

Decision Making and Behavioral Heuristics of Investors in Non-Financial Sector: A Case of Pakistan Stock Exchange

Shagufta Parveen* and Muhammad Ayub Siddiqui†

Abstract

Modern finance state investors as rational being, who make all economic decisions carefully and systematically. But irregularities were noticed during the financial crisis of 2008 that started from USA and caused global recession. Investors were shaken by this crisis around the world as financial theories were failed to produce the desired results. Investors were found to be irrational during this period and they applied heuristics in their financial decisions in uncertain situations. Pakistan stock market and investors were also affected by this financial crisis. Purpose of this study was to find out the impact of behavioral heuristics on investment decisions of Pakistani investors. To find out this, data of ten years (2005-2014) from non-financial sector was collected. Total 184 companies are listed in non-financial sector at Pakistan stock exchange. Logit regression was applied to find the relationship between representative heuristic, anchoring heuristic, availability heuristic, disposition effect, and overconfidence (behavioral heuristics) and investment decisions of investors in Pakistani stock market. Results showed that these heuristics are used by Pakistani investors in their financial decision making and it helps them to generate positive returns specially disposition effect.

Keywords: Overconfidence, Representative, Availability, Anchoring, Availability, EMH, CAPM

Introduction

Introduction of behavioral finance has ended the supremacy of efficient market hypothesis as a model of investment and selection of securities. Ever since, traditional way of investing was in continuous disagreement with new model of investing patterns and investors' behavior. The intrinsic limitations of efficient market hypothesis have strengthened the acceptance of new investing approach. Concept of rationality and efficient markets has ignored the investors' behavior, behavioral biases and market fluctuation. Market irregularities and unavailability of information in the long run has been opposed by the idea of efficiency of information and combination of arbitrage approach (Konstantinidis et al., 2011). Efficient market hypothesis was considered a popular model for

* Shagufta Parveen, PhD Scholar, Bahria University Islamabad

† Dr. Muhammad Ayub Siddiqui, Professor, Department of Management Sciences, FAST University of Computer and Emerging Sciences Islamabad

the selection of portfolios till 1990s. After the introduction of behavioral finance, efficient market hypothesis has become controversial. Authors (Thaler, 2015; Slovic et al., 2002) have conducted a broad survey about efficient market hypothesis and behavioral finance. They found the possible reasons for the rejection of efficient market hypothesis and rationality of individuals and efficiency of markets concept. They proposed to replace it with behavioral finance concepts. They also proposed that behavioral finance should be adopted as model for investment in the financial markets as it includes and focus on the behaviors and psychology of investors. Financial models of Efficient Market Hypothesis (EMH) and Capital Asset Pricing Model (CAPM) are theoretically strong models but empirically these models were challenged by supporter of behavioral finance like Warren Buffet (1984) and other researchers like Amos Tversky and Daniel Kahneman, (1974), Richard Thaler (2015) and Paul Slovic et al., (2002).

The global financial crisis of 2008 and 2009 started from 20th century back and has increased in intensity since then. US housing prices started to decrease at the end of 20th century. In mid of 2008 there was a dramatic increase in mortgage delinquencies. This led to decline in the value of US banks and other financial institution. Pakistan was severely affected by this financial crisis because of their reliance on foreign funding. International Monetary Fund (IMF) set strict conditions on borrowing and loans which made the macroeconomic situation worse for Pakistan. Sources of funding were contracted. This crisis also affected stock market of Pakistan. On December 2008 Karachi Stock Exchange had 653 listed companies with total of \$23 billion of market capitalization and it was \$58 billion in December 2007. On January 2009 KSE-100 index stood with \$20 billion market capitalization, a loss of 65% from its highest point ever. It is significant to know and understand the impact of global financial crisis on the economy because it helps to understand the overreaction or under-reaction in economic behavior of investors. The news of international financial crisis affects their investment strategies and help to estimate the shock absorbing abilities of capital market. This shows that investors over and under reacted to financial crisis and proved that individual act irrational under uncertainty. This arise the need to study this phenomenon in capital market of Pakistan and check whether heuristics were used by investors in financial decision making or not.

Political and economic conditions are uncertain in Pakistan and investors prefer short term returns to avoid risk. They also have less financial knowledge about utilization of their money. They do not want to take risk by putting their money in long term ventures and

investments. There is another important point to mention is that Pakistani stock market is developing market and its information system is not strong. Information and data is not easy to obtain. This also makes harder for investors to do estimation on the basis of data available. They do not have proper understanding of financial instruments (Rasheed and Arshad, 2009). Pakistani investors follow other investors without knowing and assessing their financial goals. We see that some investors invest in the companies with stocks falling in prices. This fall in price is short term but investor think that after reaching to the high price, the stock will fall and they will be able to purchase the stock at low prices than before. Investors are anchoring on the current high prices. This practice causes them loss on their investment as this condition does not last long (Northcraft and Neale, 1987). This makes it important to know the financial decision making patterns of Pakistani investors in capital market.

This study is conducted first time in Pakistan on non-financial sector with this methodology. It will help to fulfill gaps in literature on heuristics with reference to Pakistan. It is important to see the contribution of these behavioral heuristic whether it is positive or negative. So this study will contribute to the body of knowledge with respect to these factors especially in case of Pakistan. The second research gap is this that previous researchers (Sarwar and Afaf, 2016; Ishfaq and Anjum, 2015; Asif et al, 2015) have applied only primary data to find out the impact of cognitive biases on investment decisions. Heuristics and biases have never been studied in non-financial sector with quantified variables before. We have quantified these variables first time. As far as we know no quantitative study has been done in Pakistan on this topic with this methodology.

Pakistani investors are less educated and financially illiterate. They do not know where to invest and how to invest. They rely on others to get guidance about their financial plans. They do not compare their financial condition, environment, situation and timing of investment with other investors. They try to invest on the basis of current situation (if price are rising) without considering future prospects of the stock. They do not know about technical and fundamental analysis for their investment estimates (Butt et al., 2011). This research will be useful to explain and understand the influence of behavioral heuristics on the financial decision making of investor in the non-financial sector of Pakistan. We will also know how investors in non-financial sector behave under uncertain situation.

Literature Review

Market has transaction and taxation cost associated with trading of stocks in the stock market. The main purpose of the efficient market is to reduce risk and increase profits but we can find overconfident investors in the market who take risk and try to earn more profits. A study on market efficiency of Asian stock exchanges was conducted by Huang (1995) and he selected nine Asian countries. He found that random walk hypothesis does not hold in Korea and Malaysia. In Hong Kong, Thailand, Bahrain and Saudi Arabia do not have weak form EMH. Kuwait has only weak form EMH and investors can use historical data to take investment decisions.

Criticisms of the EMH and CAPM theory's failure to predict human financial decision making led to the development of behavioral finance in the early 1970s as a new model. Behavioral finance has shed substantial light on the outcomes of biases, heuristics, and framing on financial decision making. People are not rational decision makers. Their decisions are affected by their behavior and biases and lead to poor performance. Decisions are based on emotions, feelings and sixth sense and do not follow systematic pattern. Traditional financial economics focuses on utility maximization and rationality of the individuals (Masomi & Ghayekhloo, 2011).

The most long-term evaluation of the EMH is focused on the liking and activities of the investors in the market. A number of points were highlighted by the Psychologists and experimental economists that are different from the modern finance. The points revolve around the behavior of the investors under uncertain situations and their decision making. These decisions lead to unfavorable results for investors in the market. These behaviors biases include overconfidence (Slovic and Lichtenstein 1982; Barber and Odean, 2001; Gervais and Odean, 2001), loss aversion (Kahneman and Tversky, Odean, 1998), psychological accounting (Tversky and Kahneman, 1996), miscalibration of probabilities (Lichtenstein, Fischhoff and Phillips, 1982), hyperbolic discounting (Laibson, 1997), and regret (Bell, 1982). These opponents of the EMH disagree on the concept of rational investors and they say that individuals are different and they behave unsystematically in different situation. They are not predictable. These biases cause market to be inefficient and every individual has different level of information about the securities and the market. This helps some investors to earn abnormal profits and create mispricing. Hassan et al. (2013) conducted a study related to affect heuristic, fear and anger on the decision making of individual investor. On the basis of simple discussion with some investors from Islamabad stock exchange they proposed that affective

feelings lead to irrational decision making. Masomi and Ghayekhloo (2011) explored the impact of behavioral factors on the investment decision making of investors in Tehran stock exchange. They also explored the cost of human behavior on the result of investment. The behavioral factors included in the study were representativeness, overconfidence, anchoring, gambler's fallacy, loss aversion, regret aversion and mental accounting. It was found that institutional investors follow different cognitive biases in their investment decision making in Tehran. The study of Qureshi and Hunjra (2012) explained that Overconfidence, representativeness, Gambler's fallacy, availability bias, and anchoring are the elements of heuristics. Waweru, Munyoki et al. (2008) conduct a study to check the impact of behavioral factors and psychology of investor in decision making in investment. They concluded that decision making of the institutional investors was affected by behavioral factors like representativeness heuristic, anchoring heuristics, overconfidence, loss aversion, availability bias, regret aversion, gambler's fallacy, and mental accounting.

Behavioral heuristics effect investors' estimation of future income from their investment. According to Amir and Ganzach (1998) representativeness, anchoring and adjustment, and leniency heuristics affect US analysts in forecasting of income. Marsden et al (2008) examined in their study that these heuristics also affect Australian analyst's estimation relating income. The results showed that Australian investors were affected by these three heuristics. Australian experts overreact to positive changes and revisions and under react to negative changes and revisions. Ngoc (2014) found in a study the investors in the stock market behave different in different situations. The focus of his study was individual investors of Vietnam's securities companies. It was found that there are certain heuristics that were affecting investors in the Ho Chi Minh Stock Exchange. Herding behavior, disposition effect, overconfidence, anchoring and gambler's fallacy were prominent in the decision making of investors of Vietnam. These heuristics are impacting their financial outcomes. John and Schnytzer (2009) explored that people use rule of thumbs to make their investment decisions within the boundaries of their knowledge. They worked on the anchoring and adjustment heuristic in the stock market and its use by investors. Results of their study showed that bettors consider previous information on the position of barriers in the race and then bet on any race. They were not concerned with the latest or current information of the race. Basic anchoring heuristic is defined as a situation when people anchor on some information which they already have and in this they are not asked to compare the value with the estimated value (Mussweiler and Englich,

2005). It has been found that use of basic anchoring is automatically used by people when they keep in mind the anchoring value and most of the time that value is unsuitable with the value to be estimated (Wilson et al., 1996).

Behavioral finance helps us to understand the psychology of investors in the market, their decision making patterns and effect of emotions on their investment outcome. Kahneman and Tversky (1979), Shefrin and Statman (1994), Shiller (1995) and Shleifer (2000) are main contributor to the field of behavioral finance. They have used theories of psychology and social sciences to understand the mechanism of financial markets, market anomalies and market crashes and fluctuations. People are not rational utility optimization machines. Their decisions are affected by a variety of regular biases that may result in inaccurate patterns of behavior and poorer performance (Tversky and Kahneman, 1974). Various studies found that active capital market investors demonstrated reasonable degrees of behavioral biases. Investors did not act according to the basic concept of rationality. Behavioral Finance's main contribution is to better understand the irregularity present in investors' behavior by mixing psychology with finance and economics. Behavioral Finance believes that investors commit errors because they rely on heuristics to process data. One example of rules of thumb is predicting future performance on the basis of past performance. But rules of thumb are generally faulty. Consequently, investors hold biased beliefs that prompt them to commit errors. In contrast, Traditional Finance assumes that practitioners use statistical tools correctly and properly when processing data. Investment process is more human than systematic. Sentiments of loss, overconfidence and regret often overrule rationality. Finance research has often ignored the investor's decision making process while taking financial investment decisions.

On the basis of above literature following model is proposed. It includes behavioral heuristics and their impact on financial decision making of investors in non-financial sector of Pakistan.

Figure1: Behavioral heuristics and financial decision making

H1= Overconfidence heuristic has positive impact on decision making of investors in listed companies of non-financial sector of Pakistan.

H2= Disposition effect has positive impact on decision making of investors in listed companies of non-financial sector of Pakistan.

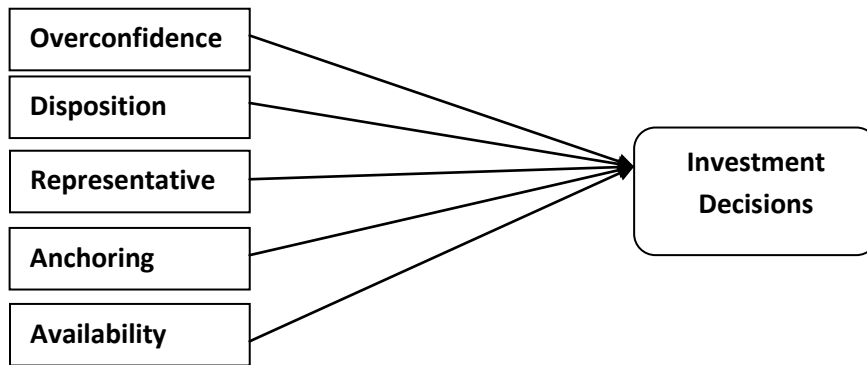
H3= Anchoring heuristic has positive impact on decision making of investors in listed companies of non-financial sector of Pakistan.

H4= Representative heuristic has positive impact on decision making of investors in listed companies of non-financial sector of Pakistan.

H5= Availability heuristic has positive impact on decision making of investors in listed companies of non-financial sector of Pakistan.

Explanation of The Theoretical Model

In this model representative, availability, anchoring, overconfidence and disposition effect are independent variables. Investment decision is dependent variable.



Representative heuristic is described as assessing similarity of objects and organizing them based on the category prototype. A sample is drawn from population that is considered highly representative of the population which can be described as representativeness heuristic (Tversky and Kahneman ,1974). They will be inclined to buy stocks, which have been increasing recently.

Availability heuristics is often employed when people rely on current information to make their decisions and ignore all previous data and details which make it biased opinion (Kliger&Kudryavtsev, 2010). In our case we are focusing on investment in stocks and usually these decisions are made under uncertain situations. Investors should calculate the chance of getting profits or earning loss on any stock whether they want to sell, hold or purchase it.

Anchoring heuristics is defined as a propensity to make decisions by using a reference point which has no logical connection to the decisions. Investors use unrelated facts and figures for investment decisions (Tversky and Kahneman ,1974). We see that some investors invest in the companies with stocks falling in prices. This fall in price is short term but investor think that after reaching to the high price, the stock will fall and they will be able to purchase the stock at low prices than before. Investors are anchoring on the current high prices.

Overconfidence is a tendency to overestimate one's understanding, abilities and the accuracy of one's information. It will be

measured by self-confidence, market knowledge and risk attitude of investor (Moore and Healy, 2008).

Disposition effect is defined as inclination of the investors to sell the share whose prices are increasing and holding the shares whose prices are decreasing (Odean, 1998).

Investment decisions are related to put your money in stocks or bonds to earn return on them. It will be measured by profit or loss earned by investor in stock market.

Methodology

For this study author has collected data through secondary sources (KSE website, Business recorder, Yahoo finance). Data was gathered from the stock exchange related to stock returns and market capitalization. Time period for this study is 2005-2014. The data was collected from listed companies in non-financial sector of Pakistan stock exchange. We have taken stock's end of day daily prices data of the listed companies. There are total 560 companies registered with Pakistan stock exchange and out of which 458 companies were registered before or on year 2005. Out of these 458 companies we have chosen 184 companies with complete data from non-financial sector. This data has shown variability in different years. We have dropped other companies with incomplete data or with zero or less variation. The reason for this is that we want to see the increase and decrease in investment cause by changes in returns. So sample size for this study was 184 companies from non-financial sector. Method for statistical analysis was Logistic regression which is a binary dependent variable model. This equation is for one independent variable and for more than one predictor, we can write this model as:

$$L_i = \ln \left(\frac{P_i}{1 - P_i} \right) = \beta_1 + \beta_2 X_i + u_i \quad (\text{Gujrati, 2004, p.597})$$

In above equations $P_i/(1 - P_i)$ is the odds ratio and \ln is the natural the log of the likelihood ratio. From the estimation point of view it is linear for X as well as linear in parameters. L stands for logit and consequently the name of the model is logit model. For this model, we have computed dummy variables for disposition effect and investment decisions. For this study, the Logistic regression model is as follows:

$$L_i = \ln \left(\frac{P_i}{1 - P_i} \right) = \beta_1 + \beta_2(\text{ovrcnf}) + \beta_3(\text{dispa}) + \beta_4(\text{anchr}) + \beta_5(\text{repre}) + \beta_6(\text{avail}) + \epsilon_i$$

L_i = If L , the logit, is positive, it means that when the value of the regressor (s) increases, the odds that the regress and equals 1 (meaning some event of interest happens) increases and vice versa.

β_1 = intercept

β_2 = the slope, measures the change in L for a unit change in X_2

β_3 = the slope, measures the change in L for a unit change in X_3

β_4 = the slope, measures the change in L for a unit change in X_4

β_5 = the slope, measures the change in L for a unit change in X_5

β_6 = the slope, measures the change in L for a unit change in X_6

$\frac{P_i}{1-P_i}$ = refers to investment decisions

Where (P_i is current price, $1 - P_i$ is previous price)

Ln= natural logarithm

Ovrconf(X_2) = refers to Overconfidence

Dispa(X_3) = refers to Disposition effect

Anchr(X_4) = refers to anchoring heuristic

Repre(X_5) = refers to representative heuristic

Avail(X_6) = refers to availability heuristic

ϵ_i = Residual term

- For calculation of representative heuristic we measured return by taking natural log of the ratio of current-to-previous price i.e. $\ln\left(\frac{P_2}{P_1}\right)$. At the second stage all positive returns are assigned value 1 indicating an incentive for the investors to invest in the subsequent period. If answer is yes then the representative heuristic does affect the investors and their decisions the financial markets and vice versa i.e. $D=1$ if lagged return is positive and 0 otherwise.
- For calculation of availability heuristic we used $\frac{\Delta \text{market capitalization}}{\Delta \text{Price}}$ formula where price is an indication about taking decision about whether to increase investment or decrease it. If this value is positive then availability heuristic exists and it matters in investment decisions otherwise not.
- For calculation of anchoring heuristic, we have calculated the highest return in the week time for all five days. Using this value as reference, we have calculated the series by using the following formula:

$$\frac{R_i}{R_{\text{highest}}} \text{ where } i = 1,2,3,4,5(\text{days return})$$

Each day's return will be divided by the highest return.

- For calculation of availability heuristic we used $\frac{\Delta \text{market capitalization}}{\Delta \text{Price}}$ formula where price is an indication about taking decision about whether to increase investment or decrease it. If this value is positive then availability heuristic exists and it matters in investment decisions otherwise not.
- For calculation of *overconfidence* GARCH (1,1) variance series is used to determine the overconfidence. After calculating the series we

have taken the square root of it to get a better picture of the variations. If the investment is increasing despite the increase in sigma σ that clearly indicate the overconfidence of the investors. Calculation of data of both market and individual securities is included in it.

- For the calculation of *disposition effect*, change in price has been calculated i.e. $\frac{p_2 - p_1}{p_1}$. After this we have applied dummy variables to it. Positive change is equal to 1 and negative change is equal to zero where 1 indicates investors' disposition to sell and zero to represent retain or buy.
- For the calculation of investment decisions, we have used market capitalization data. We have taken differential log of change in market capitalization data where D=1 where differential log is positive and zero otherwise. For differential log of change in market capitalization = $dln(\frac{mc_2}{mc_1})$.

Data Analysis

After applying Logit model to data of non-financial sector, following results were derived:

Table 1: Logistic regression model for non-financial sector

Dependent Variable: INSTD
 Method: ML - Binary Logit (Quadratic hill climbing)
 Sample: 1 449644
 Included observations: 449640

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-7.74754	0.298974	-25.9138	0.00000
ANCHR	4.470035	0.291141	15.35352	0.00000
AVAIL	-1.68519	0.115758	-14.5579	0.00000
DISPA	10.09695	0.04776	211.4112	0.00000
OVR CNF	-0.00162	0.001059	-1.52807	0.12650
REPR	0.771502	0.046968	16.42607	0.00000
McFadden R-squared	0.951488	Mean dependent var		0.630244
S.D. dependent var	0.482739	S.E. of regression		0.073611
Akaike info criterion	0.063948	Sum squared resid		2436.355
Schwarz criterion	0.064095	Log likelihood		-14370.8
Hannan-Quinn criter.	0.06399	Deviance		28741.55
Restr. Deviance	592468.7	Restr. log likelihood		-296234
LR statistic	563727.1	Avg. log likelihood		-0.03196
Prob(LR statistic)	0.0000			

The Table 1 is shows the Maximum likelihood Logit model results for non-financial sector. First if we see the value of “ANCHR” it is highly significant at less than 5% level of significance. This heuristic has positive and direct effect on investment decisions in non-financial sector. If investors are investing in non-financial sector and they use anchoring in decision making then there is probability that investment will generate positive returns. The second predictor is “AVAIL” and its log odd is negative but significant with less than 5% p-value. It shows that if people use this heuristic in their decisions of investing in non-financial sector then there are chances that their investment will provide them negative returns.

Likewise the “DISPA” effect is showing positive value of its coefficient and it is highly significant at p-value less than 5%. So when investors are using disposition effect in their investments, there are chances that they will get positive returns on their shares. If they sell the shares with high prices in the market then their odds of getting good returns increases. “OVR CNF” has negative value of its log odd and it is not that much significant in non-financial sector for investment. If investors are overconfident and take risks with their investment then there are zero chances of getting negative returns. So investors should not be worried about taking risks with their investments in non-financial sector. The “REPR” heuristic has highly significant positive value at less than 5% level of significance. It is a good sign for investors that in non-financial sector, representative heuristic can be used to get good returns. Historical prices can information can be used to make decisions about investment in non-financial sector of Pakistan. This value shows that if investors are using representative heuristic in their investment decisions then there is probability that they will earn profit on their investments.

Now if we see the value of R^2_{MAC} it is showing the reliability of predictor and response variables in our model. Its value is near to one so our model is good for predicting the effect of heuristics on investment decisions in non-financial sector of Pakistan. The value of R^2_{MAC} is considered to be good if it is near 1. Standard deviation of dependent variable's value is also showing considerable effects of predictor on response variable.

The other criterion like Akaike information criterion (0.063948), Schwarz criterion (0.064095) and Hannan-Quinn criterion (0.06399) are also low. It shows that our model is preferred one and it has statistical goodness of fit. Now if we look at the value of LR statistic, it is significant and it can then be used to compute a p -value, or compared to a critical value to decide whether to reject the null model in favor of the alternative model. If the value of this statistic is too small then likelihood

ratio test rejects the null hypothesis. Low values of the likelihood ratio mean that the observed result was less likely to occur under the null hypothesis as compared to the alternative. In our study we have value of LR statistic which is highly significant at less than 5% level of significance.

So we can say this that we accept the alternative hypotheses for representative heuristic, anchoring heuristic and disposition effect are accepted and for avail heuristic and overconfidence are rejected. Behavioral heuristics affect investment decisions of investors in non-financial sector of Pakistan. Here also EMH and CAPM assumptions are not fulfilled because investors have acted differently than their normal economical behavior.

As we have witnessed that in Pakistani stock market, investors are affected by heuristics and other biases in their investment decisions. They are more focusing on disposition effect for gaining returns on their investment. Overconfidence has less contribution towards response variable in KSE listed sectors. This shows that investors are not risk takers in this market. As an investor, we also cannot use availability heuristic as it is negatively related to investment decision in Pakistan. Focusing on market capitalization ratio and previous day return will not bring any profit in stock trading. It will lower the gains in the market. Anchoring has small effect on investment decisions in Pakistani market. But investors can rely on high weekly returns to decide about buying and selling of shares. Representative heuristic has also shown contribution towards investment decision determination. Investors in this market can rely on past performance of a company, its share prices, news and returns for making profitable use of their money. They want to gain quick returns and focus on short term profits. They rely on historical prices, P/E ratios, market capitalization ratio, returns to make their decisions related to purchasing and selling of shares.

EMH and CAPM theories assume that investors are rational and they act rationally in the market. These models believe that information is easily available in the market and help investors in their decision making process. But we can see that in case of Pakistani stock market, investors have chances to earn high returns than other investors by using these heuristics and biases in their decisions making, which mostly they use. According to CAPM, investors can generate more returns by taking more risks. Investors are not rational in stock market of Pakistan and they heavily rely on their intuitions, estimations and historical data for stock buying and selling. In this market, investors want to generate high and quick returns. They mostly focus on short term returns. Non-financial sector has shown the presence of these heuristics and biases in

investors' decisions. Investors do not behave rationally always as we have seen in case of stock market crisis in Pakistan of 2008-09. In that uncertain situation, they invested more so the prices were increased in the market.

Discussion

The results of our study are in accordance with other research studies that were conducted to test the validity of EMH and CAPM in stock market of Pakistan. There is a general concept in Pakistani stock market that volatility is result of insider trading by brokers. According to Khawja and Mian (2005) stock prices in Pakistan are manipulated by collusive stock brokers. A study by Irshad and Sarwar (2013) on validation of weak form of EMH in KSE explored that return in this market are not normally distributed on daily, weekly and monthly basis. These dynamics situation has shown abnormal returns and price trends for investors and this study has also proved that EMH weak form does not exist in KSE market.

A research study by Naz et al., (2014) proves that KSE market does not follow EMH and random walk theories. Returns were abnormally distributed and investors used past prices to predict future returns. Anwar et al., (2013) examined the behavior of small stock investors in Pakistani stock exchanges. Findings of the study suggested that investors are not rational in Pakistani capital market and markets are inefficient and do not follow random walk hypothesis. Rabbani et al., (2013) conducted a study on testing of weak form efficiency of emerging stock market of Pakistan. The reasons for volatility in market prices of securities are due to slow communication and incomplete information, colluding brokers and insider trading of selected groups.

We can conclude this discussion by saying that Pakistan stock exchange does not support EMH and CAPM. This market is inefficient and role of information is weak on stock exchange activity. Investors use heuristics in their decision making and are irrational in their approaches. They are affected by week effect like weekly high returns, previous prices, take risks with their investment and use market capitalization ratio. Pakistani financial markets are not efficient. Investors do not have complete information and knowledge of market and its changes.

Here is summary of all hypotheses:

Emerging Issues in Economics and Finance

Table 2: Summary of all hypotheses

Hypothesis	Impact	McFadden R ²	Coefficients	P-value	Hypothesis supported
H1	Ovrcnf -ve on decision making	0.951488	-0.00162	0.12650	No
H2	Dispa +ve on decision making	0.951488	10.09695	0.0000	Yes
H3	Anchr +ve on decision making	0.951488	4.470035	0.0000	Yes
H4	Repre +ve on decision making	0.951488	0.771502	0.0000	Yes
H5	Avail -ve on decision making	0.951488	-1.68519	0.0000	No

Note. *p<0.05. Overconfidence bias (overcnf), Disposition effect (dispa), Anchoring heuristic (anchr), Representative heuristic (repre), Availability heuristic (avail)

Conclusion

Behavioral finance studies the effects of factors like cognitive, social, psychological and emotions on the decisions of individuals and organizations. Market prices, returns on investments and resource allocation are also concern of behavioral finance areas. Bounded rationality of economic agents or individuals is the prime concern and behaviors models are introduced by these two areas. These models incorporate psychology, neuroscience and microeconomic theory. These models help to study the behavior and decision making of individuals and organizations in the market and the mechanism that form their choices. The financial crisis of 2008 has given numerous financial specialists enormous loss as a consequence of applying and using these two theories in their investment. Warren Buffet and other researchers like Daniel Kahneman, Amos Tversky, Richard Thaler and Paul Slovic have argued EMH both empirically and theoretically. They said that cognitive biases and human errors in information processing make market imperfect and inefficient. It is found that investors avoid value stock and go for growth stocks at higher prices. So we can say that basic assumptions of EMH and CAPM models are not applied in Pakistani capital market. This market is inefficient and role of information is weak on stock exchange activity. Investors use heuristics in their decision making and are irrational in their approaches. They are affected by week effect like weekly high returns, previous prices, take risks with their investment and use market capitalization ratio.

Recommendations

We will suggest few points to investors and policy makers in the stock market of Pakistan:

- If Pakistan wants its stock markets to be efficient then flow of information should be made transparent to all investors in the market.
- There should be strict rules to stop insider trading in Pakistan as it affects minority traders.
- Trainings, seminars and print material should be provided to investors about the current situation of the stock market.
- Pakistan stock exchange should have a strong data portal with reliable and complete entries for data collection and research on capital market. This will help in improving the current condition of the investment in country.

Limitations of the Study

Following were the limitations of our study:

- Data of all listed companies were not completely available.
- Companies that were registered on and after year 2005 have missing values for most of years.
- Data collection resources were limited.

Future Research

In future market anomalies can be included to see the impact on investment decisions of investors in Pakistani stock markets. Financial sector can also be studied using same variables to make the comparison. Other cognitive biases can also be used to determine investment decisions.

References

- Anwar, Z., Nazir, M. S., Khan, M. K., & Khan, A. (2013). Behavior of small equity investors in Pakistan's Stock Exchange. *Middle-East Journal of Scientific Research*, 18(3), 321-326.
- Amir, E., & Ganzach, Y. (1998). Overreaction and under-reaction in analysts' forecasts. *Journal of Economic Behavior & Organization*, 37(3), 333-347.
- Asif, M., Khawaja, H., & Wali, S. (2015). Testing the weak form efficiency of KSE 100 Index. *City university research journal*, 5, 291-300.
- Barber, B. M., & Odean, T. (2001). Boys will be boys: Gender, overconfidence, and common stock investment. *The quarterly journal of economics*, 116(1), 261-292.
- Bell, D. E. (1982). Regret in decision making under uncertainty. *Operations research*, 30(5), 961-981.
- Butt, M. A., Saddar, R., Shafi, H., Rehman, K.-U., & Rehman, R. R. (2011). Investor's Dilemma: Fundamentals or Biasness in Investment Decision. *Journal of Economics and Behavioral Studies*, 3, 122-127.
- Gervais, S., & Odean, T. (2001). Learning to be overconfident. *the Review of financial studies*, 14(1), 1-27.
- Huang, B. N. (1995). Do Asian stock market prices follow random walks? Evidence from the variance ratio test. *Applied Financial Economics*, 5(4), 251-256.
- Hassan, E. U., Shahzeb, F., Shaheen, M., Abbas, Q., Hameed, Z., & Hunjra, A. I. (2013). Impact of affect heuristic, fear and anger on the decision making of individual investor: a conceptual study. *World Applied Sciences Journal*, 23(4), 510-514.
- Irshad, H., & Sarwar, G. (2013). Is Karachi Stock Market Weak Form Efficient?. *Journal of Commerce* (22206043), 5(1).
- Ishfaq, M., & Anjum, N. (2015). Effect of Anchoring Bias on Risky Investment Decision. Evidence from Pakistan Equity Market. *Journal of Poverty, Investment and Development*, 14, 1-9.
- Johnson, J. E. V., Schnytzer, A., & Liu, S. (2009). To what extent do investors in a financial market anchor their judgments excessively? Evidence from the Hong Kong horserace betting market. *Journal of Behavioral Decision Making*, 22(4), 410-434.
- Konstantinidis, A., Katarachia, A., Borovas, G., & Voutsas, M. E. (2012). From efficient market hypothesis to behavioural finance: Can behavioural finance be the new dominant model for investing. *Scientific Bulletin–Economic Sciences*, 11(2), 16-26.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica: Journal of the econometric society*, 263-291.
- Kahneman, D., & Tversky, A. (1996). On the reality of cognitive illusions.
- Kliger, D., & Kudryavtsev, A. (2010). The availability heuristic and investors' reaction to company-specific events. *The Journal of Behavioral Finance*, 11(1), 50-65.

- Khwaja, A. I., & Mian, A. (2005). Do lenders favor politically connected firms? Rent provision in an emerging financial market. *The Quarterly Journal of Economics*, 120(4), 1371-1411.
- Laibson, D. (1997). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics*, 112(2), 443-478.
- Lichtenstein, S. F., & Fischhoff, B. B. and Phillips, LD (1982). Calibration of probabilities: The state of the art in 1980. *Judgment under uncertainty: Heuristics and biases*, 306-334.
- Marsden, A., Veeraraghavan, M., & Ye, M. (2008). Heuristics of representativeness, anchoring and adjustment, and leniency: Impact on earnings' forecasts by Australian analysts. *Quarterly Journal of Finance and Accounting*, 83-102.
- Masomi, S. R., & Ghayekhloo, S. (2011). Consequences of human behaviors' in Economic: The effects of behavioral factors in investment decision making at Tehran Stock Exchange. In *2010 International Conference on Business and Economics Research, Malaysia* (Vol. 1).
- Moore, D. A., & Healy, P. J. (2008). The trouble with overconfidence. *Psychological review*, 115(2), 502.
- Mussweiler, T., & Englich, B. (2005). Subliminal anchoring: Judgmental consequences and underlying mechanisms. *Organizational Behavior and Human Decision Processes*, 98(2), 133-143.
- Naz, S., Razaque, S., Khuwaja, H. A., & Ahmed, N. (2014). Validity of EMH; A Case Study of KSE-100 Index. *Sukkur IBA Journal of Management and Business*, 1(1), 112-126.
- Ngoc, L. T. (2014). Behavior Pattern of Individual Investors in Stock Market. *International Journal of Business and Management*, Vol.9, No.1 , 1-16.
- Northcraft, G.B. and Neale, M.A., (1987). Experts, amateurs, and real estate: An anchoring-and-adjustment perspective on property pricing decisions. *Organizational behavior and human decision processes*, 39(1), pp.84-97.
- Odean, T. (1998). Are investors reluctant to realize their losses?. *The Journal of finance*, 53(5), 1775-1798.
- Qureshi, S. A., & Hunjra, A. I. (2012). Factors affecting investment decision making of equity fund managers.
- Rasheed, F., & Arshad, M. (2009). The Significance of financial literacy. *Proceedings 2nd CBRC*.
- Rabbani, S., Kamal, N., & Salim, M. (2013). Testing the weak-form efficiency of the stock market: Pakistan as an emerging economy. *Journal of Basic and Applied Scientific Research*, 3(4), 136-142.
- Sarwar, A., & Afaf, G. (2016). A comparison between psychological and economic factors affecting individual investor's decision-making behavior. *Cogent Business & Management*, 3(1), 1232907.
- Shefrin, H. (2002). *Beyond greed and fear: Understanding behavioral finance and the psychology of investing*. Oxford University Press on Demand.

Emerging Issues in Economics and Finance

- Shefrin, H., & Statman, M. (1985). The disposition to sell winners too early and ride losers too long: Theory and evidence. *The Journal of finance*, 40(3), 777-790.
- Shiller, R. J. (2003). From efficient markets theory to behavioral finance. *The Journal of Economic Perspectives*, 17(1), 83-104.
- Slovic, P., Finucane, M., Peters, E., & MacGregor, D. G. (2002). Rational actors or rational fools: Implications of the affect heuristic for behavioral economics. *The Journal of Socio-Economics*, 31(4), 329-342.
- Thaler, R. H. (2015). *Misbehaving: The making of behavioral economics*. WW Norton & Company.
- Tversky, A., & Kahneman, D. (1975). Judgment under uncertainty: Heuristics and biases. In *Utility, probability, and human decision making* (pp. 141-162). Springer Netherlands.
- Waweru, N. M., Munyoki, E., & Uliana, E. (2008). The effects of behavioural factors in investment decision-making: A survey of institutional investors operating at the Nairobi Stock Exchange. *International Journal of Business and Emerging Markets*, 1(1), 24-41.