PSYCHOLOGICAL EFFECTS IN FX MARKETS.
THE BEHAVIOUR OF TURKISH FX INVESTORS.

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ANAHTAR KELİMELER

1) Geleneksel/Klasik Finans

2) Davranışsal Finans

3) Etkin Piyasa Hipotezi

4) KT Beklenti Teorisi

5) Beklenen Fayda Teorisi

KEYWORDS

1) Traditional /Classical Finance

2) Behavioral Finance

3) The Efficient Market Hypothesis

4) Prospect Theory

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ABSTRACT

Classical finance presumes that investors are rational decision makers who consciously seek to maximize their utility. However, a considerable number of researches in behavioral finance reported that investors made some irrational investment decision in some occasions. The objective of this study was to examine factors leading an investor to decide irrationally. To attain this objective the literature was reviewed and relevant concepts, arguments and theories were investigated.

In the literature, psychological biases such as heuristics, cognitive biases and mental accounting, degree of sensitivity of investor, and propensity to herd behavior were pointed out as three major factors causing irrational investor behaviors. In case of Turkish investors, which was analyzed based on findings of a questionnaire applied to a sample of 82 interviewees in the foreign exchange market; it was found that investors were subject to herd behavior, investor sensitivity as overreaction, loss aversion, optimism bias, and but were not subject to disposition bias, which appear as behaviors of keeping currencies constantly loosing value and hurrying up in selling currencies gaining value.

ÖZET

Klasik Finans yatırımcıların bilinçli bir şekilde faydalarını maksimize etmeye çalışan rasyonel karar vericiler olduğunu varsayar. Buna karşın Davranışsal Finans alanındaki bir dizi araştırma yatırımcıların bazı durumlarda irrasyonel davranışlar sergilediklerini rapor etmiştir. Bu çalışmanın amacı bir yatırımcıyı irrasyonel bir şekilde karar almaya yönlendiren faktörleri incelemektir. Bu amaca ulaşmak için ilgili literatür gözden geçirilmiş ve ilgili kavram, argüman ve teoriler sorgulanmıştır.

Literatürde, hevristikler, bilişsel eğilimler ve zihinsel muhasebe, yatırımcının duyarlılık derecesi, ve yatırımcıların sürü davranışına olan eğilimleri irrasyonel davranışlara sebep olan üç faktör olarak işaret edilmiştir. Döviz piyasasından seçilen 82 kişilik örneklemeye uygulanan bir anketin bulgularına dayanılarak gerçekleştirilen Türk yatırımcıları vakasının analizinde, yatırımcıların sürü davranışına, aşırı tepki vermek gibi yatırımcı duyarlılığına, kayıptan kaçma eğilimine, iyimserlik eğilimine maruz kaldıkları fakat değer kazanan dövizleri hızla satma ve sürekli kaybeden dövizleri elde tutma şeklindeki davranışlarda ortaya çıkan yanlış pozisyon alma eğilimine maruz kalmadıkları bulunmuştur.

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ABBREVIATIONS

SEUT	Subjective Expected Utility Theory
EMH	Efficient Market Hypothesis
CAPM	Capital Asset Pricing Model
MCH	Mispricing-Correction Hypothesis

CHAPTER 1

Introduction

It is one of basic assumptions in microeconomics that individuals are rational decision makers seeking for maximizing their utility. In this sense, individuals avoid systematic mistakes, act in their own self-interest, and act in an unbiased way to maximize their utility. When they get new information they update their beliefs and decisions correctly as described in Bayes' Law and they make decisions normatively acceptable as described in Savage's Subjective Expected Utility Theory (SEUT).

Researchers, especially in the field of behavioral finance, have questioned whether the behavioral arguments stated above have worked in real contexts or not. Findings of researches showed that basic facts about individual behaviors and decisions can not be easily explained within the framework stated above. In that sense, some researchers began to argue that some financial phenomena and investment decisions can be better explained using models in which some agents are not fully rational. As some models in behavioral finance proved some agents fail to update their beliefs correctly or apply Bayes' Law properly but make decisions that are not normatively correct.

Another important finding of behavioral finance is that in an economy where rational and irrational traders interact, irrationality can have significant and long-lived impact on prices. This finding contradicts with one of the major assumptions of the Efficient Market Hypothesis (EMH) that choices of irrational economic agents do not affect price in a market because of opportunity of arbitrage by rational economic agents.

To understand behavioral finance in a more effective way, one needs to understand traditional finance and the efficient market hypothesis against which it has evolved. The following section shortly introduces traditional finance and then passes to behavioral finance which brings alternative explanations for irrational and systematic behaviors of investors.

CHAPTER 2

Literature Review

The categorization of traditional finance versus behavioral finance is widely based on alternative approaches to explain rational and irrational behaviors of investors. In this paper, the term: *classical finance* was used interchangeable with the term: *traditional finance*.

2.1 Traditional Finance and the Efficient Market Hypothesis (EMH)

In traditional finance, where agents are rational and there are no frictions, a security's price equals its "fundamental value". This is the discounted sum of expected future cash flows, where in forming expectations, investors correctly process all available information, and where the discount rate is consistent with a normatively acceptable preference specification. The hypothesis that actual prices reflect fundamental values is the Efficient Markets Hypothesis (EMH). According to this hypothesis, "prices are right", in that they are set by agents who understand Bayes' law and have sensible preferences. In an efficient market, there is "no free lunch": no investment strategy can earn excess risk-adjusted average returns, or average returns greater than are warranted for its risk.

The Efficient Market Hypothesis is widely accepted as a descriptive model in explaining rationality and decision making qualities of economic agents in traditional finance. The efficient market hypothesis became a dominant notion of traditional finance in 1970s. It is based on the idea that speculative asset prices always incorporate the best information about fundamental variables and prices change only when investors receive good and sensible information that allow them update their decisions correctly (Shiller, 2002).

Like many other models, the efficient market hypothesis is also relied on some simplifying assumptions. The major assumptions EMH bases are as follows:

- Markets are not segmented.
- Transaction costs are zero
- No barriers to entry into securities market
- Investors act, in an unbiased way, to maximize the value of their portfolios.
- Investors always act in their own self-interest
- Since investors are rational they make rational decisions in trading securities
- Some investors are not rational but since their transactions are random, they can not change price
- Some investors are irrational but there are rational investors who can eliminate their effect by arbitrating

Fundamentals of the efficient market hypothesis are based on studies of Samuelson (1965). According to Samuelson (1965), if information and expectations of all market participants involved in process, price changes would not be forecasted. Fama (1970) further developed this argument by dividing market participants into three groups and by identifying three forms of efficient markets; *Weak Form, Semistrong Form, and Strong Form* (N. Barberis and R. Thaler, 2003).

2.1.1. The Weak Form

The weak form of the efficient market hypothesis holds that information on the past movements of stock security prices and volumes cannot be used to predict future stock prices. In examining the validity of this hypothesis, it is useful to divide the empirical tests into certain categories. First, since any discussion of the weak form of the hypothesis requires an explicit definition of "past," it is useful to discuss three categories of "past"-intraday, between 1 and 40 days, and more than 40 days. Second, since certain results can be statistically significant and still not provide the basis for a profitable investment strategy, it is useful to differentiate between two categories of "significant" research-statistical and practical.

When the evidence in support of the weak form of the efficient market hypothesis is viewed in this context, the conclusions are both clear and consistent. Beginning with the shortest possible time periods (intraday price changes), there is statistical evidence that such changes are not

random. While this would imply that someone who could trade without commissions (such as a specialist) might be able to implement inordinately profitable trading strategies, this level of nonrandomness has no practical significance for someone who must pay transaction charges. This research is emphatic in the conclusion that practices such as tape reading are useless (Hagin, 1979).

In the next time interval, the period between 11 and 40 days, there is absolutely -no reliable evidence that historical price and volume information is statistically, much less practically, significant. In the third time interval, in excess of 40 days, there is statistical evidence of the phenomenon of relative strength continuation, where the best performing stocks tend to show above-average performance in subsequent periods. Attempts to translate these statistical phenomena into reliable, practical trading strategies, however, face failure. Thus, two conclusions can be drawn with regard to the weak form of the efficient market hypothesis:

1. The weak form of the efficient market hypothesis is a valid description of the market for anyone who is interested in developing profitable investment strategies from historical price or volume information.
2. There is neither a theoretical foundation nor empirical support for technical analysis based on historical price and volume data.

2.1.2. Semistrong Market Form

The most widely used form of fundamental security analysis is based on developing projections of price-earnings multiples and earnings per share. However, price-earnings multiplies are subject to wide swings for which there is neither a theoretical nor empirical basis for prediction. Nonetheless, even though the uncontrollable and unexpected events of price-earnings multiples constitutes the basis for this kind of analysis, it can be shown that accurate earnings estimates would provide above-average investment performance.

The semistrong form of the efficient market hypothesis however, brings about serious questions about an analysts' ability to develop useful earnings forecasts. Specifically, this form of the hypothesis holds that the analysis of any publicly available information is needless because all such information is already reflected in prices.

The situation is again clear. First, it has been shown that period-to-period earnings changes behave in consistency with a random-walk model. This means that the common practice of basing future earnings projections on historical data of earnings changes does not work. Secondly, studies which have investigated the behavior of security prices prior to unexpected earnings changes exaggerate that the market is remarkably efficient at accurately anticipating such fluctuations. This evidence points out that the marketplace consists of competent analysts who, as a whole, accurately forecast earnings. Under such very competitive circumstances, it is doubtful that a few superior earnings forecasters consistently "beat the market to the punch." (Hagin, 1979).

Dividend information constitutes a significant challenge to the efficient market hypothesis. Dividend changes reflect management's largely correct assessment of a firm's future.

2.1.3. Strong Market Form

In its strong form, the efficient market hypothesis indicates that even investors with privileged information cannot utilize that information to formulate profitable investing strategies. But there is a week support for this hypothesis. Management insiders have extra information about their company's future. In addition to this, there is evidence that stock exchange specialists can cause dramatic patterns of fractional price changes (Hagin, 1979).

Robert Merton wrote "An Intertemporal Capital Asset Pricing Model" in 1973, which explained how to generalize the capital asset pricing model (CAPM) to a comprehensive intertemporal general equilibrium model. Robert Lucas wrote "Asset Prices in an Exchange Economy" in 1978, which indicated that in a rational expectations general equilibrium, rational asset prices may have a forecastable aspect that is related to the forecastability of consumption. Douglas Breeden explained his theory of "consumption betas" in 1979, where a stock's beta (which measures the sensitivity of its return compared to some index) was determined by the correlation of the stock's return with per capita consumption.

The 1970s already saw the beginnings of some disquiet over these models. For example, Eugene Fama's 1970 article, "Efficient Capital Markets: A Review of Empirical Work,"

pointed out some anomalies such as slight serial dependencies in stock market returns. In 1980-2000, a number of empirical studies (Conlisk, 1996; Haugen, 1999; Camerer, 1995 and Starmer, 2000) questioned the validity of the efficient market hypothesis in general. The most important one of these studies was that of Kahneman and Tversky (1979), which constituted fundamentals of behavioral finance.

2.2 Behavioral Finance

Behavioral finance questions whether the behavioral assumptions underlying the EMH are true. For example, consider the assumption that individuals always act in their economic self-interest. Suppose you are having dinner at an out-of-town restaurant and it is extremely unlikely that you will ever return to this restaurant. Do you leave a tip? Most people do, but in this case leaving a tip decreases, rather than increases one's wealth, and because you won't be returning to this restaurant there are (presumably) no "costs" associated with not leaving a tip. In this case leaving a tip violates the rational expectations and self-interest assumptions. As a more serious example, consider "social investing" such as arbitrarily deciding not to invest in tobacco stocks or deciding to overweight environmentally clean industries. Such behavior is not consistent with pure "utility-maximization" approach. Why investors might commit non-wealth maximizing behavior, and what are the consequences of such behavior for security pricing, are areas of most researches in behavioral finance (Schleifer, 2000).

In behavioral models, irrationality and limited (bounded) rationality approaches are dominant rather than rationality in models of traditional finance. Behavioral finance assumes that financial decisions in general and investment decisions in specific are made in a context characterized by uncertainty and complexities and various factors such as psychological and cognitive biases of investors affect overall price level due to limits of arbitrage. Contrary to the efficient market hypothesis, behavioral finance assumes that arbitrage is limited and risky in the real world and irrational decisions of individuals may have a long-standing impact on price.

According to Fama (1970) current price of a security reflects all available information where there are no transaction costs and no costs of access to information. Contrary to Fama (1970), Grossman (1976) and Grossman and Stiglitz (1980) argue for impossibility of completely efficient markets. They claim that seeking for gains via obtaining information is completely needless if markets are completely efficient. In this sense, there are very few reasons for

transactions based on information. As an alternative, degree of inefficiency of markets is an important determinant in investors' efforts to obtain and utilize information. Therefore, market equilibrium occurs only when there are profit opportunities, which means market inefficiencies.

Researchers in behavioral finance argue against the idea that individuals in general and investors in specific are entirely rational. But they do not argue for irrationality of all investors. They claim that there are strong biases. In this sense, many investors make investment decisions based on their biases or their biases influence their decisions at least to some extent.

As Black (1986) indicated investors tend to make investment decisions based on speculations and noise rather than information. Investors tend to follow advices of finance gurus, not to diversify their portfolio, sell shares gaining value and keep shares loosing value and follow price movements and other popular financial models. As a summary, they sometimes behave in an irrational way.

Many cases in which individuals in general and investors in specific have deviated from rationality have been reported by researchers in finance. Studies of Kahneman and Tversky n 1971, 1973, 1974, 1979, 1981, 1984, 1989 and 1992 were pioneers in this field. Cases where individuals deviate from rationality are studied under three groups:

1. Attitudes toward risks
2. Formation of expectations not in accordance with Bayes Theory
3. Sensitivity to framing of problem while making decision

Loss aversion and narrow framing play a significant role in formation of attitudes toward risk. Empirical findings provided evidence that there is a correlation between degree of loss aversion and previous gains and losses. Losses following a previous gain result in less pain whereas losses following another loss cause more pain and disappointment.

Kahneman and Tversky (1979) were pioneers developing a model to explain preferences and biases of investors. The Prospect Theory of Kahneman and Tversky (1979) has been used in efforts explaining various puzzles in finance. For example, Odean (1998) explained *the equity premium puzzle*, which was identified as great differences in returns of shares and bonds by Benartzi and Thaler (1995), with investors' bias to keep shares had lost value for a long time

and sell shares had gained value quickly, which could be defined as “loss aversion”. Kahneman and Riepe (1998) who argued for this bias also pointed out that investors had a bias for overconfidence, especially within a context of uncertainty.

2.2.1. KT Prospect Theory as Alternative to the Expected Utility Theory

Normative analysis is based on reasoning and nature of decision making and seeks for rational resolutions for the problem in question. Contrary to normative analysis, the descriptive analysis relies on what beliefs and preferences of individuals are rather than what they should be. The descriptive analysis seeks to identify behaviors and biases of individuals in decision making processes. The Expected Utility Theory of Von Neumann and Morgenstern (1944) has been regarded as a normative model for rational preferences in decision making and widely accepted. Decision making hypotheses under uncertainty have been widely based on the Expected Utility Model.

The Expected Utility Model of Von Neumann and Morgenstern (1944) is based on the idea of maximizing utility. For example, if there is an investor with 100$ and he has a probability of 10% to gain, then his expected utility will be 10 $ (0.10 x 100 $ = 10 $). If there is uncertainty, optimal decision making occurs according to comparison of expected utilities of alternatives. For example, if there is an investor and he has an option of gaining 100 $ with a probability of 25% or another option of obtaining 1000 $ with a probability of 10 %, he will choose the second option because its expected utility is higher than that of the first (100 $ x 25% = 25 $ < 1000 x 10% = 100 $).

Since its formulation by Kahneman and Tversky in 1979, the *Prospect Theory* has been a primary alternative to the Expected Utility Theory in decision making under risk. What makes the Prospect Theory attractive is its descriptive dimension. There had been various studies criticizing basic assumptions of the Expected Utility Model before Kahneman and Tversky (1979). For example, Maurice Allais (1953) argued that preferences were not linear in EUM. Even though EUM had been criticized by various researchers, Kahneman and Tversky (1979) made the most serious critics on the theory.

Kahneman and Tversky (1979) introduced prospect theory to explain many of the shortcomings of the expected utility theory. Prospect theory models an individual’s behavior under

uncertainty and offers an explanation for several behavioral anomalies. Kahneman and Tversky's choice theory assigns values for gains and losses rather than for the final levels of the assets. This implies that individuals care about fluctuations in the value of their financial wealth. Another critical element of prospect theory is that the value function is steeper for losses than for gains (Nitzan Melamed, 2001)

The work of Kahneman and Tversky (1979) provide empirical evidence on the two behaviors of individuals. Based on this empirical evidence, they formulate a general, convenient form of loss aversion called prospect theory. Specifically, prospect theory captures the notion that investors care about changes in the value of their wealth rather than the conventional approach of deriving utility from levels. In addition, prospect theory takes into account that investors evaluate positive and negative wealth changes differently. Investors are more sensitive to losses than they are to gains. They measure a gain or loss by comparing the outcome to some reference point.

To make sharp predictions, behavioral models often need to specify the form of agents' irrationality. How exactly do people misapply Bayes' Law or deviate from SEU? Behavioral economists typically turn to the extensive experimental evidence incorporated by cognitive psychologists on the biases that arise when people form beliefs, and on people's preferences, or on how they make decisions, given their beliefs. Thus, investor psychology is a basic leg of theories and arguments in behavioral finance.

In traditional finance, it is argued that even if some agents in the economy are less than fully rational, rational agents will prevent them from influencing security prices for very long, through a process known as arbitrage. One of the biggest successes of behavioral finance is a series of theoretical papers showing that in an economy where rational and irrational traders interact, irrationality can have a substantial and long-lived impact on prices. These papers, known as the literature on "limits to arbitrage", form one of the two main legs of behavioral finance.

2.2.2. Limits to Arbitrage

Behavioral finance argues that some features of asset prices are most reasonably interpreted as deviations from fundamental value, and that these deviations are brought about by the presence

of traders who are not fully rational. A long-standing objection to this view that goes back to Friedman (1953) is that rational traders will quickly undo any dislocations caused by irrational traders. To illustrate this argument, suppose that the fundamental value of a share of Ford is $20. Imagine that a group of irrational traders becomes excessively pessimistic about Ford's future prospects and through its selling, pushes the price to $15. Defenders of EMH argue that rational traders, sensing an attractive opportunity, will buy the security at its bargain price and at the same time, hedge heir bet by shorting a "substitute" security, such as General Motors, that has similar cash flows to Ford in future states of the world. The buying pressures on Ford shares will then bring their price back to fundamental value (Thaler and Barberis, 2003: 1054).

The argument rests on two arguments. First, as soon as there is a deviation from fundamental value –in short, a mispricing- an attractive investment opportunity emerges. Second, rational traders will immediately utilize the opportunity, thus correcting the mispricing. Behavioral finance does not discuss the second step in this argument: when attractive investment opportunities emerge, they are quickly utilized. Behavioral finance questions the first step. Even when an asset is clearly mispriced, strategies developed to correct the mispricing can be both risky and costly, rendering them unattractive. As a consequence, the mispricing can remain unchallenged (Thaler and Barberis, 2003: 1054-55).

In common finance literature, irrational traders are often called as "noise traders" whereas rational traders are typically identified as "arbitrageurs". An arbitrage is an investment strategy that provides riskless profits at no cost. The rational traders in Friedman's theory became known as arbitrageurs due to the idea that a mispriced asset immediately creates an opportunity for riskless profits. Behavioral finance claims that this is not true; the strategies of rational traders of Friedman are not necessarily arbitrages; but usually, they are risky.

CHAPTER 3

Psychological Biases

Traditional economics and traditional finance assumes that individuals have constant preferences and seek to maximize their utility from these preferences. On the other hand, behavioral finance has found a bulk of evidence supporting limited rationality (irrationality in some cases) and preference reversal and have attributed these facts to psychological biases. Contrary to traditional finance, behavioral finance claims that some irrational behaviors are not temporary but constant.

Many psychological biases occur as a result of perception errors based on ways of coding, correcting and processing of information or of errors occurred in process of problem formulation (McFadden, 1998: 1). Due to limitedness of human cognition, psychological biases occur in cases of decision making under uncertainty. Psychological biases can be studied under two major groups namely: Heuristics and cognitive biases, and psychological factors.

3.1 Heuristics

Heuristics can be defined as strategies or mental shortcuts used to resolve problems (Atkinson et al, 1996: 714). Heuristics may provide or may not provide right answers and resolutions. Heuristics provide individuals with the opportunity of making decisions with relatively limited efforts and confusion. In this sense, most individuals tend to resort to heuristics in decision-making processes. Heuristics, which are so-called “rules of thumb”, make decision-making easier, but can sometimes result in biases, especially when things change. These can cause

suboptimal investment decisions. When there are N choices of investing retirement money, many people resort to the 1/N rule. If there are three funds, they invest one-third in each. If two are stock funds, two-thirds goes into equities. If one of the three is a stock fund, one-third goes into equities. Benartzi and Thaler (2001) have documented that many people follow the 1/N rule.

Researches show that investors tend to use heuristics to eliminate complexities of analyzing data. The heuristics lead investors to make predictions without examining all available data. Heuristics help individual investors in organizing and processing a bulk amount of information in a rapid and relatively less difficult way. But they can lead to irrational decisions due to avoidance of complex analysis of whole available data.

In the literature various heuristics have been defined. These heuristics were identified below. Some researches have focused on the question that which heuristics have been utilized under various conditions. Aronsan (1992: 137) defined four different circumstances under which heuristics were applied:

1. When individuals are exposed to a lot of information and processing whole data becomes quite hard or impossible
2. When individuals do not have enough time to analyze a problem or situation
3. When individuals are not willingly to think about events which are unimportant and depend on chance
4. When individuals have very little data necessary to make decision

Major heuristics affecting decisions of investors and leading to irrational investment decisions in some cases are summarized below.

3.1.1. Availability Heuristics

Availability heuristics can be defined as a misleading mental shortcut that evaluates probability of an event based on its availability in memory. Researches show that people tend to overweight some information and underweight some other while making their decisions. For example, some researches provide evidence that people are biased to overweight data and idea based on current events and also tend to utilize attractive and spectacular data and concrete examples rather than abstract and statistical data based on fundamental analysis (Tversky and Kahneman, 1974: 4 & Bar Hillel, 1980: 83).

People also tend to overweight attractive, salient, memorable data while making decisions (*salience bias*). People usually think that if something is easily reminded, it is something common and common things provide better insights. According to Tversky and Kahneman (1973) easily memorable events can lead to perception errors.

3.1.2.Representativeness Heuristics

Representativeness heuristic is mental judgment or shortcut based on the extent to which something represents a typical stereotype. Tversky and Kahneman (1974: 83) identified representativeness heuristics with the following words: "A person who follows this heuristic evaluates the probability of an uncertain event, or a sample, by the degree to which it is (i) similar in its essential properties to the parent population (ii) reflects the salient features of the process by which it generated". Subjective evaluation of probabilities is like subjective determination of physical quantities or distance. In this sense, representativeness heuristics may lead to irrational evaluations and/or decisions.

In finance, representativeness heuristic appear as a result of investors' bias to associate "good shares" with "good companies" and to prefer shares of these "good companies". Even if shares of companies, which are not perceived as good, have a higher total return potential, investors choose shares of companies, which seem sound and "good", for investment. As a consequence of this bias, popular shares are associated with sound firms whereas unpopular ones are mentally related to "bad" companies. Investors are biased to exaggerate the probability that "good" shares are shares of "good" companies.

Representativeness heuristic leads investors to invest in shares of "good" companies and avoid investing in shares of other relatively less "good" or seemingly "bad" companies even if the latter have higher profit potential. In this way, too much funds are allocated in stocks of "good" companies. In many cases, representativeness heuristic prevents investors from analyzing market data rationally and results in losses (Nofsinger, 2001: 114).

3.1.3. Adjustment and Anchoring

In many cases, people make their decisions by using a starting value and by making corrections on it. The starting or anchoring value shape the formulation of decision but generally results in wrong decisions.

When people are asked to make guess, they usually make frequently used numbers (like medium or mean number) their anchor and guess by making adjustments. Tversky and Kahneman (1974) asked a sample to say the result of following multiplying operation within 10 seconds: 2*3*4*5*6*7*8. The average of the guesses was 512. Then, they asked the same question by changing the order of numbers as 8*7*6*5*4*3*2 to a second sample. In the second case, the average of the guesses was 2250. Since each sample took the initial numbers the anchor two significantly different results were generated.

If an investor was asked to guess probability distribution of IMKB index, his anchoring value would be estimation of the medium. As an anchoring point, this value will allow the investor to make further guesses and to shape his/her expectations. Contrary to this situation, if the investor was asked to guess the probability distribution of IMKB by giving a previously determined value, then, the investor would tend to take the given value as the anchor point. Thus, these two processes would generate different guesses.

3.2 Cognitive Biases

Studies in the field of cognitive psychology and behavioral finance present evidence that decision making processes of individuals are subject to systematic and irrational biases. Some of common situations in which cognitive biases occur are as follows (Edwards and Winterfeldt, 1986: 643):

1. Using some formal principles in answering a mental question
2. Using intuitions (without assistance of physical means) while answering questions
3. Existence of systematic anomalies between answer occurred as a judgment and true answer

Cognitive anomalies occur in situations where individual seriously deviates from rationality. To determine cognitive anomalies Tversky and Kahneman has conducted a series of studies in 1971, 1973, 1974, 1981, 1989 and 1992. The initial studies were based on lottery games. The reason for this can be the critical role of probability judgments in lottery games. Cognitive biases could more easily appear in such circumstances.

Even though many cognitive biases have been identified, no absolute limits were drawn for the extent of these biases. Most common cognitive biases observed in investment field are as follows:

3.2.1. Overconfidence

Majority of researches in related areas of cognitive psychology show that people are overconfident about themselves and their knowledge. Overconfidence usually results in a irrational decisions, which lead to losses. People who are overconfident tend to be very optimistic, to overestimate reliability of information they have and underestimate risks. As a result of overconfidence, individuals perceive themselves more clever and talented than normally they are (self-deception theory).

Overconfidence manifests itself in a number of ways. One example is too little diversification, because of a tendency to invest too much in what one is familiar with. Thus, people invest in local companies, even though this is bad from a diversification viewpoint because their real estate (the house they own) is tied to the company's fortunes. Think of auto industry employees in Detroit, construction industry employees in Hong Kong or Tokyo, or computer hardware engineers in Silicon Valley. People invest way too much in the stock of the company that they work for. Men tend to be more overconfident than women. This manifests itself in many ways, including trading behavior. Barber and Odean (2001) recently analyzed the trading activities of people with discount brokerage accounts. They found that the more people traded, the worse they did, on average. And men traded more, and did worse than, women investors.

Overconfidence is one of the major factors affecting attitudes of investors toward risk. According to the Expected Utility Theory, rational investors seek to minimize risk and to maximize gains. According to KT Expectation Theory, on the other hand, perceived risk affects an investor's attitude rather than expected risk. Investors with overconfidence misinterpret the risk and make some irrational decisions. For example, investors who expect high income from the shares they invest in believe that their investments carry low risk.

Overconfident investors are likely to be more risk takers. Nofsinger (2001) indicated two reasons for this phenomenon:

- Overconfident investors tend to have highly risky investments
- Overconfident investors tend to have underdiversification in their portfolio

Investment is complex business. It requires the investor to collect information, to analyze it and then to make a decision based on the analysis. Overconfidence leads an investor to overestimate his/her ability to interpret the information and to make correct decision. As result the investor becomes very confident about the future returns of his/her investments. Overconfidence leads to investing in risky instruments and making irrational investment decisions.

According to Grossman and Stiglitz (1980), who based their argument on rational expectations, an investor makes investment decision if marginal utility of the investment is at least equal to its marginal costs. Contrary to these researchers, Odean (1998), Gervais and Odean (1999) and Caballe and Sakovics (1998) concluded that investors were affected by overconfidence while making decision. They claim that investors overestimate accuracy of their analyses and make wrong decisions as a result.

3.2.2. Optimism Bias

Another popular tendency of individuals is *optimism*. Optimist people are biased to underestimate effects of events and developments not under their controls. According to Tversky and Kahneman (1974) optimist individual tend to be subject to illusion of control and exaggerate their efforts to control future developments.

Combination of overconfidence and optimism occur as exaggeration of power and ability to control events, overestimate of value and effects of information owned and underestimate risks taken. In addition, backward bias lead people to internalize negative impacts of wrong past estimates and underreact them (Kahneman and Riepe, 1998: 54). People who have backward bias have a tendency to overestimate probability of their past estimates after when the event happen.

In financial markets, optimism manifests itself in estimates on returns and professional advices. A number of researches found evidence that estimates about returns were usually optimistic. Espahbodi et al (2002: 2) showed following factors as reasons for optimism in financial markets:

1. Optimistic return estimates motivate investors to make investments and this increases commissions received by brokerage companies and vice versa.
2. Optimism and optimist estimates are needed by analysts who seek to maintain good relations with management of companies.
3. Optimism leads to higher demand and higher price for investment instrument under question

Even though optimist estimates of analysts and other intermediaries have (in case of favorable results) some benefits such as high commissions and good relations with top management, they have (in case of unfavorable results) some negative outcomes such as legal responsibility and reputation. Espahbodi et al (2002) claimed that optimism would be less if costs of optimist estimates were higher than its benefits.

3.2.3. Familiarity Bias

Most individuals have a tendency to purchase things they are familiar with. In stock exchange, it is observed that many people tend to buy shares of companies they work for or they are familiar with. In this sense, *familiarity bias* shows that people prefer things they are familiar rather than things they do not know. If there are two options with the same probability of gains and losses, people tend to prefer the one they are familiar with. Even in some cases it is observed that individuals prefer a familiar option less likely to provide gain rather than another unfamiliar option more likely to provide gain (Nofsinger, 2001: 117).

Tendency to invest in familiar investment instruments leads to overdemand for some instruments and less diversifications in portfolios. Familiarity bias also causes perceived risk to be lower than real risk.

3.2.4. Framing

Framing is the notion that how a concept is presented to individuals matters. For example, restaurants may advertise "early-bird" specials or "after-theatre" discounts, but they never use peak-period "surcharges." They get more business if people feel they are getting a discount at off-peak times rather than paying a surcharge at peak periods, even if the prices are identical. Cognitive psychologists have documented that doctors make different recommendations if they see evidence that is presented as "survival probabilities" rather than "mortality rates," even though survival probabilities plus mortality rates add up to 100%.

3.2.5. Conservatism

A number of psychologists such as Edwards (1968) have identified conservatism as a cognitive bias. Conservatism means that individuals are slow to change their beliefs and preferences in case of new evidence. In other words, they *anchor* on the ways things have normally been. When things change, people might underreact because of the conservatism bias. But if there is a long enough pattern, then they will adjust to it and possibly overreact, underweighting the long-term average.

3.2.6. Disposition Effect

The disposition effect refers to the pattern that people avoid realizing *paper losses* and seek to realize *paper gains*. For example, if someone buys a stock at $30 that then drops to $22 before rising to $28, most people do not want to sell until the stock gets to above $30. The disposition effect manifests itself in lots of small gains being realized, and few small losses. The disposition effect shows up in aggregate stock trading volume. During a bull market, trading volume tends to grow. If the market then turns south, trading volume tends to fall. As an example, trading volume in the Japanese stock market fell by over 80% from the late 1980s to

the mid 1990s. The fact that volume tends to fall in bear markets results in the commission business of brokerage firms having a high level of systematic risk.[2]

One of the major criticisms of behavioral finance is that by choosing which bias to emphasize, one can predict either underreaction or overreaction. This criticism of behavioral finance might be called "model dredging." In other words, one can find a story to fit the facts to *ex post* explain some puzzling phenomenon. But how does one make *ex ante* predictions about which biases will dominate? There are two excellent articles that address this issue: Barberis and Thaler (2002), and Hirshliefer (2001) in particular indicate the issue of when we would expect one behavioral bias to dominate others. He emphasizes that there is a tendency for people to excessively rely on the *strength* of information signals and under-rely on the *weight* of information signals. This is sometimes described as the *salience* effect (Ritter, 2003).

3.2.7. Insistence on Belief and Adjustment Biases

An adjustment bias is an investor's tendency to seek for evidence to support his/her original hypothesis or belief. People are usually interested in information supporting their hypothesis and ignore contradicting evidence. When an investor is convinced that his/her current investment strategy is correct, he/she is less interested in feedbacks even if they indicate negative results (Robin, 1996).

People tend to ignore evidence contradicting their hypothesis and rely on evidence supporting their hypothesis (Fisher and Statman, 2000: 74). This attitude results in misattribution bias and misattribution leads to mistakes in pricing assets. For example, there are some assets with high expected future returns. If investors exaggerate expectations about future yields then the asset will be overpriced.

3.3 Mental Accounting

People sometimes separate decisions that should, in principle, be combined. For example, many people have a household budget for food, and a household budget for entertaining. At home, where the food budget is present, they will not eat lobster or shrimp because they are much more expensive than a fish casserole. But in a restaurant, they will order lobster and shrimp even though the cost is much higher than a simple fish dinner. If they instead ate lobster and

shrimp at home, and the simple fish in a restaurant, they could save money. But because they are thinking separately about restaurant meals and food at home, they choose to limit their food at home.

Mental accounting helps in explaining reasons for anomalities and investor behaviors in financial markets. Each investor behavior is based on a mental account. Mental accounting includes consideration of costs and benefits while making a financial decision. It is usually very hard to change a decision based on a comprehensive mental account.

A research conducted by Nofsinger (2001: 80-81) provided evidence on how mental accounting works. Nofsinger (2001) asked the sample for making a choice on following options while buying a washing machine:

1. 6 equal monthly payments before buying the machine
2. 6 equal monthly payments after buying the machine

84% of the sample preferred the second choice whereas 16% the first. This finding is compliant with traditional cost-benefit approaches. But, the finding of the following question is not.

Nofsinger (2001) asked the same sample to make a choice among the following options while purchasing a holiday package in Bahamas Islands:

1. 6 equal monthly payments before going to holiday
2. 6 equal monthly payments after going to holiday

Contrary to the findings of the first question, the sample reported preference for option 1 by 60% and for option 2 by 40%.

The nature of things being purchased creates the difference. Utility of buying a holiday is consumed within very short period whereas benefits of a washing machine are consumed within a relatively long period. Since the majority of the sample believed that a payment before the holiday would make the holiday more pleasures they preferred early payments.

As a third question, the sample was asked to report whether they would want to receive wage of a business they would finish by working at weekends in the following six months on advance or after finishing the business. 66% of the sample chose after-work wage payments. This finding contradicts with the traditional theory claiming that people tend to postpone costs and accelerate income.

The findings of the research show that people avoid debt in case of fast consumption of goods and services. People tend to compare length of the payment period with the length of consumption period of goods and services. In this sense, buying car, home and electronic goods is a common behavior because consumption period of these products is long. Nevertheless, people do not prefer to have debts for goods and services consumed in very short periods because, short-term benefit at the expense of long-term cost is undesirable. Similarly, people do not want to get a short-term benefit like on-advance income (short-term benefit) from a 6 month longing business that would be finished by working at weekend (long term cost).

3.3.1. Mental Accounting: Aggregated Evaluation vs. Segregated Evaluation

Decisions of individuals are affected by presentation of a problem. Contradictory findings of the questions of previous section are explained within the context of "narrow framing" by Kahneman and Lavallo (1993). According to the researchers, tendency for narrow framing in the decision problems lead choices to contradict with the traditional approach in case of segregated problems. Segregated perception of the problem results in separate evaluations and independent mental accounts. In this sense, segregated or aggregated evaluation of a portfolio influence financial decisions. Individual risk of each element of a portfolio seems to disappear and risk of a whole portfolio appears when a portfolio is composed. Thus, composing a portfolio becomes attractive for investors who tend to disregard individual risks. Contrary to this, segregated assessment of each element apart from the portfolio will increase the perceived risk.

3.3.2. Mental Accounting and Lost Cost Effect

People tend to consider past and irrecoverable costs while making future-related decisions. Nofsinger (2001: 83) identified this behavior as "lost costs effect". People's tendency to include

extraordinary events in mental accounting lead them to be subject to *lost cost* considerations, which is not, in fact, expected to rationally influence decision-making process.

The case of Pareto (2001: 2) can be regarded as an evidence to test this thesis. Pareto (2001) depicted a scenario and asked two questions to the sample: There is a theatre play whose ticket is $20. On the way to theatre, you are loosing your ticket you bought one week ago. Would you buy a new ticket when you arrive there? Approximately 88% of the sample said "yes" to this question. In another, approximately the same, scenario the same question is asked. In this scenario, you are loosing your $20 on the way to the theatre. Would you buy a ticket when you arrive the theatre building?

Even though the total cost is $40 in both cases, the sample of Pareto (2001) gave different answers for each scenario. People are more willingly to buy a ticket in case of loosing $20 on the way compared to the case they loose the theatre ticket worth of $20. The total monetary loss is $40 and $20 loss is the "lost" cost in both cases. Different mental accounts result in different choices. Those able to close their old mental account can buy a ticket whereas those not able to close their old mental account due to emotional stress caused by loss avoid buying a new ticket. In the case of loosing a previously bought ticket on the way to the theatre, total cost is perceived as $40 whereas in the case of loosing just $20 on the way to the theatre total cost is perceived as $20.

3.3.3. Mental Accounting and Investment

According to Mahra & Presscot (1985) whether investments are evaluated as a portfolio or stock shares' particular value on a specific date and frequency of assessment of a portfolio depend on individuals' mental accounting. Investors who tend to make decisions based on "narrow framing" do not follow long-term policies and make short-term decisions. Investors who evaluate past results with a narrow framing assess his/her gains/losses very frequently (Mahra & Presscot, 1985: 115). According to Gross (1982) investors prefer some framing than others. This is known as "hedonic adjustment" (Shefrin, 2000: 26-27). To continue with Gross (1982):

> *When you advise a customer to close a transaction suggested by you and resulted in loss and invest in a new position, there is a need for trust. You need to use some transmission words to create a proper*

atmosphere. These are "magic selling words". The words such as "transfer your assets" allow the customer in accepting losses.

According to Shefrin (2000) the phrase "transfer your assets" motivates the customer to use a framing that will transfer his/her assets from one account to another rather than closing a mental accounting with loss. People tend to have framing loyalty due to some psychological and cognitive reasons. Cognitive reasons are widely related to way of organizing knowledge whereas psychological reasons refer to emotional aspects of people while coding knowledge (Shefrin, 2000).

While selling an investment instrument which provided extraordinary returns in the past but average returns in the present people have some hesitations. People get used to high returns in times of fast economic growth and open optimistic mental accounts. However, they become unwillingly to close these accounts when the securities do not provide high returns. Nevertheless, they avoid selling even securities constantly loosing values (Shefrin, 2000: 116).

Investors create separate accounts for loosing securities and gaining securities. They keep their securities generating loss for a long-time to avoid regret of closing an account with loss. Thus, they take too much risk and get low returns. In addition to this, to enjoy the pleasure of closing an account with profits they tend to sell securities gaining value very quickly.

3.3.4. Mental Accounting and Diversification

Traditional behavioral theory claims that diversification strategy works better if more shares are added to the portfolio. Markowitz (1952) suggests that after a point addition of new shares to a portfolio does not decrease risk. According to Konuralp (2001: 250) risk and return are two most important concepts of modern portfolio management. Risk is measured as deviation from average return. The third most important variable is correlation between average return of each share and mental accounting prevents this third variable from functioning (Nofsinger, 2001: 84).

The portfolio theory of Markowitz (1952) shows how portfolio risk can be decreased and how the diversification should be performed. Correlation between investments is the most important tool of diminishing risk but investors sometimes can not utilize this tool because of their mental

accounting. Constituting a portfolio with low risk requires investigating correlation between different investment instruments that will be added to the portfolio. Despite of this notion, investors tend to open separate accounts for each instruments and disregard correlations between the accounts. While deciding to make a new investment, investors open new mental accounts and lack of correlation between the accounts result in misperception of risk. What important is not individual risk and expected return of each investment but the whole portfolio. In other words, correlation of securities is important. In this sense, a risk averse investor can decrease overall risk of his/her portfolio consisting of bonds by adding some risky shares even though the dominant notion is not so.

Combination of mental accounting and other psychological biases (such as overconfidence, familiarity and representativeness) lead to misperception of risk and low diversification of portfolios. Diversification method of individual investors does not comply with traditional portfolio theory. They develop new diversification methods based on their biases. For example, it there are three portfolios such as monetary market fund, bonds and stock exchange shares funds, individual investors tend to divide their investments into three equal parts and make diversification in this way. Benartzi & Thaler (1999) calls this heuristics as "naïve diversification" and identify as *1/n rule.*

3.4 Behavioral Portfolio

According to Shefrin and Statman (2000) psychological biases of investors lead them to consider their portfolio as an asset pyramid. Each layer of the pyramid shows intention of satisfying a certain need. An investor owns a different mental account for each investment goal and for each goal has a different level of risk. The investor seeks for assets and options that will match expected risk and return of each mental account.

Primary need of the investor is security. Thus, she/he seeks for investing in secure assets that satisfy his/her mental account. Then, she/he makes investment with higher risk and higher expected returns to satisfy needs in other layers of the pyramid.

3.5 Dealing with Cognitive Biases

Human cognition is limited and irrationality may always occur as a result of cognitive biases. Experience, specialization and learning have significant contributions to efforts to eliminate biases. Among these factors, learning is the most important one. An effective learning help deal with cognitive biases. Effective learning can occur only under proper circumstances. For effective learning true and rapid feedback is needed. But in many cases, these conditions can not occur. Some of major reasons for this are as follows (Hanson and Kysar, 1999: 692):

1. Results are usually postponed and do not indicate a certain action
2. Variability of environment negatively influence reliability of feedback
3. Unless another decision is made, there is no information about what the conclusion will be
4. There are very limited opportunities to learn, because there are no patterns of important decisions

Various statistical techniques have been developed to help people in dealing with their cognitive biases. But many studies show that individuals go on to make mistakes due to their cognitive biases even when they get statistical knowledge to utilize in such situations (Rabin, 1996: 37).

Biais et al (2000) investigated effects of various personality traits such as impulsiveness and self-monitoring and various heuristics such as overconfidence, representativeness and self-confirmation biases on transaction behaviors of a group of investors. They further examined how effective learning and experience are in helping individuals adjust their biases. They found that individuals who rapidly made their decisions without analyzing too much had more transactions but were not exposed to big losses. They also reported that overconfidence usually led to transactions that were not profitable. In addition to this, they concluded that representativeness and self-confirming biases prevent learning of optimal transaction strategies and diminish profitability.

Every estimation method is subject to cognitive biases and statistical methods are used to reduce or eliminate these cognitive errors. For example, regression method was developed

against overconfidence since it takes standard error into account. Furthermore, it is recognized as an effective measure because it takes all supporting and contradicting data into account against predisposition bias (Fisher and Statman, 2000: 78). But while using statistical methods, their drawbacks should be carefully considered.

CHAPTER 4

Sensitivity of Investor

Investor sensitivity is defined as beliefs based on heuristics rather than Bayes Rationality. Derivations from EMH investors do not always react according to new info. In some cases, investors sell loosing shares and buy gaining shares by showing overreaction. In some other cases, on the other hand, they show underreaction. Such overreaction or underreaction leads deviation of price from its normal values. Only rational investors can arbitrage and help the price to come equilibrium. This phenomenon is explained with reversal of preferences. Shares gaining value begin to loose and those loosing begin to gain value. It is a common belief that contrarian investment strategies which mean buying declining shares and selling shares gaining value provide high returns in such times.

Researches show that share prices underreact to income declaration news. Underreaction means that investors are subject to conservatism and representativeness heuristics while evaluating incomes-related explanations of companies. Investors have some prejudices while evaluating a company. Investors do not react according to Bayes Theory when they obtained an income gain explanation because, they tend to be conservative. Conservatism bias explains why share prices underreact income declarations and short-term deviations.

4.1 Underreaction

Asset prices show low reaction to declarations of earnings. Underreaction is explained with investors' conservatism and representativeness heuristics while interpreting company earnings. Investors have some prejudices while assessing a company. Investors are not likely to react to news of earnings by firms as claimed in Bayes Theory because people tend to be conservative in such situations. Conservatism bias explains why share prices show underreaction to declaration of earnings and short term trends.

Analysts who are subject to anchoring and adjustment biases and conservative as a result do not adjust their earnings estimates while reacting to new information involving declaration of earnings. After earnings announcements, they face unexpected results. Conservatism in estimates of earnings means positive earnings will follow unexpected positive earnings whereas negative earnings will follow unexpected negative earnings (Shefrin, 2000).

Ball and Brown (1989) were pioneer researchers who conducted a study and concluded that investors underreacted to current announcements of earnings. The empirical research of Bernard and Thomas (1989) found similar evidence and confirmed the hypotheses of the pioneers. Sixty days after announcements of earnings, shares with unexpected returns showed a performance 2% over the market average whereas shares with unexpected negative returns showed 2% worse performance when compared to the market average. Cutler, Poerba and Summers (1991) concluded that expected returns were positively autocorrelated from one period to another (monthly, quarterly or annual) in many financial markets.

According to Shefrin (2000) overconfidence, anchoring and adjustment biases lead investors and analysts not to consider the new information enough and to conservatism. Under these circumstances, constant changes are perceived as temporary and changes in the near past would be underweighted. Shefrin (2000) argues that salience is an important factor in such situations. If the past information before that of more recent one was salient, the recent one would be underweighted and if vise versa the recent one would be overweighted.

4.2 Overreaction

It is observed that investors overreact to securities presenting constant good news for a long time. As a result, such securities are overpriced in the market. Following a period of overpricing, they tend to provide low average returns. Dreman and Berry (1995) found empirical data for this phenomenon and named the corrective price change after mispricing as *Mispricing-Correction Hypothesis (MCH)*. According to MCH, investors tend to overprice investments with well image and underprice investments with negative image. Investors expect recent positive or negative developments to continue and, respectively, overprice or underprice the securities parallel to these expectations.

Barberis, Shleifer and Vishny (1998) argue that investors underreact to news with short-term effect and overreact to news with long-term effect. After a number of good news investors become overoptimistic and overreact to the news. But next news result in low returns contrary to optimistic expectations of the investors.

Predictability of returns of shares is one of the most argumentative issues in financial researches. Researchers in the field of behavioral finance indicate overreaction and underreaction of investors as the main reason for reversal of sign of returns whereas those opposing to this hypothesis seek to explain the reversion with the systematic risk and size effect attributed to the Efficient Market Theory.

De Bondth and Thaler (1985) conducted an empirical research and analyzed performance of shares traded in NYSE in the period between 1926 and 1982. They concluded that performance of shares for first 36 month period tend to reverse in the following 36-month period. According to De Bondth and Thaler (1985) investors overreact to unexpected and dramatic changes and overweight recent information whereas underweight older information while adjusting their hypotheses or forecasts.

To explain changes in direction of returns of securities, La Porta (1996) analyzed impact of expectations. According to La Porta (1996) analysts expect extreme increases in prices of shares about which they are optimistic and expect extreme decreases in prices of shares about which they are pessimistic. La Porta suggests that returns of shares with high expected returns

are lower than those of shares with low expected returns. He further argues that shares with high expected returns provide negative returns after earnings announcements whereas shares with lower expected growth provide high returns.

CHAPTER 5

Herd Behaviour

Investors and fund managers are identified as herds that invest in risky ventures without adequate information and appreciation of risk-reward trade-offs and, at the first sign of trouble, escape to safer positions. Some observers express concern that herding by market participants worsens volatility, destabilizes markets, and increases the fragility of the financial system (Bikhchandani and Sharma, 2000: 279-280).

For an investor to imitate others, she must be aware of and be influenced by others' actions. Intuitively, an individual can be said to herd if she would have made an investment when she finds that others' decisions, but does not make that investment when she finds that others have decided not to do so. Alternatively, she herds when knowledge that others are investing changes her decision from not investing to making the investment.

There are several reasons for a profit/utility maximizing investor to reverse a planned decision after observing others. First, others may know something about the return on the investment and their actions reveal this information. Secondly, and this is relevant only for money managers who invest on behalf of others, the incentives provided by the compensation scheme and terms of employment may be such that imitation is rewarded. A third reason for imitation is that individuals may have an essential preference for conformity (Bikhchandani and Sharma, 2000: 280).

According to the definition of herd behavior given above, herding results from an obvious intent by investors to copy the behavior of other investors. This should be distinguished from

"spurious herding" where groups facing similar decision problems and information sets take similar decisions. Such spurious herding is an efficient outcome whereas "intentional" herding need not be efficient. But it needs, pointing out that empirically distinguishing "spurious herding", since typically, a multitude of factors have the potential to affect an investment decision (Bikhchandani and Sharma, 2000: 281).

Rational herd behavior in financial markets derives from a number of reasons. The principal ones are imperfect information, concern for reputation, and compensation structures.

5.1 Imperfect Information

Suppose that individuals face similar investment decisions under uncertainty and have private (but imperfect) information about the correct course of action. In such a case, an investor's private information may be the conclusions of her research effort. Alternatively, all information related to the investment is publicly available but there is uncertainty about the quality of this information. For example, has the government changed the economic data just released? Does the government really engage in economic reform? An individual's evaluation of the quality of publicly available information is only privately known to her/him.

Individuals can witness each other's actions but not the private information or signals that each player gets. If individuals have some view about the appropriate course of action, then inferences about an investor's private information can be made from the actions chosen. Herd behavior may occur in such situations. Furthermore, such behavior is fragile, in that it may change easily with the arrival of a little new information; and it is suspicious, in that random events combined with the choices of the first few players determine the type of behavior on which individuals herd. A simple example can explain this situation better.

Let's assume that several investors decide in sequence whether to invest in an individual stock (or an industry or a country). For each investor, let V represents the payoff to investing relative to the next best project. V is either +1 or -1 with equal probability. (The payoff from the next best project is normalized to zero). The order in which the investor decide is specified. Each investor observes a private signal (either a good signal, G, or a bad one, B) about the payoff of the investment. If V = +1, then the probability that signal is G is equal to p and that the signal is B is 1-p, where $0.5 < p < 1$. Similarly, if V = -1 then the signal realization is B with probability

p (G with probability 1-p). The investors' signals are independent conditional on the real value. Apart from her/his own private signal, each investor observes the decisions (but not the private signals) of her predecessors (Bikhchandani and Sharma, 2000: 284).

It is worth noting the following implication of the symmetry of the signals. Suppose that a total of M good signals and N bad signals are observed. Then repeated application of Bayes' rules implies that, if M > N, the posterior distribution of V is the same as if a total of M-N signals were observed, all of them good. On the other hand, if M < N, the posterior is same as if a total of N – M signals were observed, all of them bad. And if M = N then the posterior is the same as the prior, that is, V is either +1 or -1 with equal probability. This observation makes the remainder of this section easier to follow.

Applying Bayes' rule, the posterior probability of V = +1 after observing a G is

Prob (V = +1/G) =

(Prob (G/V = +1). Prob (V=+1)) / (Prob (G/V = +1). Prob (V=+1) + Prob(G/V= -1). Prob (V=-1))

= p x 0.5 / (p x 0.5 + (1-p) x 0.5) = p > 0.5

A similar calculation using Bayes' rule implies that the posterior probability of V = +1 after observing a B is

Prob (V=+1/B) = (1-p) x 0.5 / (p x 0.5 + (1-p) x 0.5) = 1-p < 0.5

As a result, the first investor, let's call Angela) will follow her signal: if she observes G then she invests, if she observes B then she does not invest. Bob, the second investor, knows this and can evaluate Angela's signal according to her action. If this signal is G and he notices Angela invest, then another application of Bayes' rule implies that his posterior probability that V= +1 is 0.5 (it is as if Bob observed two signals, a G and B); as a result, Bob is indifferent between investing and rejection and he decides randomly. As a result, if Angela invests and Bob rejects, then Claire, the third investor, will infer that Angela saw G and Bob saw B. If instead Angela and Bob both invest, then Claire will think that Angela saw G and Bob is more likely to have seen G than B. The remaining two cases where Angela rejects and Bob either invests or rejects are symmetric.

Suppose that Angela and Bob both invest. Claire concludes that Angela and probably also Bob observed good signals. Another application of Bayes' rule shows that Claire should always invest regardless of her private information. Even if Angela' signal is B, her posterior

probability that V = +1 exceeds 0.5. This is so because Claire's B signal and Angela's G signal (which Claire infers from Angela's decision to invest) cancel each other and, Claire reasons, that since Bob invested he is more likely to have observed G rather than B. Thus, David, the fourth investor, learns nothing about Claire's signal realization from her (rational and optimal) decision to invest. David is in exactly the same position that Claire was and he too will invest regardless of his own signal realization. And so will Emma, Frank, Greta, Harry, etc. An invest cascade is said to have started with Claire. Similarly, if Angela and Bob both do not invest then a reject cascade starts with Claire.

If, on the other hand, Angela and Bob take opposite actions, then Claire infers that one of them saw the signal G and the other observed signal B. Her prior belief (before observing her signal) is that V= +1 and V = -1 are equally likely and she, being exactly in the position that Angela found herself in, follows her signal (Bikhchandani and Sharma, 2000: p. 285).

5.2 Reputation-Based Herding

Reputational concerns related to fund managers and analysts is a reason for herd behavior. Reputational concerns occur due to uncertainty about the ability or skill of a person in charge of directing investment decisions. The basic idea is that if an investment manager and her/his employer are uncertain of the manager's ability to choose the right option, conformity with other investment professionals diminishes the uncertainty related to the ability of the manager to manage the portfolio. This benefits the manager in question and if other investment professionals are in a similar situation, then herding occurs.

Consider the decisions of two investment managers, I_1 and I_2, confront an identical investment opportunity. Each manager I_i,i =1,2, may be of high ability or low ability, and their type or ability level is chosen independently. A high ability manager receives informative signals about the return from an investment, whereas a low ability manager's signal is pure noise. Neither the manager I_i nor her employer E_i knows whether the manager I_i is of low or high ability. Each manager and employer has a similar prior belief about the manager's type. This belief is updated after the decisions of the two managers and the return form the investment (which is observed whether or not an investment is made) are observed. The price of the investment remains the same throughout.

If both managers have high ability then they observe the identical signal perception (good or bad) from an informative signal distribution (but neither manager observes the other's signal realization). If both managers have low ability then they observe independent realization of a signal (either G or B) from a distribution that is pure noise. If one manager is of high ability and the other of low ability, then they observe independent draws from the informative signal distribution and the noisy signal distribution respectively. The informative and noisy signal distributions are such that the ex-ante probability of observing G is the same with either distribution. Thus, after seeing her signal realization a manager does not adjust her prior beliefs about her own type.

I_1 decides first and I_2 does so. I_1's investment decision is relied only on her signal realization (which may either be informative or pure noise - I_1 does not know which it is). I_2's decision is relied on her own signal realization and on I_1's decision. In the final period, the investments pay off and the two investors are rewarded according to an ex post assessment or their abilities. This game has a herding equilibrium in which I_1 follows her own signal and I_2 imitates I_1 regardless of her own (I_2's) signal. The reason for this result is that since I_2 is uncertain about her own ability, she cannot take a decision contrary to I_1 decision. Thus, it is better for I_2 to imitate I_1 even if her own evaluation is different. If there are several managers making decisions in sequence, everyone imitates the decision of the first manager.

5.3 Compensation-Based Herding

If an investment manager's (agent's) compensation depends on how her performance compares with that of other similar professionals, then this distorts the manager's incentives and she/he ends up with an inefficient portfolio. It may also lead to herd behavior.

Maug and Naik (1996) study situation of a risk-averse investor (the agent) whose compensation grows with her own performance and lessens in the performance of a benchmark (which may be the performance of a separate group of investors or the return of an appropriate index). Both the agent and her benchmark have imperfect, private information about returns of investment options. The benchmark investor makes her investment decisions first and the agent chooses her portfolio after observing the benchmark's actions. Then, as argued in the section on information-based herding above, the agent has an incentive to imitate the benchmark in that

her optimal investment portfolio approaches to the benchmark's portfolio after the agent observes the benchmark's actions. Furthermore, the compensation scheme also stimulates to imitate the benchmark. The fact that her compensation reduces if she performs worse than the benchmark leads the agent to approach her investments even more towards the benchmark's portfolio than if she decides without any such impact.

It is optimal for the employer of the agent to have such a relative performance contract when there is moral hazard or adverse selection. Any other efficient contract (i.e. any contract that maximizes a weighted sum of the employer's and the agent's utility) will also relate the agent's compensation to the benchmark's performance. Therefore, herding may be constrained efficient (the constraints being imposed by moral hazard or adverse selection). However, the compensation scheme selected by an employer would seek to maximize the employer's profits rather than society's welfare.

CHAPTER 6

A Qualitative Research on Investor Psychology and Investment Behaviours in Turkish Foreign Exchange Market

This second part of the study includes a quantitative research designed to determine major psychological biases and characteristics of Turkish foreign exchange investors.

6.1 The Objective of the Research

The main objective of the research is to identify major psychological biases affecting investment decisions foreign exchange markets. In accordance with this goal, the research also aimed at determining some key investment behaviors such as diversifying portfolios and being subject to various factors (such as friends, news etc.) affecting decision making.

6.2 The Methodology

The research consists of two main parts. In the first part, major arguments and theories of traditional finance and behavioral finance were studied by reviewing the relevant literature sources. To develop this part, various articles, books, essays, and written documents were reviewed and summarized. The concepts were introduced and hypotheses and theories on the concepts were investigated.

The second part of the study is composed of a primary research conducted in Turkish foreign exchange market. The basic goal of this part was to study to what extent Turkish foreign

exchange investors are subject to psychological biases and systematic irrational behaviors argued in theories of behavioral finance. In this part of the study, a structured questionnaire was designed as the basic instruments of collecting data. The questionnaire was applied to a sample of individual investors drawn from Turkish foreign exchange markets. The questionnaire was posted on the web site of a foreign exchange brokerage firm in period between November 10th to December 20th of 2006 and visitors were asked for filling the questionnaire. Even though more than 100 visitors answered the questionnaire, only 82 questionnaires were accurately filled. Answers of 82 questionnaires were coded into computer and were analyzed with the assistance of SPSS 12.0 (Statistical Package Program for Social Sciences 12.0).

6.3 Data & Analyses

The research question is whether Turkish foreign exchange investors are effected by psychological biases and systematic irrational behaviours argued in theories of behavioral finance or they are rational decision makers and avoid systematic mistakes as classical finance assumed.To investigate this question a structured questionnaire was designed and the descriptive analysis of the answers had been done.

6.4 The Questionnaire

The questionnaire is the basic instruments of collecting primary data for the research. It consists of 22 closed-ended and multiple-choices questions. The first question was designed to obtain information about how long interviewees have invested in foreign exchange markets. To answer this question, five options were provided as a possible answer. First one was a time period less than six months, second one between one and two years, third between two and three years, fourth between 3 and four years, and finally the last option four or more than four years. The second question was asked to find out how many different currency pairs the sample invests in. Five possible answers were presented: one, two, three, four, and finally five or more than five sort of currencies representing answers.

Third question was prepared to have an idea about the extent to which the interviewees are rational. Six alternative ways of gaining with varying probabilities were presented and the respondent was asked to choose one. If investors are rational as assumed in classical finance, they are expected to choose the option in which percentage of gaining times probability of gaining is highest.

The fourth question was put in the questionnaire to find out the share of fx investment budget in overall investment budget. The choices were listed as percentage intervals ranking from 10 to 90 or over.

Factors affecting investors' buy-sell decisions in parity transactions were asked in fifth question. Five possible factors; *interpretations of others, own ideas, news, own technical analysis, and ideas of friends*, were given as possible answers to mark.

What percentage of parity account is allocated to carry position is an issue the sixth question designed to reveal. 10 percent intervals from ranking from 10% to 90% and over were provided as possible answers.

Question 7 targeted to reveal percentage of gains bringing about profit realization decision and Question 8 aimed at revealing percentage of loss resulting in closing position. In both questions, five possible responses; *10%, 20%, 50%, 100% or over,* and *I carry long-run position* were provided to choose.

In each of the questions from 9 to 16, a statement was given to the sample and the interviewees were asked to report if they agree with the given statement by choosing "yes" or "no" choice. What they were asked were respectively as follows: taking reverse position contrary to sharp movement of parity within daytime, taking new position to decrease cost, believing in the notion that making investment in foreign exchange market is a sort of gamble, believing in the claims that big players manipulate investors in foreign exchange markets, tendency to think again and again after making an investment decision, having a fear of loosing everything while investing in parity, having a hope of "this time everything would be better" in last parity investment, and why not invest all in Euro if Euro appreciates faster than US Dollar.

In seventeenth question, the sample was provided with five statements and requested to choose one best expresses themselves. The statements were related to continuous fear about investment decisions even after decisions, associating parity invested with oneself, making investment decisions based on intuitions and feelings, focusing on gains not on losses while investing in parity, and expecting invested parity to have no loss.

Last five questions of the questionnaire were about demographic characteristics of the sample. Gender, age, occupation, education level, and income level were the characteristics asked in these questions. Possible answers to age were categorized into five groups: from 18 to 25, between 26 and 33, 34-41, 42-49, and over 50. Possible occupation groups were given as *doctor, lawyer, engineer, manager,* and *others.* Education level was identified with *primary school, secondary school, high school, university,* and *master/PhD.* degrees. Finally, income levels were segmented as follows: under 750, between 751 and 1250, between 1251 and 1750, between 1751 and 2250, between 2251 and 3000, between 3001 and 3750, between 3751 and 4500, and *4501 or over*.

6.5 Findings

Findings of the research are investigated in descriptive analysis of answers .Frequency analysis is presented in the following section and Pearson correlation and Chi-Square statistics are provided in the following part.

6.5.1. Descriptive Analysis of Answers

Approximately 80% of the sample aged between 26 and 50, 8.5% over 50 years and 9.8% between 18 and 25. Age distribution of respondents is summarized in Table 6.1.

6.1: Age Distribution of Respondents

AGE	Frequency	Percentage
18-25	8	9.8
26 -33	25	30,5
34-41	19	23,2
42-49	21	25,6
50 or older	7	8,5
Missing	2	2.4
TOTAL	82	100

The distribution of the sample according to “gender” is summarized in Table 6.2. As seen, a great proportion of the sample consists of males (with 97,6%) and only a small proportion of the sample is composed of female investors, with 2,4%. This statistic suggests that a great

majority of Turkish foreign exchange market consists of males. This finding is in accordance with the literature review that male investors are generally active in financial markets.

6.2: Gender Distribution of Respondents

Gender	Frequency	Percentage
Male	80	97.6
Female	2	2.4
TOTAL	82	100

Highest level of schooling of the sample is indicated in Table 6.3. As it can be noticed in the table, a significant share of the sample with 63,4% consists of university graduates. The second largest group in the sample, with 18,3%, is “high school” graduates and the third, with 12,2%, is master or Ph.D. degree owners. The sample involves no respondents whose highest degree of schooling is primary school. This result support the literature review that financial decisions are complicated and require knowledge .

6.3: Education Level of Respondents

Highest Level of Schooling	Frequency	Percentage
Primary School	-	-
Secondary School	2	2,4
High School	15	18,3
University	52	63,4
Master/PhD.	10	12,2
Missing	3	3,7
TOTAL	82	100

The distribution of the sample with respect to income level is depicted in Table 6.4. Respondents whose monthly individual income level is between 751 and 1250 accounts for 26,8%, interviewees with income level equal to or over TL 4.500 constitute 18,3% and those whose income level is between 2251 and 3000 compose another 18,3% of the sample.

6.4: Income Levels of Respondents

Income Level (TL)	Frequency	Percentage
Under 750	4	4,9
751–1250	22	26,8
1251–1750	-	-
1751-2250	13	15,9
2251-3000	15	18,3
3001-3750	5	6,1
3751-4500	3	3,7
4500 or higher	15	18,3
Missing	5	6,1
TOTAL	82	100

Past trading experience as investors in foreign exchange markets is shown in Table 6.5. Roughly 52% of the interviewees reported themselves as investors in foreign exchange markets for more than 4 years. Approximately 17% of the sample had reported that they have invested in foreign currencies for less than six months and another 17% for between 1-2 years.

6.5: How long have you invested in foreign currencies?

Period of past trading experience	Frequency	Percentage
Less than six months	14	17,1
1-2 years	14	17,1
2-3 years	6	7,3
3-4 years	3	3,7
More than 4 years	43	52,4
Missing	2	2,4
TOTAL	82	100

Number of parities respondents invested in was another variable questioned. A considerable proportion of the sample, with approximately 47%, indicated that they invested in two different parities, 27% in one parity and approximately 18% in three parities. In a sense, more than 70% invest in two or less parities and this indicates a low degree of diversification. Indeed, it a well-known fact that US dollar and Euro is highly convertible in Turkey and neither investors nor borrowers and lenders are used to use other currencies in their transactions. This characteristic of Turkish investor partially indicates a familiarity bias, because it points out the fact that the investors prefer currencies they are familiar.

6.6: How many different curriencies do you usually invest in?

Number of currencies	Frequency	Percentage
1	22	26,8
2	38	46,8
3	15	18,3
4	3	3,7
5	3	3,7
Missing	1	1,8
TOTAL	82	100

When the sample had been asked to prefer an gaining option among several different ones, approximately 29% indicated “25% gaining with 80% probability”, 22% preferred “80% gaining with 50% probability”, roughly 20% stated “17% gaining with 100% probability”, and 11% chose “100% profit with 30% probability”. The diversity in choices shows that there is no one concrete and rational method of assessing such options of earnings. In accordance with Efficient Market Hypothesis and classical approach in finance, respondents were expected to agree on a certain choice. The choice should have been determined by calculation based on percentage of earning offered times probability of the earning. In this respect, *80% Gain with 50% probability* option should have been selected by a great majority of sample. But only 22% of the sample preferred this choice and the rest selected other choices. As a consequence, it can be argued that Turkish foreign exchange market investors also make irrational financial decisions based on their psychological biases.

6.7: Which Option of Earnings Do You Prefer?

200% Gain with no guarantee	5	6,1
100% Gain with 30% probability	9	11
80% Gain with 50% probability	18	22
40% Gaining with 60% probability	8	9,8
25% Gaining with 80% probability	24	29,3
17% Gaining with 100% probability	16	19,5
Missing	2	2,4
TOTAL	82	100

When share of foreign exchange parity investment in total investments was asked, 22% of the sample reported as 10%, roughly 21% of the interviewees as 20%, and approximately 17% of respondents as 50%. Table 6.8 figures out the responses. Those allocating 50% or less of their investment budget in foreign exchange parity investments constitutes a very significant part of the sample.

6.8: What is the share of your parity investment in your total investments?

Share in total investments (%)	Frequency	Percentage
10	18	22
20	17	20,7
30	11	13,4
40	10	12,2
50	14	17,1
60	2	2,4
70	1	1,2
80	1	1,2
90	6	7,3
Missing	2	2,4
TOTAL	82	100

Distribution of factors affecting buy-sell decisions in foreign exchange investments were depicted in Table 6.9. 35.4% of the sample indicated their "own technical analyses" as the main factor in decision-making. Those basing their sell-buy decision on their "own ideas" constitute roughly 23% and interviewees taking "evaluations of others" as main determinant of their decisions account for 19.5% of the sample. Not surprisingly, a significant proportion of the sample, approximately 38%, rest their decisions on *evaluations of others* and *news*. This shows that a considerable part of investors is likely to become subject to *herd behavior* and/or *investor sensitivity* behaviors such as overreaction.

6.9: What are the factors shaping your buy-sell decisions?

Factor	Frequency	Percentage
Evaluations of Others	16	19,5
My own ideas	19	23,2
News	15	18,3
My own technical analyses	29	35,4
Missing	3	3,7
TOTAL	82	100

The share of account allocated to carry position in foreign exchange market is figured out in Table 6.10. As it can be noticed in the table, the majority of sample, roughly 80%, allocated 50% or less of their accounts to carry position. This shows that a significant share of the respondents has a bias of avoiding losses which may derive from carrying positions.

6.10: What size of position of leverage?

Size of leverage position	Frequency	Percentage
10	13	15,9
20	10	12,2
30	15	18,3
40	14	17,1
50	11	13,4
60	3	3,7
70	4	4,9
80	2	2,4
90	7	8,5
Missing	3	3,7
TOTAL	82	100

Table 6.11 illustrates by what percentage of gain interviewees realize their profits. 30.5% of the sample indicated 50% profit and 28.0% reported 20% as their profit realization point. Since Turkey experienced a long-lasted high inflation for a period of nearly three decades, which ended just before for years ago, inflation-adjusted profit expectation is high.

6.11: By what percentage of gain you realize your profit?

Percentage of Gain	Frequency	Percent
10	10	12,2
20	23	28,0
50	25	30,5
100 or over	12	14,6
Long run position	12	14,6
Missing	6	7,3
TOTAL	82	100

At what percentage of loss respondents close their positions are shown below. More than 70% of the sample closes their position in case of a loss equal to 50% or less. These figures and statistics of profit realization stated above indicate that the sample is more sensitive to losses than to gains and has a bias of avoiding losses. Contrary to the arguments expressed in the literature review, in Turkish case, investors do not have a bias to hold foreign exchange parities loosing value for a long time by taking some reference values into account.

6.12: By what percentage of loss you close your position?

Percentage of loss to close position	Frequency	Percentage
10	16	19,5
20	28	34,1
50	16	19,5
100 or more	4	4,9
Carry long run position	13	15,9
Missing	5	6,1
TOTAL	82	100

Half of the sample, with 50%, stated that they did not take and roughly the other half, with 46.3%, indicated they did take a reverse position if their parity had dramatically decreased or increased.

6.13: Would you take a reverse position if your parity dramatically increased or decreased during daytime?

Answers	Frequency	Percentage
Yes	38	46,3
No	41	50
Missing	3	3,7
TOTAL	82	100

Slightly more than 50% of interviewees stated that they did not take a new position to decrease cost and to average out the cost while carrying position whereas approximately 43% of the sample stated they did take.

6.14: Do you take new position to decrease cost and to average out the cost while carrying position?

Answers	Frequency	Percentage
Yes	43	52,4
No	35	42,7
Missing	4	4,9
TOTAL	82	100

More than half of the sample, with 58.5%, reported that they did not perceive investing in foreign exchange market as a sort of gamble and roughly 43% perceived so. Three interviewees gave no answer.

6.15: Do you think to invest in foreign exchange markets is a sort of gambling?

Answers	Frequency	Percentage
Yes	31	37,8
No	48	58,5
Missing	3	3,7
TOTAL	82	100

Whether big investors manipulate small ones is an argumentative claim in many investment markets. A significant portion of the sample, with roughly 76%, agreed on the claim and only 19,5% disagree.

6.16: Do you think big players manipulate investors in foreign exchange markets?

Answers	Frequency	Percentage
Yes	62	75,6
No	16	19,5
Missing	4	4,9
TOTAL	82	100

Investors' hesitations and continuous concerns for their investment decisions is another critical aspect in investors' psychology. The proportion of the sample stating continuous "rethinking of investment decisions" and that reported no continuous "rethinking" after the investment decision is approximately the same; with respectively 48,8% and 46,3%. This statistic points out that a significant proportion of investors suffer *feeling of hesitation*, which is likely to cause irrational investor behaviors.

6.17: I can't stop thinking again and again whether I made right decision or not?

Answers	Frequency	Percentage
Yes	40	48,8
No	38	46,3
Missing	4	4,9
TOTAL	82	100

The sample was asked whether they had "a fear of loosing everything while making a parity investment". The majority with 70,7% indicated no such a fear but 25,6% reported they had a fear of loosing everything. Like *feeling of hesitation*, *fear of loosing everything* has a potential to cause irrational buy-sell decisions and narrow framing.

6.18: I have a feeling of loosing everything while making a parity investment

Answers	Frequency	Percentage
Yes	21	25,6
No	58	70,7
Missing	3	3,7
TOTAL	82	100

More than 52% of the sample stated no additional hope of "everything would be o.k." in their last investment in parity whereas roughly 43% reported such a hope. Table 6.19 shows distribution of the sample with respect to this issue. Those indicating feeling of a strong hope in their last investment decisions reveal that fact that significant proportion of foreign exchange investors has optimism bias. Such an optimistic bias leads investors to have unrealistic expectations rather than a rational analysis and reasonable decisions.

6.19: I had a strong hope while making the last investment in parity and said "this time, everything would be o.k."

Answers	Frequency	Percentage
Yes	35	42,7
No	43	52,4
Missing	4	4,9
TOTAL	82	100

Two out of third of the sample stated that they would not question why they did not all their money in Euro if Euro had appreciated more than US Dollar. But one out of third of the sample reported such a bias. The latter group has a bias of narrow and short-term framing, due to very frequent reassessment of investment decision.

6.20: In case of investing some of my money in Euro and some in US Dollar, I question why I do not invest all of my money in Euro when Euro appreciates and US Dollar remain the same or appreciates less

Answers	Frequency	Percentage
Yes	26	31,7
No	54	65,9
Missing	2	2,4
TOTAL	82	100

Distribution of the answers to the question "which statement express you best" is summarized in Table 6.21. Within a listed number of different statements 26,8% of the sample indicated "I behave with my feelings and intuition, I decide in very short-time and have great trust in the parity I choose" (*the impulsive investor*) and 23,2% of respondents pointed out "I expect the foreign currency I invest in does not loose any value if possible" (*the " make me safe" investor)*, 18.3% selected "I focus on my potential earnings, not on my potential losses while investing in foreign exchange parity" (*the gambler)*, and another 18.3% chose "I can not stop worrying about my investments" (*the "I can't stop worrying" investor*) as the statements expressing themselves best.

As indicated in the parentheses, each of these groups has certain biases that are shortly named within parentheses. These biases and similar psychological biases sometimes act as sources of irrational investment decisions and investor behaviors. These results indicate that Turkish foreign exchange investors have shared characteristics with investors identified in the literature review section of this study.

6.21: Which statement below expresses you best?

Statements	Frequency	Percentage
I can not stop worrying about my investments	15	18,3
I associate the parity I invest in with myself	7	8,5
I behave with my feelings and intuition, I decide in very short-time and have great trust in the parity I choose	22	26,8
I focus on my potential earnings, not on my potential losses while investing in foreign exchange parity	15	18,3
I expect the foreign currency I invest in does not loose any value if possible	19	23,2
Missing	4	4,9
TOTAL	82	100

6.5.2 Chi-Square Statistics and Cross-Tabulation of some questions:

6.22: age * prefer Crosstabulation

			prefer					Total
			1,00	2,00	3,00	4,00	5,00	
age	18-41	Count	6	6	16	10	12	50
		Expected Count	9,7	4,5	14,3	9,1	12,3	50,0
	42 and over	Count	9	1	6	4	7	27
		Expected Count	5,3	2,5	7,7	4,9	6,7	27,0
Total		Count	15	7	22	14	19	77
		Expected Count	15,0	7,0	22,0	14,0	19,0	77,0

Prefer indicates the question 'which statement express you best'

(1) ' I can not stop worrying about my investments'

(2) 'I associate the parity I invest in with myself '

(3) 'I behave with my feelings and intuition,I decide in very short-time and have great trust in the parity I choose'

(4) 'I focus on my potential earnings,not on my potential losses while investing in foreign exchange parity'

(5)' I expect the foreign currency ı invest in does not loose any value if possible'

Distribution of the answers to the question "which statement express you best" and age is summarized in Table 6.22.The purpose of the test is to examine whether there is any statistical relationship between the two variables of a cross-classification table.The chi-square test for independence begins with the null hypothesis of there is no relationship between

the variables of the cross-classification tables and alternative hypothesis of some relationship of the variables. Where the observed count and expected count are reasonably similar, this is evidence for the null hypothesis.If the null hypothesis is correct, so there is no relationship between two variables then O=E for each cell, if the alternative hypothesis is correct, then O is different from E .As it is seen on the table 6-22 , investors ' s expected count is very different from observed count demonstrate that there is a relation between age and people's worrying about their investment in other words, their potential to take risk. (1).

The other statements are pointed out by other investors is 'I associate the parity I invest in with myself 'and ''I behave with my feelings and intuition, I decide in very short-time and have great trust in the parity I choose'.These two investor profile (the power investor and the impulsive investor) and age has relationship on the other hand,

There is no relationship between gambler amd make me safe type of profile and investor's age as it is seen on the 4 th and 5 th column of the table.

6.23: income * prefer Crosstabulation

			prefer					Total
			1,00	2,00	3,00	4,00	5,00	
income	2250 ytl and under	Count	8	5	9	4	13	39
		Expected Count	7,7	3,6	10,8	7,7	9,2	39,0
	2251 ytl and over	Count	7	2	12	11	5	37
		Expected Count	7,3	3,4	10,2	7,3	8,8	37,0
Total		Count	15	7	21	15	18	76
		Expected Count	15,0	7,0	21,0	15,0	18,0	76,0

Prefer indicates the question 'which statement express you best'

(1) 'I can not stop worrying about my investments'

(2) 'I associate the parity I invest in with myself '

(3) 'I behave with my feelings and intuition; I decide in very short-time and have great trust in the parity I choose'

(4) 'I focus on my potential earnings, not on my potential losses while investing in foreign exchange parity'

(5) ' I expect the foreign currency ı invest in does not loose any value if possible'

When the sample had been asked to prefer the statement express you best and it was examined the relationship with the monthly income of investors, some interesting results can be obtained. The expected counts and observed counts are similar, those indicating people's hesitation about their investment neither is nor related with their income. Investors are worrying for their investments independently from their income. On the other hand, the other investors who chososed other sentences shows that a considerable part of investors have high income is likely to satisfy with their investments than investors who have low income.

6.24 education * gamble Crosstabulation

			gamble		Total
			yes	no	
educatio	Secondary and high school	Count	9	8	17
		Expected Count	6,8	10,2	17,0
	University/master/PhD	Count	22	38	60
		Expected Count	24,2	35,8	60,0
Total		Count	31	46	77
		Expected Count	31,0	46,0	77,0

As it is seen, people who are graduated from secondary school and high school are equal to perceive investing in FX markets as the sort of gambling and do not perceive as it.It can be said that when the education level advance, the proportion of perceiving Fx
Markets as gambling is decreasing.As it can be noticed in the table, more than half of the university graduated sample reported that they did not perceive investing in foreign exchange market as a sort of gamble and slightly all of them of master and /PhD investors gave the same answer.Because expected count and observed count are different it can be an evidence taht thre is a relation between the level of education and perceiving fx markets as gambling.In the literature ,psychological biases effect the individuals as systematically and contrary to traditional finance,behavioral finance claims that some irrational behaviours are nat temporary but constant.Only experince,being an expert and education can eliminate these psychological biases relatively.The results on the table above seems to support the literature view.

CHAPTER 7

Conclusion

In classical finance, investors are assumed as economic agents seeking to maximize their profits with rational decisions. These investors are rational beings and avoid systematic mistakes. According to the theory of traditional finance, effects of decisions of irrational investors are temporary and clarified by rational decision makers who commit arbitrage.

Contrary to classical finance, psychological finance is based on bounded rationality of investors. According to this approach, in some cases, investors make their investment decisions according to their feelings and intuitions rather then their rationality and systematically behave irrationally. Various researches executed by Kahneman and Tversky in 1971, 1973, 1979, 1981, 1984, 1989, and 1992 provided evidence for this hypothesis and shaped the KT Prospect Theory. According to the KT Prospect Theory, various psychological biases, which are created by a number of factors ranging from past experiences to media, cause irrational decisions especially while making decisions under uncertainty.

The primary goal of the first section of this research was to investigate main concepts and arguments of psychological finance related to investor psychology. Prospect Theory of Kahneman and Tversky (1979) was studied in this respect. The theory provided some insights into shortcomings of the Expected Utility Model and explanation for a number of behavioral anomalies. As explained in this study, loss aversion bias of investors and limits to arbitrage which indicates long-run effect of irrational behaviors on overall price level have been two significant findings of behavioral finance.

Psychological biases which usually emerge in form of a heuristic or a cognitive bias are the major factors causing irrational investor decisions and behaviors. Investors who are subject to a cognitive bias such as overconfidence or conservatism, or a heuristic such as availability and representativeness show various irrational investment behaviors such as herd behavior, investor sensitivity or mental accounting. Behavioral finance suggests that various impacts of irrational investors, such as deviations from fundamental value, can not always be corrected because actions to correct them can be both risky and costly.

The research conducted as the second part of this study provided some findings about behaviors of investor in Turkish foreign exchange market. The findings were summarized and analyzed in the previous section of the paper. The research question is whether Turkish foreign exchange investors are effected by psychological biases and systematic irrational behaviours argued in theories of behavioral finance or they are rational decision makers and avoid systematic mistakes as classical finance assumed.To investigate this question a structured questionnaire was designed and the descriptive analysis of the answers had been done.

When the gender factor was studied for investing on fx markets, the same results were obtained with literature.Generally men investors are active in financial markets.So, investment decisions are seen as the business of men according to all studies related with the subject.

Variety of the interviewees' answers to the question: "Which option of earnings do you prefer?" support the hypothesis that investors base their decisions on their intuitions and feelings as well as or more than their reasoning. Otherwise, they had been expected to choose the option which gave the highest result when percentage of gain was multiplied by probability of the gain. But many of the respondents choosed the other options as the behavioral finance assumed.

The sample's answers to the question: "What are the factors shaping your buy-sell decisions?" give an idea about factors contributing to irrational, as well as rational, decisions of investors. Although majority of the sample, with roughly 60%, reported that they based their decisions on their own ideas or own technical analyses, a significant proportion, with roughly 40%, reported that they decided according to *evaluations of others* and *news*. As explained in the literature review section, such biases result in herd behavior and/or investor sensitivity in terms of overreaction.

Like investors studied and reported in the literature of behavioral finance, a significant proportion of Turkish foreign exchange investors have some common biases such as loss aversion (according to the evidence provided by 80% of the sample who reported that they carried position under 50%) and optimism bias.

Contrary to the findings of the behavioral finance literature examined in the literature review section, Turkish foreign exchange investors were founded to utilize diversification as a common and dominant strategy and do not have a disposition bias of avoiding paper losses by keeping currencies loosing value or realizing paper gains by realizing profits very quickly. A relevant finding is about taking a reverse position in case of a dramatic daily increase or decrease. Half of the sample reported no reverse position whereas the other half reported taking a reverse position as their behaviors. This finding indicates that 50% of Turkish investors, who are used to experience drastic changes in value of their parities, are not very sensitive to the changes whereas the other half need to change their position.

The perception of the sample on whether investing in foreign exchange market resembles a gamble also generated some interesting results. Slightly more than one-third of the sample perceives foreign exchange market investments as a gamble. This situation can be attributed to highly volatile nature of the Turkish foreign exchange market. Investors who experienced two unexpected and very dramatic devaluations in 1994 and in 2001 overweight factors they can not control. Thus, a significant proportion of investors perceive investing in foreign currencies as a very risky action open to drastic changes. Why these people invest foreign exchange market, despite of perception of high risk, can be explained with expectation of high return.

Another finding of the research was on if the investors are subject to the feeling of hesitation. Approximately half of the sample reported that they suffer from *the feeling of hesitation* and can not stop rethinking of their investment decisions again and again. Continuous hesitation and high stress were indicated as two factors contributing to irrational investor decisions in the literature review section of the paper. Thus, it can be argued that Turkish foreign exchange market investors have a tendency to make irrational decisions due to their continuous fears and hesitations about correctness of their decisions.

Various instruments can be suggested to deal with psychological biases and heuristics, which lead to irrational investor behaviors. Education, experience and knowledge are factors that can eliminate or reduce negative impacts of psychological biases. But, there is still a need to understand very nature of psychological factors distorting rational decision making. Those aware of possible psychological biases can more easily deal with them. For example, disposition effect leads investors to hurry up in realizing profits and to keep investment instruments with losses for long-time. An investor who is aware of the fact can manage his/her bias so that he/she can avoid an irrational decision.

Another strategy that can be used to decrease the probability of being subject to psychological biases is having concrete and usually medium and long-term goals rather than widely short-term and abstract objectives. An objective of "having a diversified foreign currency portfolio, which would make me financially secure in my retirement, within two years" is better than an objective of "gaining a lot of money".

The other strategy of dealing with psychological biases in investment decisions is to have quantitative investment criteria. Such criteria prevent various irrational behaviors such as being exposed to evaluations of others a lot and/or herd behavior. Profit realization "after an annual gain five point over inflation rate" can be taken as a criterion.

Of a surety, diversification is one of the most effective strategies to deal with psychological biases such as *attachment* and *familiarity* biases. Diversification can be made within a foreign currency portfolio and constituting another portfolio with different instruments such as government bonds, treasury bills and/or shares.

Also the relationship between the some of the properties of the respondents such as gender,age ,education, income ,the potential of taking risk ,having some of the psychological biases and etc. were investigated. The research findings indicated that older investors have the longest period of past trading experince than the younger ones.
Another research findings about the realation between the gender and potential of taking risk supports the view inthe literature that men have a tendency to taking risk more than females.The relationship between education and perceiving fx markets as a sort of gambling was examined and fond that the findings are in accordance with the literature review that psychological biases can be eliminated or reduced with the help of education and

experience.The respondents who have higher educational level have not perceived investment on fx markets as a gambling contrary to the others perceived so.

To explain factors affecting investor decisions and those leading to irrational investor decisions in Turkish foreign exchange market further research and larger samples are needed. Due to time and availability limitations the findings of this paper could be drawn from a sample of 82 investors. Despite of this fact, the study provided a preliminary idea on the issue.

APPENDIX:

Questionnaire

ANKET

Aşağıdaki anket İstanbul Bilgi Üniversitesi'ne teslim edilecek bir bitirme tezinin bir parçası olarak hazırlanmıştır. Tez konusu *işletmelerin döviz yatırımları ile ilgili verdikleri kararları etkileyen faktörlerdir*. Vereceğiniz cevaplar tamamen gizlilik içinde değerlendirilecektir ve anket boyunca adınız-soyadınız ve adresiniz gibi özel sorular sorulmayacaktır. Vakit ayırdığınız ve ilgi gösterdiğiniz için teşekkür ederiz.

CEVAP VERMEK İÇİN: Cevaplarınızı seçeneklerin yanındaki kutucukları iki defa tıkladığınızda çıkan menüde "checked" (onaylandı) şıkkını seçerek verebilirsiniz.

1. BÖLÜM

1. (İşletme Olarak) Kaç yıldır dövize yatırım yapmaktasınız?

☐ 10 yıl ve üstü
☐ 8 (dahil) ile 10 yıl arası
☐ 6 (dahil) 8 yıl arası
☐ 4 (dahil) ile 6 yıl arası
☐ 2 (dahil) ile 4 yıl arası
☐ 2 yıldan az

2. Genellikle kaç farklı pariteye yatırım yapmaktasınız

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ve üstü

3. Aşağıdakilerden hangisini tercih edersiniz?

☐ Garantisiz %200 kazanç
☐ %30 ihtimalle kazanılacak % 100 kazanç
☐ %50 ihtimalle elde edilecek %80 kazanç
☐ % 60 ihtimalle elde edilecek %40 kazanç
☐ %80 ihtimalle %30 kazanç
☐ %100 ihtimalle %15 kazanç

4. Yatırıma ayırdığınız paranın yüzde kaçını parite işlemlerine ayırıyorsunuz?

☐ % 20 veya daha az
☐ %21-40
☐ %41-60
☐ %61-80
☐ %81-100

5. Paritede işlem yaparken size alım satım fikirlerini sağlayan etkenler nelerdir?

☐ Başkalarının yorumları
☐ Kendi oluşturduğum fikirleriniz
☐ Haberler
☐ Kendi teknik analizleriniz
☐ Arkadaşlarınızın fikirleri

6. İşlem yaparken paritem hesabınızın yüzde kaçıyla pozisyon taşıyorsunuz?

☐ % 20 veya daha az
☐ %21-40
☐ %41-60
☐ %61-80
☐ %81-100

7. Genellikle kaç puan kar ettiğinizde karınızı alıyorsunuz?

☐ 10
☐ 20
☐ 30
☐ 50
☐ Kapatmıyorum

8. Kaç puan zarara girerseniz pozisyonunuzu zarara kapatıyorsunuz?

☐ 10
☐ 20
☐ 50
☐ 100
☐ Kapatmıyorum

9. Parite gün içerisinde çok yükselmiş ya da düşmüşse, o hareketin tersi yönünde pozisyon alıyor musunuz?

☐ Evet
☐ Hayır

10. Pozisyon taşırken maliyeti düşürmek ve paçal yapmak amaçlı yeni pozisyon alıyor musunuz?

☐ Evet
☐ Hayır

11. Döviz piyasalarında yatırım yapmanın aslında bir tür kumar olduğunu düşünür müsünüz?

☐ Evet
☐ Hayır

12. Döviz piyasası yatırımcılarının büyük oyuncular tarafından manipüle edildiğine inanıyor musunuz?

☐ Evet
☐ Hayır

13. Yatırım kararlarımı verdikten sonra doğru karar verip vermediğim konusunda tekrar tekrar düşünmekten kendimi alıkoyamam.

☐ Evet
☐ Hayır

14. Parite yatırımı yaparken her şeyi kaybetme korkusu duyarım

☐ Evet
☐ Hayır

15. Pariteye en son yatırım yaptığımda umutluydum ve içimden "bu sefer her şey farklı olacak" dedim

☐ Evet
☐ Hayır

16. Paramın bir kısmını dolara bir kısmını Euro'ya yatırdığım bir ortamda, Euro hızla değer kazanıp, dolar daha az kazandırırken veya yerinde sayarken neden bütün paramı Euro'ya yatırmıyorum diye düşünürüm.

☐ Evet
☐ Hayır

17. Aşağıdakilerden sizi en iyi ifade edeni belirtiniz:

☐ Yatırımlarım için endişelenmekten kendimi alıkoyamam
☐ Yatırım yaptığım pariteyi kendimle özdeşleştiririm
☐ Yatırım yaparken duygu ve sezilerimle hareket ederim, yatırım yapacağım pariteye kısa sürede karar veririm ve ona büyük güven duyarım
☐ Pariteye yatırım yaparken kazancım üzerine odaklanır kaybedeceklerimi pek düşünmem
☐ Yatırım yaptığım döviz kurunun mümkünse hiç değer kaybı yapmamasını beklerim

2. BÖLÜM

Cinsiyetiniz

☐ Bayan ☐ Erkek

Yaşınız

☐ 18 ile 25 Yaş Arası
☐ 26 ile 33 Yaş arası
☐ 34 ile 41 yaş arası
☐ 42 ile 49 yaş arası
☐ 50 yaş ve üstü

Mesleğiniz

☐ İşletme Sahibi veya Ortağı
☐ Muhasebe veya Finans Müdürü /Müdür Yrd. veya benzeri
☐ Uzman - Çalışan
☐ Serbest Meslek
☐ Diğer

Eğitim Durumunuz:

☐ İlkokul
☐ Ortaokul
☐ Lise
☐ Üniversite
☐ Master /Doktora

Aylık Gelir Düzeyiniz

(Üst ve alt sınırlar ilgili gelir grubuna dahildir)

☐ 750 YTL Altı
☐ 751 YTL ve 1250 YTL arası
☐ 1251 YTL ve 1750 YTL arası
☐ 1.751 YTL ve 2.250 YTL arası
☐ 2.251 YTL ve 3.000 YTL arası
☐ 3.001 YTL ve 3.750 YTL arası
☐ 3.751 YTL ve 4.500 YTL arası
☐ 4.501 YTL ve Üstü

Anket bitmiştir, teşekkür ederiz…

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