intermediary institutions, Social Security Institution (SSK), Social Security Institution for Artisans and the Self Employed (BAĞKUR) and the retirement funds may establish mutual funds and the first mutual fund was founded by Türkiye İş Bankası A.Ş. in 06/07/1987. Below in Figure 7, the net asset value of mutual funds in Turkey is shown which reached to 26.381.161 thousand TL by the end of 2007 which was 1.219.444 thousand TL in 1999 with 2.998.454 shareholders.

Figure 7: Net Asset Value of Mutual Funds in Turkey

Net Asset Value of Mutual Funds in Turkey(Thousand TL)

Source:

http://www.spk.gov.tr/digermenuler/handle.aspx?action=showheaders&id=1
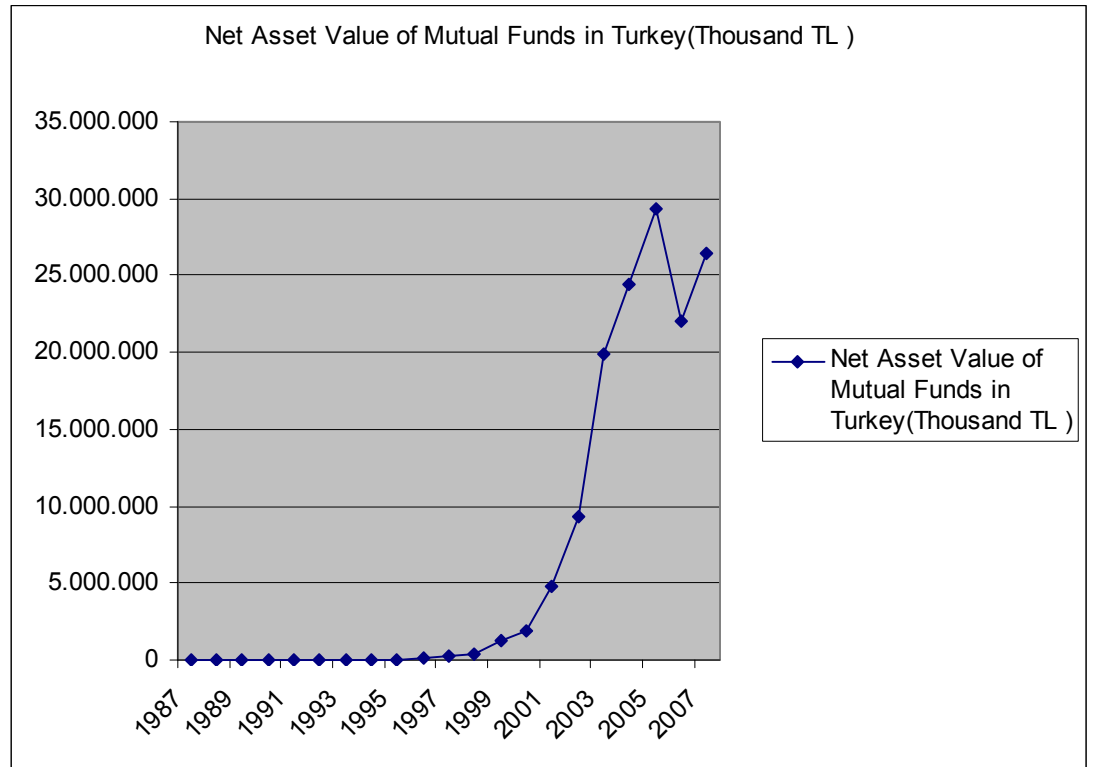
The top five mutual fund founders in Turkey according to their total value of assets are lined as İş Bankası, Yapı Kredi Bankası, Garanti Bankası, Akbank and Ziraat Bankası as shown in Figure 8. These five banks manage 18,202,745,051 YTL of the total 26,848,746,218 YTL of mutual fund portfolio by April 2008, and the asset distribution of the total portfolios is shown in Figure 9.

Figure 8: Turkey's top Five Mutual Fund Founders According to Their Total Portfolio Values by April 2008

Source:

http://www.takasbank.com.tr/StatisticalInformation.aspx?c=PortfoyIstatistikleri&tF
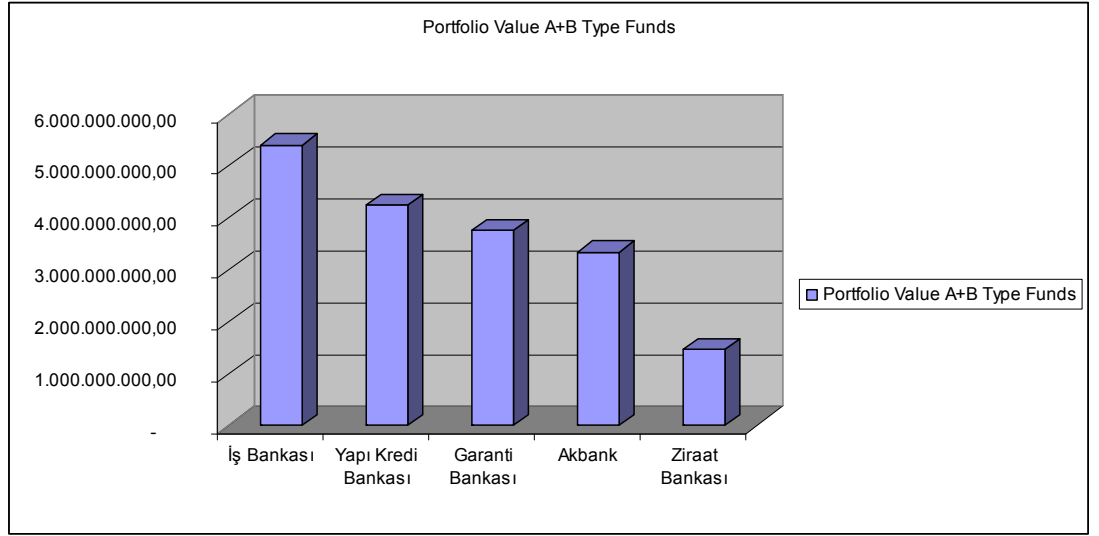
Figure 9: The Asset Distribution of the Portfolios by April 2008

Source:

http://www.takasbank.com.tr/StatisticalInformation.aspx?c=PortfoyIstatistikleri&tF
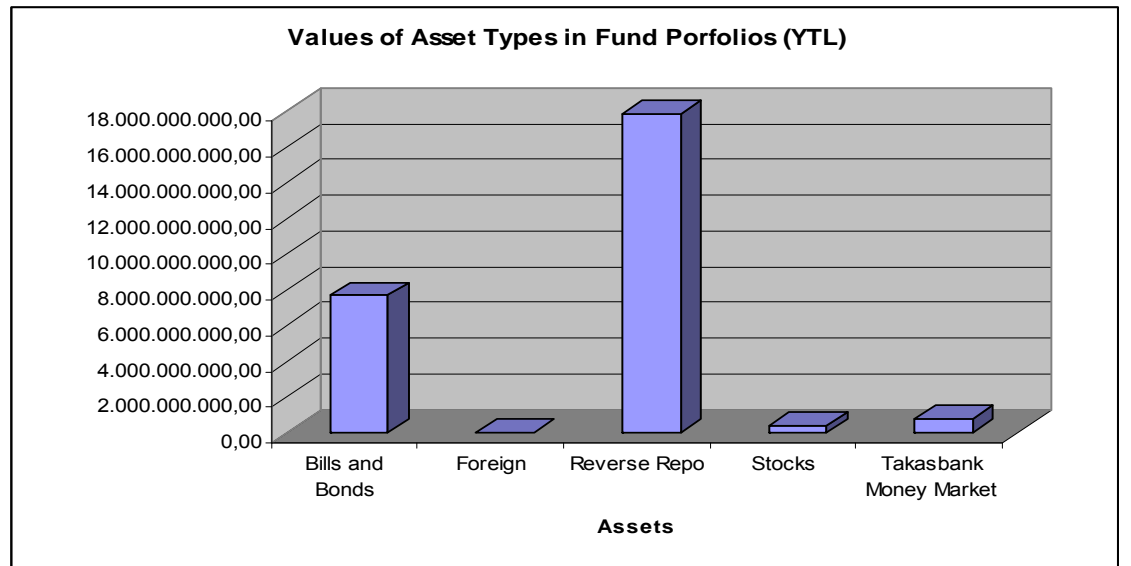
2.1.3 Types of Mutual Funds in Turkey

Capital Markets Board (CMB) of Turkey differentiates the mutual funds into two main categories. Due to the tax considerations, the mutual funds are divided into two groups as 'A' and 'B'; and due to the risk variations, as funds of Bills and Bonds, Stocks, Group, Liquid, Index, Free, Specialty, Gold, Other Precious Metals, Foreign, Industry specific, Affiliated, Flexible and Mixed.

According to the Capital Markets Law Regulations of 1993, the funds which invest at least 25% of their portfolio to the stocks of the companies founded in Turkey are named as 'A' type Funds, while others as 'B' type funds. Due to the income tax principles in Turkey, 'B' type funds are subject to taxation by ten percent, and 'A' type Funds by zero percent. Another difference between investing in 'A' and 'B' type funds is the risk factor. Because of the stock content, the returns of 'A' type Funds are more consistent with the stock market volatility in a positive or a negative way.

The mutual fund investors in Turkey reached up to three million by June 2007, and 95 percent of these investors prefer 'B' type funds to 'A' type funds. By June 2007, there were 125 'A' type Funds in Turkish Capital Markets with 743 million YTL and 162 'B' type funds with 23.832 million YTL in total asset value as shown in Figure 10.

Figure 10: Mutual Funds Portfolio Allocation in Turkey by June 2007
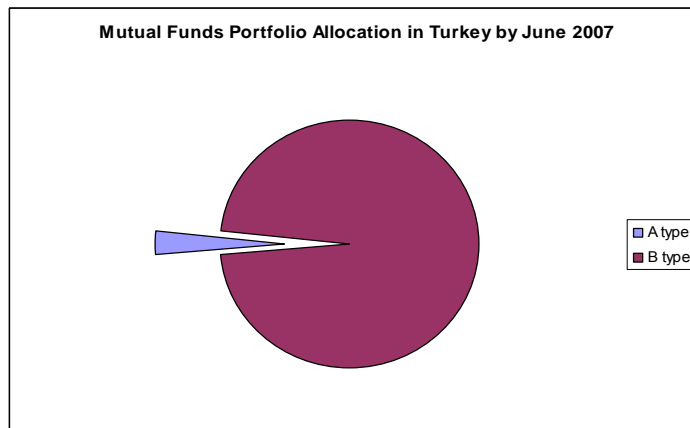
Source: CMB, 2007/1 Capital Markets Development Report

Based on the CMB mutual funds information booklet of 2007, 'A' and 'B' type funds are divided into 14 kinds by CMB, based on their percentage of contents as listed below:

- **Bills and Bonds Funds:** At least 51 percent of the fund's portfolio continuously consists of bills and bonds.

- **Stock Funds:** At least 51 percent of the fund's portfolio continuously consists of the stocks of the companies founded in Turkey.

- **Group Funds:** At least 51 percent of the fund's portfolio continuously consists of the securities of company groups like Sabancı or Koç Holding.

- **Liquid Funds:** 100 percent of the fund's portfolio continuously consists of securities with a weighted average maturity of 45 days.

- **Index Funds:** At least 80 percent of the fund's portfolio continuously consists of the securities on an index which is authorized by CMB. The correlation coefficient of the index and fund's share value must be at least 90 percent.

- **Free Funds:** These funds are established merely for the demand of the well-qualified investors.

- **Specialty Funds:** These funds are designated for the preset investors.

- **Gold Funds:** At least 51 percent of the fund's portfolio continuously consists of gold and gold-backed securities traded on national and international exchanges.

- **Funds of Other Precious Metals:** At least 51 percent of the fund's portfolio continuously consists of minimum two other precious metals and precious metals-backed securities traded on national and international exchanges. The percentage of one precious metal should be at least 20 percent of the portfolio.

- **Foreign Funds:** At least 51 percent of the fund's portfolio continuously consists of foreign private and public securities.

- **Industry Specific Funds:** At least 51 percent of the fund's portfolio continuously consists of the securities of the companies of the same industry such as textile.

- **Affiliated Funds:** At least 51 percent of the fund's portfolio continuously consists of the securities of the affiliates of the founder.

- **Mixed Funds:** The funds in which consist of minimum two of the following securities as stocks, loan contracts, gold and gold-backed securities, and precious metals and precious metals-backed securities. The percentage of one security should be at least 20 percent of the portfolio.

- **Flexible Funds:** The funds which do not match the above criteria are named as flexible by the CMB.

32 percent of the 'A' type funds are flexible in Turkish Capital Markets by June 2007 with the second follower as the mixed funds as can be seen in Figure 11.

Figure 11: The Distribution of the A Type Funds by percentage in Turkey by June 2007
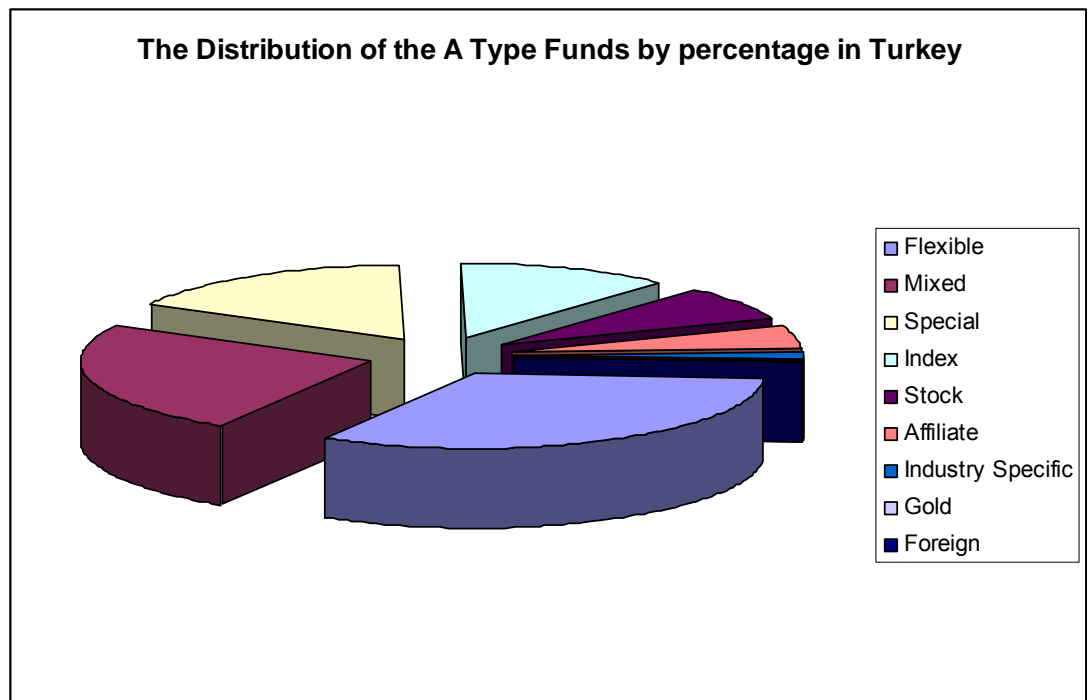
Source: CMB, 2007/1 Capital Markets Development Report

85 percent of the 'B' type funds are liquid however, by June 2007 followed by bills and bonds funds as can be seen in Figure 12. Although the types of these funds are alike, the contents of the portfolios differ according to the funds' managements resulting variety in net changes of the prices.

Figure 12: The Distribution of The B Type Funds by Percentage in Turkey by June 2007
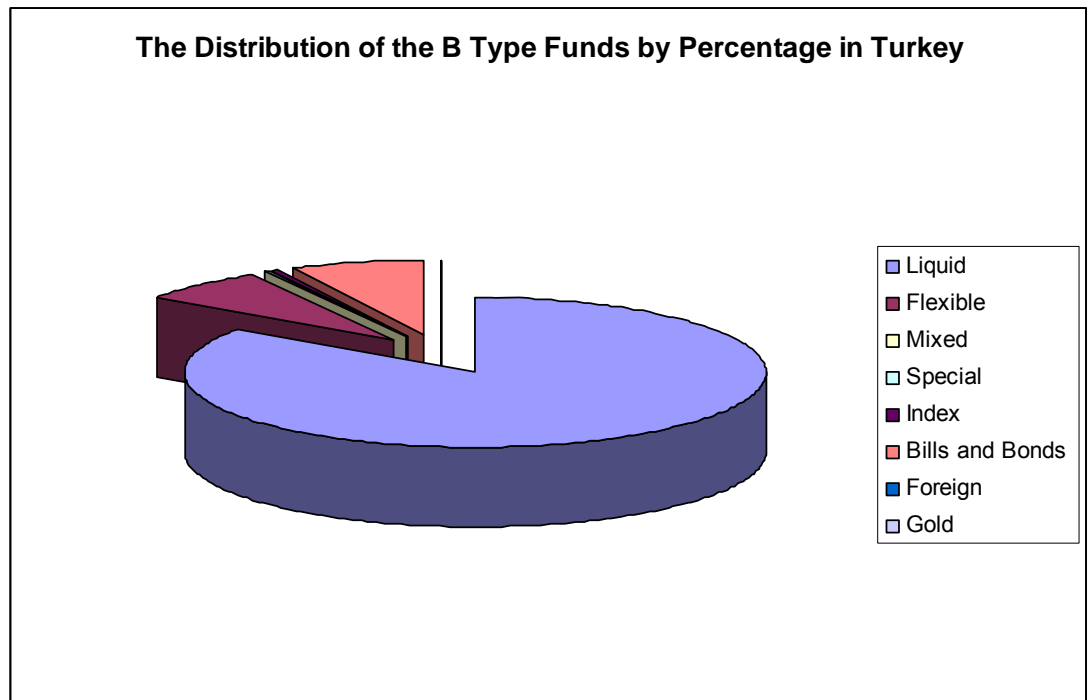
Source: CMB, 2007/1 Capital Markets Development Report

The top five mutual fund founders' main 'A' type mutual funds are shown below in Table 1 with their net price changes from 02/04/2007 to 01/04/2008. Table 1 reflects that İş Bankası 'A' type flexible fund investors lost 11.59% in one year, while Yapı Kredi Bankası 'A' type flexible fund investors earned 2.93%. The same variety may be seen in the types of 'B' type funds as shown in Table 2, but the returns are more comparable.

Table 1: The Net Changes on the 'A' type Fund Prices 02/04/2007-01/04/2008

FUNDS	LATEST DATE	LATEST PRICE	FIRST DATE	FIRST PRICE	NET CHANGE	% CHANGE
İş Bank A Type Flexible	01/04/2008	2.919007	02/04/2007	3.301715	-0.382708	-11.59
Yapı Kredi Yat. A Type Flexible	01/04/2008	0.096559	02/04/2007	0.093812	0.002747	2.93
Garanti Ban. A Type Flexible	01/04/2008	0.013801	02/04/2007	0.014971	-0.001170	-7.82
Akbank A Type Flexible	01/04/2008	0.049560	02/04/2007	0.051327	-0.001767	-3.44
Ziraat Ban. A Type Flexible	01/04/2008	26.544947	02/04/2007	27.073584	-0.528637	-1.95
İş Bank A Type Mixed	01/04/2008	0.053870	02/04/2007	0.051887	0.001983	3.82
YKB A Type Mixed	01/04/2008	0.140426	02/04/2007	0.139693	0.000733	0.52
Ziraat Ban. A Type mixed	01/04/2008	0.043333	02/04/2007	0.043538	-0.000205	-0.47

Source: http://www.fonbul.com/fon_tarih_getiriler.asp

Table 2: The Net Changes on the 'B' type Fund Prices 02/04/2007-01/04/2008

FUNDS	LATEST DATE	LATEST PRICE	FIRST DATE	FIRST PRICE	NET CHANGE	% CHANGE
İş Bank B Type Liquid	01/04/2008	95.025767	02/04/2007	84.469537	10.556230	12.50
YKB B Type Liquid	01/04/2008	0.101289	02/04/2007	0.089671	0.011618	12.96
Garanti Ban. B Type Liquid	01/04/2008	23.325360	02/04/2007	20.677248	2.648112	12.81
Akbank B Type Liquid	01/04/2008	14.722640	02/04/2007	13.033223	1.689417	12.96
Ziraat Ban. B Type Liquid	01/04/2008	61.483728	02/04/2007	54.071590	7.412138	13.71
İş Bank B Type Flexible	01/04/2008	28.741236	02/04/2007	25.153278	3.587958	14.26
YKB B Type Flexible	01/04/2008	10.106474	02/04/2007	8.718394	1.388080	15.92
Ziraat Ban. Type Flexible	01/04/2008	53.109285	02/04/2007	46.480902	6.628383	14.26

Source: http://www.fonbul.com/fon_tarih_getiriler.asp

2.1.4 The Advantages and Disadvantages of Mutual Funds Investments

Investment decision is a tough procedure for the majority of the investors, especially for the smaller ones. In this section the main advantages and disadvantages of the investors to choose mutual funds rather than investing in securities by themselves are presented.

2.1.4.1 The Advantages of Mutual Funds for the Investors

The advantages of mutual funds for investors can be listed as follows:

- **Professional Management:** Mutual funds may act as a facilitator for the investors by their regulated professional management under detection of the CMB. Professional managers of the mutual funds do the

research, portfolio selection, and monitoring; thus saving time for the fund's shareholders.

- **Time Saving:** Despite the function of the professional managers, the mutual funds would act as a time saver due to their effortless buying and selling ways. In the present time investors may buy and sell mutual funds by using ATMs, interactive phones, internet, and branches of the founders. The investors also benefit by not losing time for worrying about dividends, stock splits, financial analysis, coupons, and performance monitoring since the prices of mutual funds are stated daily.

- **Diversification and Risk:** SEC refers to diversification as "Do not put all your eggs in one basket". Investors may lower their risk by diversifying investments across different types of securities. Jeffry (2007) implies that "the beauty of the mutual fund is that it allows the personal investor to buy into a single fund without having to buy shares of each individual company included in the fund. There is one share price for the mutual fund, which is diversified over many companies."

Kennedy (2007) states that mutual funds are large diversified portfolios and thus provide automatic diversification within their respective asset classes. Investors may decrease their aggregate exposure to risk by investing in different kinds of mutual funds. Statman (2002) points out that individual investors fail to diversify their stock portfolios because they consider them as the equivalent of individual lottery tickets and do not diversify for the same reason that they do not diversify their lottery tickets. Some stocks like lottery tickets may lead to great profits, but a well diversified portfolio of stocks guarantees mediocrity.

Farnik (2005) defines diversification as requiring investments in different securities, industries, countries, types of securities, markets, maturities of securities, etc., which can minimize exposure to all types of risks. Individual investors would probably not achieve diversification since it requires huge amounts of capital to invest in many different kinds of

securities, plus the knowledge of volatility, correlation coefficients, betas, balance sheets, income statements, and management considerations and so on. However the professional fund managers may do all this work for individual investors and offer them a share of diversified portfolios by purchasing mutual funds.

- **Affordability:** Individual investors may buy small amounts of mutual fund shares and benefit from the fund equally with large capital investors.

- **Liquidity:** The increases in the asset values are reflected daily on the mutual fund prices and the investors can sell their shares at the current asset value easily. Although the buying and selling hours may differ among the mutual fund founders in Turkey, the hours of Türkiye İş Bankası is common. According to the website of Türkiye İş Bankası, the investors of the 'B' type liquid mutual funds are available for buying and selling for 24 hours a day. For the other funds, the buying or selling process occurs from the T+1 price (next business day after the order) if the order is given before 13:30. After 13:30, T+2 prices are considered.

- **Flexibility:** Investors can switch between funds and change their portfolios according the conditions of the financial markets.

2.1.4.2 The Disadvantages of Mutual Funds for the Investors

Although mutual funds provide the above advantages for the individual investors, there is a deep argument in the financial circles about the disadvantages. Professional management as laid out as an advantage above is stated as a disadvantage by Prather and Middleton (2000). Their empirical results suggest that there is no appreciable difference between the outcomes of team-managed and individually managed funds. Likewise, diversification may also be a disadvantage for the investors according to Brix (2007). He suggests that mutual funds generally make small investments of so many different securities. When a fund's holdings jump to high numbers, not much difference is seen in the total performance. Small gain is realized from even top performing securities caused by over diversification. In

addition, unlike other securities such as bonds or stocks, it is very hard to specify whether the fund is under or over valued for the individual investors. So just like other investment decisions, mutual fund investment decision is also tough.

The investors should not forget the risks while investing in mutual funds. They always can face the risk of losing from their principal capital. Each business day, the fund price is determined by the ratio of the total closing values of the securities on the portfolio to the outstanding shares. The investor's purchase price may be above or below the share value, just like other investments. The investors should consider the internal regulations, the founders and the managers, the prospects, circulars, financial statements, monthly reports, total commissions and fees, and the comparative funds while investing in mutual funds.

2.2 LITERATURE REVIEW ON THE DISPOSITION EFFECT IN MUTUAL FUNDS

Barber, Odean and Zheng (2000) focused on the behavior of mutual fund investors by analyzing their fund purchase and sale decisions. Their data set consisted of the buy and sale decisions of 30,000 investors with accounts at a large brokerage firm from January 1991 through December 1996. To measure the disposition effect among the mutual fund investors they used the method of Odean (1998) and calculated the difference between the proportion of gains realized and proportion of losses realized. Based on their findings, the difference was greater than zero, with t-statistics greater than 10, meaning that the mutual fund investors were twice as likely to sell a fund for a gain, than a loss, so that exhibiting the disposition effect. Such as Odean (1998) and Grinblatt and Keloharju (2001), Barber, Odean and Zheng (2000) also state that selling winners and holding losers is counterproductive for mutual fund investment decisions, too. They argue that poor past fund performance tends to persist, and last longer than the persistence of strong fund performance, so that investors should rationally sell their losers, rather than winners.

Shapira and Venezia (2000) analyzed the investment patterns by using a large random sample of clients of one of the largest banks in Israel for all investment

transactions of 1994. They tested whether the disposition effect is exhibited also by the professional investors such as the individuals by comparing the independent investment decisions of individual investors to the accounts that were managed by brokerage professionals. They used Schlarbaum, Lease and Lewellen (1978) technique to measure the disposition effect which compares the duration of losing and winning round trips. Schlarbaum, Lease and Lewellen (1978) define round trips as complete cycles from purchase to sale of each security. Shapira and Venezia (2000) called most round trips as "simple" as they consisted of one buy and one sell order; and the others "sequential" as they consisted of more than one buy and sell orders. They determined that shorter duration (weighted average of the time from the first buy to the sale and the time from the second buy to the sale) of winning round trips compared to losing round trips would designate disposition effect. They found that the average duration of losers is significantly longer than that of winners for both individual and professional groups indicating the disposition effect, however professionally managed group has longer durations of the winning round trips and shorter durations of the losing round trips showing that the disposition effect is smaller in the professionally managed group.

Shapira and Venezia (2000) also wondered about the profitability comparison of the two groups. They measured profitability by calculating holding period returns per round trip as the difference between the sum of sales plus dividends and the purchase price, divided by the purchase price. They found that the returns of the managed group were far less correlated with the market, and since the market declined in their sample period 1994, the profitability of the professionally managed group was higher. Their findings also showed that professionally managed accounts showed more activity, better round trip performance and diversification than the individual investors.

Locke and Mann (2003) state the disposition effect as an irrational behavior among individual investors. They indicate that the professional investors use the term "discipline" to point out that their trading strategies minimize the behavioral bias and test whether the professional traders control these costly irrational behavioral biases.

As data they used the futures trading transactions of Chicago Mercantile Exchange of 1995 which covered the trades lined according to their minute. They used the first six months of data for the evidence of the professional trade discipline and the disposition effect. The second six month was used for the understanding of the relationship between the discipline and future profitability.

For profitability and timing accounting they developed the following methodology. They measured the holding time for all trades in a manner similar to the cost basis. They noted that the round trips (Schlarbaum, Lease, Lewellen, 1978) indicate the number of contracts involved in a complete trade. Locke and Mann (2003) distinguished the existing positions by their unrealized trading gains or unrealized trading losses. In addition, for every trade, they found the count of potential exit minutes and calculated the maximum and minimum marking to market over the history of the trade. They stated the success of a trade as the quantity traded times the difference between the sale price and the purchase price and used two measures for calculation which are the total income for each six month sample period and the "risk-adjusted performance (RAP)". They state "RAP" as a trader's daily return on an amount related to the economic capital to cover potential trade losses which ranks the profitable but more risky traders lower. They found that lowest ranked traders earn more than the others and trades that held longer than ten minutes are unprofitable for less successful traders. They defined professional trade discipline in terms of propensity to trade quickly, so they stated that their evidence was consistent with the notion that discipline is related to success. They also found that discipline is directly related to future success. So they concluded that the willingness to hold losses comes from irrational considerations, plus no evidence is found of disposition effect among professional traders, but there is some lack of discipline in realizing both gains and losses.

Feng and Seasholes (2005) focused on the same dilemma of the elimination of the disposition effect by trading experience and investor sophistication. They measured the disposition effect on the trades of 1,511 Chinese investors of the People's Republic of China (PRC) by using the logit regression method of Grinblatt

and Keloharju (2000). To test the disposition effect and investor sophistication relationship, they defined two indicators. The first one is the "Trading Loss Indicator" (TLI). TLI values indicate one if the stock is sold for a loss or it is trading at a paper loss, zero otherwise. The second indicator is the "Trading Gain Indicator" (TGI) which takes the value of one if the stock is sold for a gain or trading at a paper gain, again zero otherwise. For the investor sophistication indicators, they used demographic variables interacted with TLI and TGI values. They used the "number of trading rights" and "initial portfolio diversification" as proxy variables for investor sophistication, plus gender and age. "Trading rights" represents the different ways to place orders in PRC as through branch offices, computer terminals, via telephone or internet links. Investors must apply for the trading right to trade for each way.

Feng and Seasholes (2005) hypothesized that the sophisticated investors have liability to use more ways to trade. "Initial Portfolio Diversification" stands for the number of stocks in an investor's portfolio on the first trading day and the hypothesis is that more sophisticated ones tend to diversify their portfolios from the beginning. The diversification variable is one if the investor buys more than one stock at the start and zero if one stock is bought. Their findings showed that the more sophisticated the investors are, the less they are disposition prone. The sophisticated investors have at least 67 percent reduced sensitivity to losses. For the effect of trading experience, they simply stated that the experience is measured by the number of positions an investor has taken each day:

Experience$_{i,t}$ = Number of positions taken by investor i up until date t

Opposed to the disposition effect, they found that trading experience decreases the disposition effect by 72 percent, but does not totally eliminate it; however their results showed that a combination of investor sophistication and trading experience can eliminate the reluctance of realizing losses. They gave an example of an investor who is sophisticated who is no longer reluctant to realize losses by the time of his sixteenth stock position. Consistent with Feng and Seasholes (2005), Dhar and Zhu (2006) found empirical evidence that wealthier and

professionally occupied individuals exhibit lower disposition effect by using demographic and socio-economic variables as proxies for investor sophistication.

Cici (2005) states that as professional investors, mutual funds have access to superior investment technologies, monitor financial markets, and have large portfolios with hundreds of securities. He suggests that this degree of sophistication should prevent them from behavioral biases. He analyzed the disposition effect influence on the trades and performance of U.S. equity mutual funds and reported that the disposition effect had a much weaker influence on the trades of mutual funds. He used the method of Odean (1998) to measure the disposition effect, calling the difference of the PGR and PLR "disposition spread". His data consisted of portfolio holdings for U.S. equity funds between January 1980 to December 2004 with name and identifier of each security held. As proxy, he used the cost basis he created for each stock held in the portfolios to illustrate gains and losses. He calculated the cost basis as the average of the prices at which the stock is bought, weighted by the number of purchased shares. To determine the relation of the disposition spreads and fund performance, he used Fama-Macbeth regressions. His findings showed statistically and economically significant negative relation between disposition effect and mutual fund performance. When the funds increased their disposition spreads, underperformance was measured in the next periods, showing that the disposition effect affects mutual fund performances. Cici (2005) suggests the mutual fund managers to search solutions for the elimination of the disposition effect.

Jin and Scherbina (2005) saw the matter in a new light and measured the disposition effect among mutual fund trades by studying instances of management changes. They stated that a new manager who inherits an investment portfolio is more likely to purge momentum losers from the portfolio than a continuing manager by opposing the trading patterns of new fund managers with the continuing ones. They found that new managers are less prone to the disposition effect, but the effect is not totally eliminated.

Kahl (2006) demonstrated a student managed investment fund and analyzed the disposition effect of the student fund managers. He found no evidence of the disposition effect in the student managed investment fund.

Krause, Wei, and Yang (2006) measured the disposition effect of individual and institutional investors by their method as mentioned in Chapter 1. They hypothesized that the more experienced a trader is, the smaller the disposition effect and found that the institutional investors as more experienced exhibit reverse disposition effect with high degree of significance supporting their hypothesis. Figure 13 below shows their findings by a graph.

Figure 13: Disposition Effect for Differently Experienced Traders
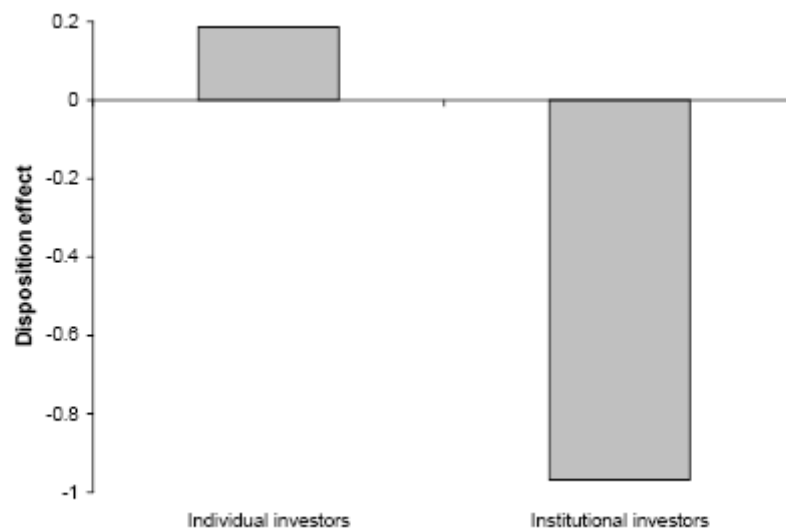
Source: Krause, Wei, Yang (2006: 32)

Annaert et al (2007) rejects the disposition hypothesis of Odean (1998) and document a propensity of mutual fund managers to cut losses early. Following the methodology of Odean (1998), they calculated the realized and paper gains and losses on each day for each portfolio of 519 different mutual funds. Their data were obtained from a major global custodian and covered all daily transactions of mutual funds which had an international spread through securities from various markets between 2002 and 2007. They calculated realized gains and losses by comparing the

selling price to the average purchase price. Paper gains and losses are calculated by comparing the DataStream high and low price on that day to the average purchase price. Then the PGR and PLR values are calculated as Odean (1998). They applied a t-test to measure the statistical significance of their results to test the following hypothesis:

$$H_1 : PLR – PGR < 0$$

According to their findings, the difference between 0.0298 PLR and 0.0259 PGR was 0.0039 with t-statistic 30.98. So gains were realized more than losses by mutual funds showing the disposition effect. Annaert et al (2007) however, focused on the number of paper gains and losses. They determined 6.460.333 paper gains with 171.745 realized; 2.303.791 paper losses with 70.792 realized. Their interpretation to these numbers was that the mutual funds sell more losses than gains relative to their opportunities to do so. This is the reason of their conclusion that the disposition effect is not exhibited, but instead the mutual funds show tendency to cut losses rather than a reluctance to hold on to losing stocks.

Xu (2007) examined the existence of the disposition effect among US equity mutual funds and the influence of disposition effect on fund performances and fund flows. Xu (2007) defines the disposition effect as "a measure of how quickly a fund manager realizes available capital gains and available capital losses". To determine the disposition effect, she followed the method of Odean (1998) and calculated PGR, PLR, and the disposition spread. The data of the study are obtained as quarterly and monthly fund holdings and stock returns from Thomson Financial and CRSP. The data consisted of quarterly information, thus she determined the sales by assuming that all changes occurred at the end of the quarters and compared the portfolios with the previous quarters. She found that disposition spreads were negative for both means and medians, -5.6% and -5.1% respectively pointing out that the mutual funds do not exhibit disposition effect. Taking into account the paper gains and losses, 43.8% of available losses are realized compared with 25.8% of available gains per quarter. When she compared the performance of the funds with high disposition spreads to the lower ones, she determined that they underperform the lower funds by 4-6% per year and disposition prone funds show 2-3% less fund flows per quarter.

CHAPTER III

ANALYSIS OF THE DISPOSITION EFFECT
FOR A TURKISH MUTUAL FUND

Statman (2005) points out that "Normal investors are you and me. We are not stupid, but neither are we "rational" in the way a computer would be". The main heuristics and biases that the individual investors experience in making their investment decisions which cause serious errors and underperformed portfolios are discussed in Chapter 1. The disposition effect which leads to lower profits as suggested by Odean (1998) and Grinblatt and Keloharju (2001) is presented. If the individual investors exhibit disposition effect in their investment decisions, can they eliminate this by investing in mutual funds? May mutual funds act as a shield for the investors to avoid the negative effects of the disposition effect? Are the investors right to invest in mutual funds? In this chapter, answers to these questions will be sought in the light of the literature on the disposition effect in mutual funds empirically. Thus, the aim of this study is to determine whether the mutual funds exhibit disposition effect in their investment decisions or not.

Only one sample fund is selected due to the limitations of the data sources and the disposition effect in the stock investments of the fund is measured by following the methodology of Odean (1998), then F and T-tests are applied to test the statistical significance. The results showed that the professional management of the sample fund does not exhibit disposition effect in the stock investment decisions in parallel with Kahl (2006).

In the first part of this chapter, the content and the limitations of the data will be described. In the second part, the methodology to measure the disposition effect is discussed and in the third part, the empirical findings are presented.

3.1 DATA

The data is from three main sources. The monthly reports of the 'A' type stock fund from February 2004 to February 2008 are obtained from the largest privately owned investment and development bank in Turkey. In Turkey, the monthly reports of the mutual funds can be obtained from the websites of the Capital Markets Board (CMB) or the issuers. Unfortunately, majority of these reports do not present the daily transactions of the funds' managements, and the minority presents solely the transactions of the last month, so the data of the daily transactions can not be obtained retrospectively even through application. The website of this investment and development bank however, has the merely retrospective record of the mutual fund reports between 2004 and 2008.

The bank was established in 1950 offering corporate and investment banking with brokerage services and awarded as the "Best Securities Firm in Turkey" in 1997, 1998 and 1999 by Euromoney. The monthly reports contained the monthly based 'A' type stock fund portfolio holdings information and the daily stock transactions of the fund's management in Istanbul Stock Exchange (ISE). The total amount of the fund is 15 million Turkish Liras in February 2008 with 21,265,210 outstanding shares. The foundation date of the fund is 22/03/2000 with unlimited duration of life. Totally 3,787 stock transactions are examined to analyze the disposition effect of four years of investments between 2004 and 2008. The daily stock transactions information consisted of the issuing firms, purchase/selling dates, nominal values of the transactions and the purchase/selling values.

Data of ISE 100 Composite Index with stock prices, returns and capital increases are obtained from the official websites of the Central Bank of the Republic of Turkey and ISE.

Because the access to the detailed data of the other mutual funds' retrospective records is not possible, the empirical results of this study should not be generalized, yet may be used as an indicator. Any possible access to the other funds'

records would present comparative and more valid results. Another limitation is that the daily transactions are listed in the monthly reports distinguished in terms of purchases and sales. Unfortunately, there is no data available in minute terms which lead to immeasurable profitability of the daily trades. As can be seen at Table 3, there is no "time" section in the data, so that MMART may be sold and then purchased; or purchased and then sold on both 14/10/2005 and 17/10/2005.

Table 3: Example of the Daily Trades

Sales			
Issuer	**Date**	**Quantity(Lots)**	**Selling Price**
MMART	14/10/2005	10,000.00	19,400.00
MMART	14/10/2005	10,000.00	20,600.00
MMART	17/10/2005	10,000.00	20,000.00
MMART	17/10/2005	10,000.00	20,400.00
MMART	25/10/2005	20,000.00	38,600.00
MMART	25/10/2005	5,000.00	9,800.00
Purchases			
MMART	14/10/2005	10,000.00	20,100.00
MMART	17/10/2005	10,000.00	19,900.00
MMART	18/10/2005	15,000.00	30,600.00

About the capital increases of the issuers, the stock splits cause no problem in the calculations, however cash dividends do so and are ignored following Odean (1998), because the profitability is measured according to the quantity of sales in terms of lots as will be demonstrated in the next section.

3.2 METHODOLOGY

In this study, the stock trades of the sample fund are examined in order to determine whether the fund management is disposition prone or not. The methodology of Odean (1998) is followed to measure the disposition effect, such as Barber, Odean and Zheng (2000), Ranguelova (2001), Brown et al (2002), Cici (2005), Barber et al (2006), Annaert et al (2007), and Xu (2007). As Xu (2007) points out, Odean (1998)'s methodology measures disposition effect in terms of how quickly an investor or a fund manager realizes available capital gains and available

capital losses. He analyzes the frequency with which investors sell winners and losers relative to their opportunities to sell each.

Due to the monthly reports of the sample fund, the initial portfolio is determined, and based on the following month's stock holdings report, the number of realized gains (RG) are opposed with the number of not realized gains which are called paper gains (PG); and the number of realized losses (RL) are opposed with the number of not realized losses which are called paper losses (PL). By the following ratios below, the results represent the proportion of gains realized (PGR) and proportion of losses realized (PLR). If the PGR value is greater than PLR value, the fund management is considered to show tendency to realize gains more frequently than losses, and if PLR value is greater than PGR value, the tendency to realize losses more than gains is determined.

$$PGR_t = \frac{^nRG_t}{^nRG_t + {}^nPG_t} \qquad\qquad PLR_t = \frac{^nRL_t}{^nRL_t + {}^nPL_t}$$

The disposition spread (DS) as the difference between the PGR and PLR values is specified for each month "t". The positive disposition spread implies that more gains are realized than losses, relative to the fund's opportunities to sell each indicating the disposition effect (DE); the negative disposition spread shows the preference of realizing losses more than gains indicating the reverse disposition (RDE) effect; zero disposition spread shows that no disposition or reverse disposition effect is exhibited by the fund's management as shown below:

$$DS_t = PGR_t - PLR_t$$

$$DE_t = PGR_t - PLR_t > 0$$

$$RDE_t = PGR_t - PLR_t < 0$$

The aim of the study is to prove empirically that the management of the mutual fund does not exhibit disposition effect, so the hypothesis one, hypothesis two, and the null hypothesis are stated as:

$$H_0 : {}^{\mu}PGR_a - {}^{\mu}PLR_a = 0$$

$$H_1 : {}^{\mu}PGR_a - {}^{\mu}PLR_a > 0$$

$$H_2 : {}^{\mu}PGR_a - {}^{\mu}PLR_a < 0$$

where μ stands for the means
and a for the aggregate values of PGR and PLR

The null hypothesis designates that the difference between the means of PGR and PLR values are equal to zero which proves the nonexistence of the disposition effect among the trades of the fund. If the null hypothesis is rejected, then the difference is greater than zero which will point out the disposition effect as in hypothesis one; or the difference smaller than zero will point out reverse disposition effect as in hypothesis two.

As mentioned in Chapter 1, Odean (1998) worked with the trades of the individual investors and constructed portfolios consisting of securities which the purchase dates and prices are known. Because I had no possible information about the mutual fund's trading activity before January 2004, I assumed that the mutual fund's January 2004 portfolio is the initial portfolio with the monthly average prices of the stocks as purchase prices and began working with my data set from February 2004. The initial portfolio is as presented in Table 4.

Table 4: The Initial Portfolio

31.01.2004			
STOCKS	NOMINAL	CURRENT VALUE	PRICE-ISE
AKENR	5.000	32.925.000,00	6.585,0
AKGRT	12.000	48.684.000,00	4.057,0
ALCTL	2.500	35.965.000,00	14.386,0
ANACM	2.794	6.403.848,00	2.292,0
BEKO	5.000	35.140.000,00	7.028,0
FROTO	4.000	36.508.000,00	9.127,0
GARAN	15.000	61.650.000,00	4.110,0
SISE	12.000	35.580.000,00	2.965,0
TEBNK	3.800	14.630.000,00	3.850,0
TOTAL	62.094	307.485.848,00	54.400,0

Source: http://www.tskb.com.tr/SPK/Yatfon/fon5AylikRaporBaglanti.pdf

To bring my calculations into sharp relief, I will demonstrate the two months of my calculations in terms of the "proportions of gains realized (PGR)", "proportions of losses realized (PLR)", "paper gains (PG)" and "paper losses (PL)" based on the method of Odean (1998).

The initial portfolio consists of nine different stocks. The prices of the stocks shown are the monthly average prices which are the parts of the raw data. The initial portfolio is compared to the next month's portfolio and the selling transactions of the fund are examined. All reductions of the stocks in terms of quantity (lots) compared to the previous month's portfolio are considered as realized. Because there is no "time" section in the data, as mentioned in the previous section, the daily trades are ignored. If there is more than one selling transaction of the same stock in the same month due to the daily trades, the first selling transaction is respected, assuming that the fund does not exhibit short selling activities. The transactions lower than 100 lots are ignored.

The comparison of the initial portfolio and the next month's portfolio and the daily transaction data of February 2004 are exhibited in Tables 5 and 6. The first stock AKENR continues to exist in the next month with the same quantity. The monthly average of the price is given as 6.585,0 for January and 6.898,0 for February

indicating appreciation which allows me to reckon the stock as paper gain (PG) showing the fund did not prefer to use the opportunity to realize the gain. The second stock AKGRT has decreased 2.000 lots in the same month. The daily trades of February as presented in Table 6 shows that, the management of the fund sold 12.000 lots of AKGRT on 17/02/2004 for 58.200.000 TL and 19/02/2004 for 57.600.000. The first sale is counted. The selling price per share is determined by dividing the total sale to the quantity as 58.200.000 / 12.000 = 4.850 TL. The cost of AKGRT is 4.057,0 for January, showing 793 TL of gain per share. So AKGRT is ranked as a realized gain (RG). The sixth stock FROTO has decreased to 9.116 TL in February 2004 from 9.127 TL and ranked as a paper loss (PL) showing the fund did not prefer to use the opportunity to realize the loss. After the determination of the number of RG, RL, PG and PL, the total numbers are used to calculate the PGR and PLR values and the disposition spread of February 2004, the month of the transactions. For this month no realized losses (RL) are recorded indicating zero PLR value. The PGR value is found as 0,50 and the disposition spread is positive for February 2004 as shown below:

$$PGR_{feb} = \frac{4}{4 + 4} = 0,50 \qquad PLR_{feb} = 0 \qquad DS_{feb} = 0,50 - 0 = 0,50$$

Table 5: The Comparison of the Two Sequential Portfolios

31.01.2004				
STOCKS	NOMINAL	CURRENT VALUE	PRICE-ISE	
AKENR	5.000	32.925.000,00	6.585,0	PG
AKGRT	12.000	48.684.000,00	4.057,0	RG
ALCTL	2.500	35.965.000,00	14.386,0	RG
ANACM	2.794	6.403.848,00	2.292,0	PG
BEKO	5.000	35.140.000,00	7.028,0	RG
FROTO	4.000	36.508.000,00	9.127,0	PL
GARAN	15.000	61.650.000,00	4.110,0	RG
SISE	12.000	35.580.000,00	2.965,0	PG
TEBNK	3.800	14.630.000,00	3.850,0	PG
TOTAL	62.094	307.485.848,00	54.400,0	

29.02.2004			
STOCKS	NOMINAL	CURRENT VALUE	PRICE-ISE
AKENR	5.000	34.490.000,00	6.898,0
AKGRT	10.000	46.100.000,00	4.610,0
ALARK	1.200	44.600.400,00	37.167,0
ANACM	2.794	7.395.718,00	2.647,0
ANACM	10.000	26.470.000,00	2.647,0
DOHOL	20.000	61.060.000,00	3.053,0
EREGL	1.000	41.436.000,00	41.436,0
FROTO	4.000	36.464.000,00	9.116,0
GARAN	7.500	35.932.500,00	4.791,0
ISCTR	10.000	59.420.000,00	5.942,0
KCHOL	5.000	37.065.000,00	7.413,0
SISE	17.000	60.265.000,00	3.545,0
SISE	3.000	10.635.000,00	3.545,0
TEBNK	3.800	16.305.800,00	4.291,0
TOASO	9.732	28.621.812,00	2.941,0
TOTAL	110.026	546.261.230,00	140.042,0000

Table 6: The transactions of February 2004

SALES				PURCHASES			
GARAN	06.02.2004	5,000	20,250,000	ISCTR	05.02.2004	12,000	63,000,000
ISCTR	06.02.2004	6,000	30,300,000	GARAN	06.02.2004	5,000	20,250,000
DOHOL	09.02.2004	15,000	38,250,000	ISCTR	06.02.2004	6,000	30,000,000
GARAN	10.02.2004	15,000	64,500,000	DOHOL	09.02.2004	15,000	38,250,000
GARAN	10.02.2004	15,000	66,375,000	YKBNK	09.02.2004	10,000	27,750,000
GARAN	11.02.2004	13,000	59,800,000	GARAN	10.02.2004	15,000	64,875,000
ISCTR	11.02.2004	12,000	66,600,000	SAHOL	10.02.2004	7,000	41,300,000
YKBNK	11.02.2004	10,000	28,750,000	SISE	10.02.2004	5,000	15,625,000
AKBNK	12.02.2004	8,000	60,000,000	TCELL	10.02.2004	2,000	28,200,000
GARAN	12.02.2004	13,000	62,400,000	GARAN	11.02.2004	13,000	59,150,000
GARAN	12.02.2004	13,000	63,375,000	GARAN	11.02.2004	13,000	59,475,000
GARAN	12.02.2004	13,000	61,425,000	ISCTR	11.02.2004	12,000	67,200,000
ISCTR	12.02.2004	13,000	77,350,000	AKBNK	12.02.2004	8,000	59,200,000
SAHOL	12.02.2004	7,000	43,400,000	AKBNK	12.02.2004	8,000	59,600,000
TCELL	12.02.2004	2,000	30,200,000	DOHOL	12.02.2004	15,000	42,375,000
HURGZ	13.02.2004	10,000	46,000,000	GARAN	12.02.2004	13,000	63,050,000
ISCTR	13.02.2004	12,000	71,400,000	GARAN	12.02.2004	13,000	61,425,000
AKBNK	16.02.2004	8,000	61,600,000	GARAN	12.02.2004	13,000	62,400,000
ALARK	16.02.2004	1,000	40,250,000	HURGZ	12.02.2004	10,000	45,000,000
DOHOL	16.02.2004	15,000	45,000,000	ISCTR	12.02.2004	12,000	70,800,000
DOHOL	16.02.2004	15,000	46,125,000	ISCTR	12.02.2004	1,000	5,950,000
GARAN	16.02.2004	13,000	65,000,000	ALARK	13.02.2004	1,000	39,250,000
ISCTR	16.02.2004	12,000	75,600,000	BEKO	13.02.2004	3,000	24,150,000
AKGRT	17.02.2004	12,000	58,200,000	ISCTR	13.02.2004	12,000	71,400,000
ISCTR	17.02.2004	12,000	74,400,000	AKBNK	16.02.2004	8,000	60,800,000
BEKO	18.02.2004	8,000	66,800,000	DOHOL	16.02.2004	15,000	46,500,000
GARAN	18.02.2004	13,000	61,425,000	EREGL	16.02.2004	1,000	43,750,000
AKBNK	19.02.2004	8,000	56,800,000	GARAN	16.02.2004	13,000	63,700,000
AKGRT	19.02.2004	12,000	57,600,000	HURGZ	16.02.2004	10,000	48,000,000
ALCTL	19.02.2004	2,500	37,250,000	ISCTR	16.02.2004	12,000	75,600,000
GARAN	19.02.2004	10,000	47,750,000	AKGRT	17.02.2004	12,000	57,300,000
GARAN	19.02.2004	13,000	63,700,000	BEKO	19.02.2004	8,000	68,800,000
HURGZ	19.02.2004	10,000	45,750,000	GARAN	19.02.2004	10,000	48,000,000
ISCTR	19.02.2004	9,000	53,550,000	GARAN	19.02.2004	13,000	63,700,000
BEKO	20.02.2004	8,000	68,000,000	ISCTR	19.02.2004	9,000	55,350,000
FENER	20.02.2004	810,000	10,368,000	TOASO	19.02.2004	15,000	45,000,000
GARAN	20.02.2004	10,000	46,250,000	AKGRT	20.02.2004	10,000	47,000,000
TOASO	20.02.2004	5,268	15,672,300	DOHOL	20.02.2004	15,000	43,875,000
EREGL	23.02.2004	1,000	40,250,000	GARAN	20.02.2004	10,000	46,250,000
GARAN	23.02.2004	10,000	46,250,000	GARAN	20.02.2004	10,000	45,750,000
DOHOL	24.02.2004	15,000	43,875,000	KCHOL	20.02.2004	5,000	37,000,000
DOHOL	24.02.2004	15,000	43,500,000	GARAN	23.02.2004	13,000	59,475,000
GARAN	24.02.2004	13,000	58,825,000	DOHOL	24.02.2004	15,000	44,250,000
ISCTR	24.02.2004	9,000	54,450,000	GARAN	24.02.2004	13,000	59,150,000
DOHOL	26.02.2004	20,000	60,000,000	ISCTR	24.02.2004	9,000	53,550,000
GARAN	26.02.2004	13,000	59,800,000	ISCTR	24.02.2004	10,000	60,000,000
HURGZ	26.02.2004	10,000	46,250,000	DOHOL	25.02.2004	20,000	59,500,000
ISCTR	26.02.2004	10,000	61,000,000	HURGZ	25.02.2004	10,000	46,500,000
DOHOL	27.02.2004	20,000	62,000,000	NETAS	25.02.2004	1,000	40,500,000

KORDS	27.02.2004	10,000	23,800,000	GARAN	26.02.2004	7,500	35,437,500
				ISCTR	26.02.2004	10,000	60,500,000
				KORDS	26.02.2004	10,000	23,100,000
				ALARK	27.02.2004	1,200	44,700,000
				ANACM	27.02.2004	10,000	26,500,000
				DOHOL	27.02.2004	20,000	61,500,000
				DOHOL	27.02.2004	20,000	60,500,000
				EREGL	27.02.2004	1,000	41,500,000

The disposition spreads of all months from February 2004 to February 2008 are calculated and summed as demonstrated.

Regression analysis is applied based on the model used by Cici (2005) to analyze the relationships between ISE 100 index and the disposition spreads. Cici (2005) used the following model in order to determine the cross-sectional regression of risk-adjusted fund returns on the disposition spread.

$$\hat{\alpha}_{it} = b_0 + b_1 DISP_{it} + \varepsilon_{it}$$

where α_{it} (alpha) is the risk-adjusted return and $DISP_{it}$ is the disposition spread of fund i measured during quarter t.

Based on the model above, the following model is used. The disposition spreads are considered as the dependent variable with ISE 100 index monthly closing values as the independent variable.

$$(DS) = \beta_0 + \beta_1 (Index) + \varepsilon$$

where it (DS) is the disposition spread and (Index) is the ISE 100 index monthly closing values.

3.3 EMPIRICAL FINDINGS

The disposition spreads are calculated for the aggregate data. Table 7 shows the descriptive statistics for PGR, PLR, and DS values and Table 8 presents the monthly distributions with totals.

Table 7: Descriptive Statistics for the PGR, PLR, and DS Values

Pgr Descriptive Statistics		Plr-Descriptive Statistics		Pgr-Plr = DS Descriptive Statistics	
Mean	0,49064694	Mean	0,509091837	Mean	-0,018444898
Standard Error	0,03764974	Standard Error	0,051060077	Standard Error	0,052770987
Median	0,5	Median	0,5	Median	0
Mode	0,5	Mode	0	Mode	0
Standard Deviation	0,26354819	Standard Deviation	0,357420539	Standard Deviation	0,369396912
Sample Variance	0,06945765	Sample Variance	0,127749442	Sample Variance	0,136454078
Kurtosis	-0,0724414	Kurtosis	-1,270498911	Kurtosis	-0,240443167
Skewness	0,28747659	Skewness	-0,050575963	Skewness	-0,374837846
Range	1	Range	1	Range	1,6154
Minumum	0	Minumum	0	Minumum	-1
Maximum	1	Maximum	1	Maximum	0,6154
Sum	24,0417	Sum	24,9455	Sum	-0,9038
Count	49	Count	49	Count	49
Confidence Level(95,0%)	0,07569988	Confidence Level(95,0%)	0,102663164	Confidence Level(95,0%)	0,10610318

The aggregate PGR and PLR for the sample is determined as 24,0417 and 24,9455 respectively. The disposition spread of the sample is calculated as – 0,9038 and the mean is – 0.018444898. The negative value designates reverse disposition effect as stated by Ranguelova (2001); however the mean is approximately zero. Although the sample shows no evidence of the disposition effect, the F and T tests should be applied to test the statistical significance.

Table 8: Total PGR, PLR, and DS values

DATE	PGR	TOTAL PLR	PGR-PLR = DS	DIFFERENCE
2004 FEBRUARY	0,5000	0,0000	0,5000	POSITIVE
MARCH	0,5000	0,3333	0,1667	POSITIVE
APRIL	1,0000	0,5000	0,5000	POSITIVE
MAY	0,3300	0,4600	-0,1300	NEGATIVE
JUNE	0,4167	0,0000	0,4167	POSITIVE
JULY	0,3158	0,0000	0,3158	POSITIVE
AUGUST	0,4286	0,3333	0,0953	POSITIVE
SEPTEMBER	0,3889	0,0000	0,3889	POSITIVE
OCTOBER	0,7778	0,5000	0,2778	POSITIVE
NOVEMBER	0,5000	0,3846	0,1154	POSITIVE
DECEMBER	0,3750	0,6667	-0,2917	NEGATIVE
2005 JANUARY	0,5000	1,0000	-0,5000	NEGATIVE
FEBRUARY	0,5455	0,7500	-0,2045	NEGATIVE
MARCH	0,0000	0,1667	-0,1667	NEGATIVE
APRIL	0,7500	0,2000	0,5500	POSITIVE
MAY	0,3500	0,0000	0,3500	POSITIVE
JUNE	0,3571	0,2500	0,1071	POSITIVE
JULY	0,3333	0,0000	0,3333	POSITIVE
AUGUST	0,2000	0,3000	-0,1000	NEGATIVE
SEPTEMBER	0,6667	1,0000	-0,3333	NEGATIVE
OCTOBER	0,3333	0,3333	0,0000	ZERO
NOVEMBER	0,3571	1,0000	-0,6429	NEGATIVE
DECEMBER	0,3333	1,0000	-0,6667	NEGATIVE
2006 JANUARY	0,3077	0,3333	-0,0256	NEGATIVE
FEBRUARY	0,3846	0,6667	-0,2821	NEGATIVE
MARCH	0,5000	0,5000	0,0000	ZERO
APRIL	0,5000	1,0000	-0,5000	NEGATIVE
MAY	1,0000	0,5000	0,5000	POSITIVE
JUNE	0,8000	0,5000	0,3000	POSITIVE
JULY	0,5000	0,7500	-0,2500	NEGATIVE
AUGUST	0,8571	0,8571	0,0000	ZERO
SEPTEMBER	1,0000	1,0000	0,0000	ZERO
OCTOBER	0,0000	1,0000	-1,0000	NEGATIVE
NOVEMBER	0,5000	0,3077	0,1923	POSITIVE
DECEMBER	0,3333	0,0000	0,3333	POSITIVE
2007 JANUARY	0,5000	0,6667	-0,1667	NEGATIVE
FEBRUARY	0,7000	1,0000	-0,3000	NEGATIVE
MARCH	0,6000	0,7143	-0,1143	NEGATIVE
APRIL	1,0000	0,8333	0,1667	POSITIVE
MAY	0,7500	1,0000	-0,2500	NEGATIVE
JUNE	0,0000	0,7000	-0,7000	NEGATIVE
JULY	0,6154	0,0000	0,6154	POSITIVE
AUGUST	0,3333	0,5385	-0,2052	NEGATIVE
SEPTEMBER	0,3750	0,7500	-0,3750	NEGATIVE

OCTOBER	0,6000	0,7500	-0,1500	NEGATIVE
NOVEMBER	0,0000	0,4000	-0,4000	NEGATIVE
DECEMBER	0,4444	0,0000	0,4444	POSITIVE
2008 JANUARY	1,00	1,00	0,00	ZERO
FEBRUARY	0,1818	0,00	0,1818	POSITIVE
TOTAL	**24,0417**	**24,9455**	**-0,9038**	**NEGATIVE**

The F test for two samples for variances is applied to PGR and PLR values to compare the variances. F test returns the one-tailed probability that the variances of PGR and PLR values are not significantly different. The hypotheses are:

$$H_0 : {}^{\sigma}PGR_a - {}^{\sigma}PLR_a = 0$$

$$H_1 : {}^{\sigma}PGR_a - {}^{\sigma}PLR_a > 0$$

$$H_2 : {}^{\sigma}PGR_a - {}^{\sigma}PLR_a < 0$$

The results of the F test are shown in Table 9. The F value 0,543702158 is smaller than F critical one-tail value 0,619053097 indicating that the variances of PGR and PLR are equal, so that the hypothesis one and two should be rejected while the null hypothesis is not rejected.

Table 9: The Results of the F test

F-Test Two-Sample for Variances

	PGR	PLR
Mean	0,490646939	0,509091837
Variance	0,069457647	0,127749442
Observations	49	49
df	48	48
F	0,543702158	
P(F<=f) one-tail	0,018576964	
F Critical one-tail	0,619053097	

The t-test then should be applied, assuming equal variances for the following hypotheses as exhibited in Table 10. The results of the t-test show that the t-statistic value -0,290745523 is smaller than t-critical one tail value 1,660881441, so that the

hypotheses one and two are rejected while the null hypothesis is not rejected at 5% significance level. The results of the F and t-tests prove that PGR and PLR values are significantly indifferent, showing that the management of the fund is not disposition-prone. In other words, because the difference of these values is equal to zero, the management of the fund does not show any tendency to hold on to losers nor selling winners. The investment decisions are independent from the disposition effect.

$$H_0 : {}^{\mu}PGR_a - {}^{\mu}PLR_a = 0$$

$$H_1 : {}^{\mu}PGR_a - {}^{\mu}PLR_a > 0$$

$$H_2 : {}^{\mu}PGR_a - {}^{\mu}PLR_a < 0$$

Table 10: The results of the t- test

t-Test: Two-Sample Assuming Equal Variances

	PGR	PLR
Mean	0,490646939	0,509091837
Variance	0,069457647	0,127749442
Observations	49	49
Pooled Variance	0,098603544	
Hypothesized Mean Difference	0	
df	96	
t Stat	- 0,290745523	
P(T<=t) one-tail	0,38593657	
t Critical one-tail	1,660881441	
P(T<=t) two-tail	0,771873141	
t Critical two-tail	1,984984263	

The results of the regression analysis are presented in Table 11. The correlation between DS and ISE 100 Index values is 0,343096174. According to the R^2 value 0,117714985, about 12% of the variations in the disposition spreads are explained by the regressor ISE 100 Index changes. The regression is statistically significant at 5 % as shown by the F value. There is a negative relationship between the disposition spread and the market. In other words, in the upward trends, the

management of the fund shows tendency to realize more losses, and in the downward trends the management realize more gains.

Table 11: The Results of the Regression Analysis

Summary Output					
Regression Statistics					
Multiple R	0,343096174				
R Square	0,117714985				
Adjusted R Square	0,098942963				
Standard Error	0,350646414				
Observations	49				
ANOVA					
	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	0,771009109	0,771009109	6,270767604	0,01580306
Residual	47	5,778786652	0,122952907		
Total	48	6,549795761			
	Coefficient	*Standard Error*	*t Stat*	*P-value*	
Intercept	0,374516864	0,164725376	2,273583306	0,027602177	
X Variable 1	-1,10572E-05	4,41555E-06	-2,504150076	0,01580306	

The empirical findings presented in this chapter significantly prove that the disposition effect is not exhibited by the management of the sample mutual fund. The professional managers of the fund achieve to eliminate this behavioral bias in their stock trades. Unsurprisingly, the sample mutual fund of the study is the second most increased mutual fund in return among Turkish Capital Markets between 29/02/2004 and 29/02/2008. The relationship of the disposition effect and the mutual fund returns would be another topic for a different study; however the fund shows 116.38% change in this four years period and beat the top five mutual fund founders of Turkey in terms of net returns. The net returns of the stock funds of Akbank, İs Bankası and Yapı Kredi Bankası are 106.93%, 79.75%, and 78.69% respectively.

CONCLUSION

Statman (2005) points out that "Normal investors are you and me. We are not stupid, but neither are we "rational" in the way a computer would be". Behavioral Finance considers the investors are "normal" rather than "rational" in contrast to the traditional framework of finance. The "normal" investors are surrounded by the heuristics and behavioral biases during their decision making process which contribute to unfortunate investment decisions. The elimination of these biases is one of the key phenomena of Behavioral Finance. The researchers have documented numbers of behavioral biases among investors in recent years. In this study, one of the most substantial biases is examined, the so called disposition effect.

Aiming the elimination of the disposition effect, the literature about the concept is analyzed in the first two chapters of this study. It is seen that the prior empirical studies linked the investor sophistication and professionalism with the disposition effect in a negative way. Considering the management of the mutual funds as one of the most sophisticated and professional investors, a sample mutual fund is selected to prove empirically that the disposition effect might be eliminated by investing in mutual funds. Based on Odean (1998)'s methodology, the presence of the disposition effect is tested among the stock investment decisions of the sample mutual fund. The aim of the study is to prove that the management of the mutual fund is not disposition prone.

The empirical findings significantly show that the professional management of the sample fund does not exhibit the disposition effect in the stock investment decisions as Kahl (2006) and coherent with Shapira and Venezia (2000), Locke and Mann (2003), Feng and Seasholes (2005), Dhar and Zhu (2006), Cici (2005), Krause, Wei, and Yang (2006) and Xu (2007); hence the individual investors of ISE may choose to invest in this mutual fund for the elimination of the disposition effect. The professional managers of the fund achieve to eliminate this behavioral bias in their stock trades. Unsurprisingly, the sample mutual fund of the study is the second most increased mutual fund in return among Turkish Capital Markets between 29/02/2004

and 29/02/2008. The relationship of the disposition effect and the mutual fund returns would be another topic for a different study; however the fund shows 116.38% change in this four years period and beat the top five mutual fund founders of Turkey in terms of net returns. The net returns of the stock funds of Akbank, İs Bankası and Yapı Kredi Bankası are 106.93%, 79.75%, and 78.69% respectively.

The contribution of this study to the Behavioral Finance literature is that as stated above, it is the first study about the disposition effect in one of the Turkish mutual funds' trades as far as I examined. I could detect no other studies about measuring the presence of the disposition effect in neither individual nor institutional investors of ISE.

Due to the limitations of the data which is consisted of a sample mutual fund, the empirical findings of this study should not be generalized, thus may be considered as an indicator; taking into account that no study of disposition effect in mutual funds is presented in Turkish Capital Markets in the literature. Adding another sample fund to the study was not possible because the daily stock trades of the mutual funds are not exhibited in any other monthly fund reports retrospectively that I could detect.

Further research would be more valid in case of the examination of more than one mutual fund's stock trades. Markets other than ISE may be analyzed to indicate the presence of the disposition effect in other investment securities. In addition, the disposition effect may be linked to the funds' returns to prove the negative effects to the investment decisions. The disposition effect of the individual investors of one of the intermediary institutions of Turkey may be measured by obtaining the portfolio holdings and stock transactions information, and the results may be opposed with the professionally managed funds.

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