Heuristics and stock buying decision: Evidence from Malaysian and Pakistani stock markets

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Abstract

Applying both qualitative and quantitative approaches, we examine whether or not investors fall prey to three heuristics; namely, anchoring and adjustment, representativeness, and availability, while investing in stocks. We also compare investors' vulnerability to these heuristics based on their economic association, their type and demographic factors such as income, education and experience. For the data collection, a self-constructed questionnaire was administered to investors in the Malaysian and Pakistani stock exchanges. Data has been analyzed through description, correlation and regression analysis. The results indicate that all three heuristics are likely to affect the investors' stock buying decisions. The effect of heuristics is similar across the sample countries, the type of investors, and the income groups. However, the investors with a higher level of education and more experience are less likely to be affected by the heuristics.

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JEL classification: G02; G11; G19

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1. Introduction

The mental shortcuts in the “decision making” process, as opposed to a thorough information gathering and analysis, are referred to as “heuristics”. Although heuristics can be helpful in many situations, they often lead to biased decisions (Tversky & Kahneman, 1974). The use of heuristics and their effects on financial decision making is well recognized in behavioral economics/finance literature [see for example (Bernard & Thomas, 1989; De Bondt & Thaler, 1985; De Bondt & Thaler, 1990)]. The literature provides many examples of poor decision making, such as selling the winners too early and holding the losers for too long, excessive trading (Odean, 1998), and under-diversification (Goetzmann & Kumar, 2008). These behaviors (anomalies) are considered to be against the assumptions of the traditional finance theory. However, no satisfactory explanation of why such behaviors exist in the markets is given by the traditional theories. The theory of behavioral finance, on the other hand, attempts to provide an understanding of the fundamental motivations behind such irregular market patterns (Subrahmanyam, 2008).

The studies in the context of the stock market and behavioral biases show that investors are greatly influenced by their behavioral characteristics. Ariely, Loewenstein, and Prelec (2006), for instance, argue that the judgment of the fundamental values of assets is a tough task, so investors are likely to value their assets in relative terms, and mostly they become anchored to the previous buying prices. Similarly, Barber,
Odean, and Zhu (2009) find that the investors are likely to buy “attention grabbing” or “in news” stocks because these stocks are easy to recall. Moreover, the investors tend to buy previously owned stocks because they can easily recall them and also have some information about them.

Although the literature recognizes the role of heuristics in buy/sell decisions, the focus of the studies has mostly been on the developed markets. A direct linkage between heuristics and stock buying decisions has not been established so distinctively in the developing countries. The economies in the developing countries differ from those in the developed countries in many aspects, such as political stability, and law and order situations, technological developments, the use of information technology, the financial structure, the income level and education. Similarly, stock markets and investors are likely to differ between the developing and developed countries. Investors' attitudes and behaviors are shaped by environmental factors and it is likely that such behaviors are reflected in their decision making: for instance, Pompian (2006) suggests that the education is an important tool to overcome heuristics and biases. Thus, the behavioral biases may work differently due to differences in education levels between developed and developing countries. Moreover, the earlier studies in behavioral finance have mostly focused on a single heuristic and considered it to be operating independently. Yet developments in the behavioral decision theory specify that different heuristics often operate collectively and influence decisions and predictions (Czaczkes & Ganzach, 1996; Ganzach & Krantz, 1990, 1991). In terms of the methodology, most of the studies in behavioral finance use a qualitative approach to examine the influence of heuristics or biases on financial decisions; however, such findings have not been tested using statistical methods.

In this study, we examine three heuristics (anchoring and adjustment, representativeness and availability) in the context of Malaysian and Pakistani stock markets. We use both qualitative and quantitative approaches to study (i) the influence of these heuristics on investors' stock buying decisions, (ii) the differences between Malaysian and Pakistani investors in their susceptibility to these biases, (iii), whether the heuristics affect investors differently when they make buying decisions for themselves and/or for their clients, and (iv) the role of demographic factors such as education, experience and income level on investors' vulnerability to these heuristics.

Based on a mixed approach (qualitative and quantitative), this study contributes towards the literature on behavioral finance in terms of its context (developing countries) and methodological approach. The study has implications for financial decision makers in Malaysia and Pakistan (such as private investors, financial brokers, fund managers, and financial consultants) because the knowledge of relevant biases can prevent decision makers from falling prey to these biases. To collect the data, a self-constructed questionnaire is administered to the investors in the Malaysian and Pakistani stock exchanges. The results show that all three heuristics are likely to influence the investors' stock buying decisions, and this influence is similar across the sample countries, the type of investors, and the income groups. However, investors with more experience and more education are less affected. In the following section we briefly discuss these heuristics and their effect on investors' decisions.

1.1. Anchoring and adjustment

Anchoring and adjustment is a cognitive heuristic that arises out of people's tendency to estimate by starting from an initial guess and then making adjustments to the initial guess in order to arrive at the final estimate. The initial guess “anchor” may come from a variety of sources, such as the computation, a given value, the current value or the historical averages. Regardless of the source of the anchor, the adjustments up or down to reach the final estimates are insufficient. Use of such estimates in financial decision making therefore leads the investors to deviate from neo-classically prescribed “rational” norms. Anchoring and adjustment can thus lead the investors to the following consequences. Firstly, while making general market forecasts, the investors are likely stay “anchored” to the current market values and stay too close to them. Secondly, the “anchor” does not allow the investors or the security analysts to adjust to the new information, and they continue adhering closely to the original estimates. Thirdly, the current levels of the returns are used as “anchors” to forecast the rise or fall in the percentage values of an asset class. Fourthly, the current economic state of certain countries or companies may serve as the “anchor” for future prospects. Anchoring is a very common bias, applying to many areas of finance and business decision making, so investors and wealth management practitioners need to be keenly aware of this behavior and its effects.

1.2. Representativeness

Representativeness is a cognitive heuristic that refers to people's tendency to consider a characteristic to be the representative of the whole of the phenomenon regardless of whether the said characteristic relates to the phenomenon or not. Two primary interpretations of representativeness bias apply especially to individual investors: first, base rate neglect and second, sample size neglect. Base rate neglect refers to investors' tendency to contextualize the venture in a way that is easy to understand, when they are judging the soundness of a company for investment purposes. However, while making the judgment they are likely to ignore other related factors which may affect the value of the investment. The reason for relying on such stereotypes is that investors consider it as an alternative to the required research to evaluate the investment.

Sample size neglect refers to investors' tendency to base their judgment on an inadequate sample of data while analyzing a particular investment. They incorrectly consider the small sample size as being representative of the population. This phenomenon is called the law of small numbers. Although such numbers may reflect the current trend they cannot describe the properties of the whole population. Thus both base rate neglect and sample size neglect can lead investors to make erroneous investment or disinvestment decisions.
1.3. Availability

Availability is a cognitive heuristic which refers to the tendency to rely on already available information. According to Tversky and Kahneman (1974), people rely on the ease with which past experiences or information can be brought to mind to assess the probability of an event. Availability is found to be relevant to the stock market: Chiodo, Guidolin, Owyang, and Shimoji (2003) have found that it can cause under-reaction or overreaction in expectations and thus in the asset prices. Availability can be divided into four types: retrievability, categorization, narrow range of experience, and resonance. Retrievability refers to investors’ tendency to consider easily retrievable ideas as the most credible, although such ideas may not in fact be the most reliable source of information for evaluating the investment. Categorization relates to investors' tendency to match the new information to a certain reference: in other words, they try to fit the new information into the existing classification of such information. The narrow range of experience refers to the restrictive set of information which is used as a frame of reference to make a judgment about the future course of an object/investment. Finally, resonance relates to the tendency by individuals to look for the situations that match their own personal characteristics; such behaviors can be very dangerous in the context of investment decisions.

The rest of the study is organized as follows: Section 2 discusses the relevant literature on the anchoring and adjustment, representativeness and availability heuristics, while Section 3 is dedicated to the methodology and construction of the instrument. In Section 4, we discuss the results from the descriptive and regression. Finally, Section 5 concludes the study with a discussion on the implications and the direction for future research.

2. Literature review

The idea of heuristics was introduced by Tversky and Kahneman (1974) who suggest that individuals tend to use mental shortcuts or rule of thumb strategies in “decision making” under situations of uncertainty. These mental shortcuts or rule of thumb strategies are called “heuristics”. These heuristics turn complex situations into simple cognitive operations. In many cases such “mental short-cuts” may prove to be helpful in dealing with complex and uncertain situations; however there are greater chances that they lead to biased decisions. Some recent contributions highlight the usefulness of the heuristics however, researchers are far from reaching a consensus with respect to the effects of heuristics on decision making [see for instance (Carmines & D’Amico, 2015; Gigerenzer & Gaissmaier, 2011; Kurz-Milcke & Gigerenzer, 2007)]. In the following section, we discuss the findings from most relevant studies on three heuristics — i.e. anchoring and adjustment, representativeness and availability.

The literature on anchoring and adjustment in context of capital market is not matured, however, there are certain areas where anchoring is found to have a significant role for the financial decisions. For example, Degeorge, Patel, and Zeckhauser (1999) find that the executives aim to exceed salient earning per share (EPS) thresholds, thus, a specific level of EPS serves as an anchor for the executives which, in turn influences their decision. Moreover, the investors are not ready to bid the stock prices high enough when the stocks are at or near their peak historical prices because they are anchored to the historical highest (George & Hwang, 2004). Similarly, Cen, Hilary, Wei, and Zhang (2010) and Cen, Hilary, and Wei (2013) observe that while estimating the future success of firm, the investors are anchored to historical averages. They also find that for the firms with high industry median-adjusted forecasted earnings per share, stock returns happen to be higher than for firms with low industry median-adjusted forecasted earnings per share. This phenomenon is referred to as the cross-sectional anchoring of forecasted earnings per share effect. Johnson, Schnyter, and Liu (2009) find anchoring and adjustment in financial market; in comparison to the horserace. They explain that the advantage given by horse barrier position serves as anchor for horse betters’ probability judgment. Kaustia, Alho, and Putonnen (2008) find significant anchoring effects in long-term future stock return estimates in Scandinavian stock market. Williams (2010) finds that stock prices depend on four things one being anchoring level. Campbell and Sharpe (2009) identify anchoring effect of historical values in predictions of macroeconomic data such as the consumer price index or non-farm payroll employment by professionals, resulting in significant forecast errors. Corporate acquisitions are also found to be affected by the anchoring bias (Baker, Pan, & Wurgler, 2009). Anchoring and adjustment affects the extremity of earning forecasts (Amir & Ganzach, 1998).

Anchoring has also been reported to influence the various types of decisions in many different contexts. These include judicial sentencing decisions (Englich, Mussweiler, & Strack, 2006), personal injury verdicts (Chapman & Bornstein, 1996), the estimation of the likelihood of diseases (Brewer, Chapman, Schwartz, & Bergus, 2007), job performance evaluation (Latham, Budworth, Yanar, & Whyte, 2008), judges’ rankings in the competitions (Ginsburgh & Van Ours, 2003), and real estate acquisitions (Northcraft & Neale, 1987). In addition, anchoring has been shown to influence intuitive numerical estimations (Wilson, Houston, Etling, & Brekke, 1996), probability estimates (Plous, 1989), estimations of sample means and standard deviations (Lovie, 1985) and estimates of confidence intervals (Block & Harper, 1991), sales predictions (Hogarth, 1981), Bayesian updating tasks (Lopes, 1991), utility assessments (Schkade & Johnson, 1989), risk assessments (Lichtenstein, Slovic, Fischhoff, Layman, & Combs, 1978), preferences of gambles (Lichtenstein & Slovic, 1971), perception of deception and information leakage (Zuckerman, Koestner, Colella, & Alton, 1984), negotiation
outcomes (Ritov, 1996), and choices between product categories (Davis, Hoch, & Ragsdale, 1986). Although we did not find a study that directly linked anchoring bias to investors' decision to invest in stocks but studies on anchoring and stock market do suggest that it can influence such decision.

The studies on representativeness bias are very limited as compared to the anchoring and adjustment bias. However, there is some literature that clearly indicates the role of representativeness in financial decisions. For example, Johnson (1983) studies the use of representativeness heuristic in judgmental predictions of corporate bankruptcy and finds that the bankruptcy probability judgments are governed by the assessed similarity of the corporate financial data. Further, the forms of representativeness such as the base rate neglect and the sample size neglect are tested by Jacobs and Potenza (1991). They find that the judgment biases displayed by the adults are specific to the social domain and that they develop over time. However, greater use of the base rates develops at the same time in the object domain. Similarly, Cox and Mouw (1992) find that the representativeness leads to the misunderstanding of statistical concepts even when participants can witness their unreasonable approach towards the situation. Even after changing answers to incorporate appropriate information related to situation, the post-test responses revealed the presence of representativeness. Pham (1998) discovers that “how do I feel about it heuristics” to be present in the decision making. This heuristic arises when a representative of the target exists in mind and it generates feelings.

Kahneman, Slovic, and Tversky (1982) apply the representativeness bias to the world of sports, these concepts can also be translated to the financial decision making (Pompian, 2006). For instance, the concept of permitting the game “to go longer” in order to increase the probability that the stronger player wins can also apply to the investing, where it is called time diversification, which refers to the idea that the investors should spread their assets across ventures operating according to a variety of market cycles, giving their allocations plenty of time to work properly. Time diversification helps reduce the risk that an investor will be caught entering or abandoning a particular investment or category at a disadvantageous point in the economic cycle. It is particularly relevant with regard to the highly volatile investments, such as stocks and long-term bonds, whose prices can fluctuate in the short term. Holding onto these assets for longer periods of time can soften the effects of such fluctuations.

The availability heuristic, a common cognitive strategy in human decision making, provides an example of how the process of making a judgment influences the evaluation of relevant events. People's judgments of the probability and the frequency of the events are based on the ease with which the examples of those events come to the mind (Tversky & Kahneman, 1973). The availability heuristic is reported to affect the decision making in different spheres of the life. For example, Folkes (1988) finds that the availability influences the judgments about the product performance. Similarly, Barber and Odean (2002) show that the investors tend to invest in the attention grabbing stocks because, choosing a suitable stock or group of stocks among thousands of stocks in the market needs considerable effort and time. Investors however, tend to limit their search to only attention grabbing stocks. They also find that the purchase of stocks was nearly twice as compared to normal trading days during the high trading days. Moreover, the investors tend to buy more stocks of companies that are in the news. Their most relevant finding was that, the attention grabbing stocks which investors buy due to the availability bias did not beat the market and they never earn abnormal profits. Similarly, Barber and Odean (2002) illustrate a direct practical application of availability bias in individual finance. They show that the investors tend to deviate from rationality because they lack time, resources and the skills to process huge volume of data that ought to contextualize a truly “rational” stock purchase. Information that is literally available to investors simply isn’t always cognitively available. When pertinent information isn't available in this latter, practical sense, decisions are ultimately flawed.

Overall, there is enough evidence to suggest that the anchoring and adjustment, the representativeness and the availability heuristics likely to affect the investors while making the stock buying decisions. However, the literature on heuristics is limited with respect to its applications to the developing economies. As discussed in the introduction section, it is possible that the biases may affect the investors differently in the developing economies. Furthermore, most of the studies in behavioral finance use qualitative approaches to examine the influence of heuristics/biases on financial decisions, however, such findings have not been tested using statistical methods. This study bridges this gap by applying both qualitative and quantitative approach to these heuristics in context of Malaysian and Pakistani stock exchanges.

3. Methodology

3.1. Population, sample, analysis technique

Active investors and brokers in the Malaysian and Pakistani stock markets constitute population of this study. Considering the typical nature of population, convenient sampling has been used and a total of 1000 questionnaires are served to investors in the Malaysian and Pakistani Stock Exchanges. We received approximately 300 responses (160 from Pakistan and 140 from Malaysia), however; we dropped some of the questionnaires for incompleteness. A total of 240 usable questionnaires have been used in the data analysis (144 from Pakistan and 96 from Malaysia). Items’ descriptive analysis has been used as main

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2 At the initial stage of data collection, the sample consisted of five Southeast Asian countries (Indonesia, India, Malaysia, Pakistan and Thailand). However, we had physical access to stock markets in Malaysia and Pakistan only. Investors in rest of the countries i.e Indonesia, India and Thailand were requested through email to fill up the questionnaire. However, we did not receive any response from those investors despite several reminders. Accordingly, the data used in analysis comes from Malaysia and Pakistan only.

3 In case of Malaysia, some questions were slightly changed to incorporate local currency in numerical examples.
approach to analyze the data whereas, the correlation and the regression analyses have been used as supplementary approach to support the findings from the descriptive analysis.

3.2. Instrument for data collection

To capture the presence or absence of the heuristics, we develop a questionnaire with the help of and inspiration from Pompian (2006). In addition to three heuristics (anchoring and adjustment, representativeness, and availability), we also construct a variable for stock buying decision which measures the investors’ inclination to invest in the stocks as compared to other investment opportunities i.e. bonds etc. The questionnaire was pilot tested in two stages and checked for validity and reliability so that it can be used for statistical analysis. The generalizability of this questionnaire may however be limited because of the specific characteristics of the population.\(^4\) The questionnaire consists of 27 questions,\(^5\) each item captures the responses on 5 point Likert scale (from strongly disagree to strongly agree).\(^6\)

<table>
<thead>
<tr>
<th>Questions for Anchoring and Adjustment</th>
<th>Responses in %</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Malaysia</strong></td>
<td></td>
<td><strong>Pakistan</strong></td>
</tr>
<tr>
<td>1. Suppose that KSE-100 Index is currently at 13500, in your opinion, KSE-100 index at the end of year 2012 would be somewhat closer to the current level.</td>
<td>SDA</td>
<td>DA</td>
</tr>
<tr>
<td></td>
<td>1.0</td>
<td>5.2</td>
</tr>
<tr>
<td>2. Suppose you own a stock that is now at 52 weeks highest price level, you are likely to sell the security at this price level because in your opinion, it has achieved the maximum price level.</td>
<td>SDA</td>
<td>DA</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>3.1</td>
</tr>
<tr>
<td>3. Suppose price of a stock increased by 17% during the last year. Then the expected increase in this stock till the end of current year would be somewhat closer to 17%.</td>
<td>SDA</td>
<td>DA</td>
</tr>
<tr>
<td></td>
<td>1.0</td>
<td>13.5</td>
</tr>
<tr>
<td>4. Overall economic growth of Pakistan has been declining for the past many years. You foresee a similar trend of growth in coming years.</td>
<td>SDA</td>
<td>DA</td>
</tr>
<tr>
<td></td>
<td>1.0</td>
<td>8.3</td>
</tr>
<tr>
<td>5. Suppose you bought the stock of ABC Corporation at RS 12. Couple of months ago, the stock reached at RS 20. You thought to sell it then but somehow you could not. Unfortunately the stock dropped to RS 15 and currently trading at 15. Now to sell this stock, you are likely to wait until it returns to RS 20.</td>
<td>SDA</td>
<td>DA</td>
</tr>
<tr>
<td></td>
<td>3.1</td>
<td>43.8</td>
</tr>
<tr>
<td>6. Suppose you want to sell your house. Your real estate agent prices your home at 900,000. You did not receive any bids for some days. One day your agent tells you that local real estate prices are down by 10% on average and that you must also revise your ask price. Your new price is most likely to be closer to (1) 810,000, (2) 825,000, (3) 840,000, (4) 855,000, (5) 870,000</td>
<td>SDA</td>
<td>DA</td>
</tr>
<tr>
<td></td>
<td>16.7</td>
<td>5.2</td>
</tr>
<tr>
<td>7. Suppose that stock of ABC Corporation has outperformed the market for past several years, considering its past, this stock is expected to show similar performance in future.</td>
<td>SDA</td>
<td>DA</td>
</tr>
<tr>
<td></td>
<td>0.0</td>
<td>7.3</td>
</tr>
</tbody>
</table>

Table 1 Percentage responses to questions on anchoring and adjustment.

***SDA=Strongly Disagree, DA= Disagree, N=Neutral, A=Agree, SA=Strongly Agree

\[^4^\] For example it may only be used to analyze the buying behavior of investors in stock market.

\[^5^\] These 27 questions are in addition to those asked to capture demographic aspects such as age, gender, education, income, and experience.

\[^6^\] The questionnaire is appended at the end of this study.
for prices on the most recent historical percentage increase or decrease. For Malaysia, the responses are 76.1 (agree) versus 14.5 (disagree), while for Pakistan these are 80.5 versus 13.4. The investors are likely to anchor on the current economic conditions of a particular country; question four is asked to measure this tendency. The responses for Malaysia are 51 versus 9.3 and 49.3 versus 9.8 for Pakistan. The investors, who are biased with anchoring and adjustment, tend to anchor on historical maximum or minimum stock prices; question five measures this phenomenon. The responses to this question are 13.5 versus 46.8 for Malaysia and 47.3 versus 13.2 for Pakistan. In question six, five point measurement scale includes two options (4 and 5) very close to the given value of 900,000 representing high level of anchoring, while other options were fairly away from this value with option 1 exactly 10% less of this value. In case of Malaysia the responses for option “4” and “5” are 73.9 versus 21.9 for option 1 and 2; for Pakistan, these responses are 75.7 versus 20.2 respectively. Question seven measures the phenomena that the investors, who are exposed to anchoring and adjustment, tend to anchor to current economic conditions of a particular company. The responses for this question are 88.5 versus 7.3 in case of Malaysia and 89.6 versus 7 in case of Pakistan.

Table 2 shows investors’ responses to each question for representativeness from Malaysia and Pakistan. Interpretation of responses is same as in case of anchoring and adjustment. Question 8 measures the phenomena that while judging the likelihood of a particular investment outcome, investors often fail to accurately consider the sample size of the data on which they base their judgments. The responses are 84.4 versus 9.4 and 84 versus 8.3 for Malaysia and Pakistan respectively. Similarly the investors, who are biased with representativeness, tend to neglect the sample size while analyzing the performance of stocks, questions 9 measures this phenomenon. Responses are 83.4 versus 5.2 and 87.5 versus 6.9 for Malaysia and Pakistan respectively. Question 10 measures the fact that representativeness heuristic can lead investors to ignore the base reality and consider a given characteristic as representativeness of whole the scenario. Responses to this question are 87.5 versus 7.3 for Malaysia and 84 versus 6.3 for Pakistan. Question 11 gauges the investors’ tendency to determine the potential success of an investment in a company by contextualizing the venture in a familiar, easy-to-understand classification scheme is known as base rate neglect. For Malaysia, the responses are 57.2 versus 6.3 whereas for Pakistan these are 61.9 versus 3.5. Question 12 measures the investors' tendency to ignore the base reality. Responses for Malaysia are 86.5 versus 7.3 while for Pakistan, responses are 86.1 and 9.6. Investors’ tendency to show base rate neglect was further confirmed by asking the question 13. Responses are 81.3 versus 13.5 and 80.6 versus 14.6 for Malaysia and Pakistan respectively. The sample size neglect can lead the investors to wrong conclusion about the performance of analysts or money managers by taking too narrow sample period of their performance record; question 14 verifies this aspect. For Malaysia and

<table>
<thead>
<tr>
<th>Questions for Representativeness</th>
<th>Malaysia</th>
<th>Responses in %</th>
<th>Pakistan</th>
</tr>
</thead>
<tbody>
<tr>
<td>8 Suppose you are not satisfied with your analyst’s tips about stock purchase. Your friend tells you about his own analyst that he gave him three great stock picks over the past month. You are likely to consider your friend’s analyst as “successful” and decide to switch to this analyst.</td>
<td>SDA 4.2</td>
<td>DA 5.2</td>
<td>N 6.3</td>
</tr>
<tr>
<td>9 Suppose you analyzed the performance of a stock for last 10 quarters. You found that its performance during the initial 4 or 5 quarters has been poor but for last four quarters it has been excellent so you expect the same excellent performance from the stock in future.</td>
<td>SDA 2.1</td>
<td>DA 5.1</td>
<td>N 11.5</td>
</tr>
<tr>
<td>10 Troubled steel companies can either be (A) The companies that will go out of business; or (B) The companies that are likely to recover. In your opinion, a 75 year old steel manufacturing company, which is currently facing some business difficulties, belongs to category (A) because recently there have been many bankruptcies in steel industry.</td>
<td>SDA 2.1</td>
<td>DA 5.2</td>
<td>N 5.2</td>
</tr>
<tr>
<td>11 Suppose you are looking for a long term investment stock. You are told by your friend about a new IPO Company ABC and that most firms have placed a buy rating on this stock. You are likely to buy this stock.</td>
<td>SDA 0.0</td>
<td>DA 6.3</td>
<td>N 37.5</td>
</tr>
<tr>
<td>12 New IPOs can either be (A) the stocks constituting successful long term investment or (B) the stocks that will fail as long term investment. In your opinion, ABC Company (the new IPO) belongs to category (A) because IPOs are good long term investments.</td>
<td>SDA 0.0</td>
<td>DA 7.3</td>
<td>N 6.3</td>
</tr>
<tr>
<td>13 AAA rated municipal bonds can either be (A) safe municipal bonds or (B) risky municipal bonds. In your opinion, AAA rated bond issued by inner city of a racially divided country belongs to (B) because of potential riskiness of the country (racial disputes).</td>
<td>SDA 1.0</td>
<td>DA 13.5</td>
<td>N 5.2</td>
</tr>
<tr>
<td>14 Analysis of track record of a money manager for past six months suggests that on average money manager has performed better than others. Thus you are likely to conclude that his performance is result of skilled allocation and security selection.</td>
<td>SDA 1.0</td>
<td>DA 6.3</td>
<td>N 69.8</td>
</tr>
</tbody>
</table>

***SDA=Strongly Disagree, DA= Disagree, N=Neutral, A=Agree, SA=Strongly Agree
Pakistan 22.9 versus 7.3 and 26.4 versus 6.3 responses are received respectively.

Investors' responses to each question for availability from Malaysia and Pakistan are shown in Table 3. Investors' tendency to rely on readily available knowledge rather than examine other alternatives or procedures is known as availability bias. Four types of availability biases apply most to investors: retrievability, narrow range of experience, categorization and resonance. Retrievability refers to the ease with which the information can be recalled; question 15 measures retrievability. Responses are 91.7 versus 4.1 and 90.3 versus 6.3 for Malaysia and Pakistan respectively. Investors' tendency to categorize or call for information that matches a certain reference is known as categorization and this is measured through question 16. Responses for this question are 89.6 versus 9.3 for Malaysia and 82.4 versus 4 for Pakistan. Question 17 measures the extent to which certain, given situations matches with individuals' own, personal situations can also influence judgment and this is known as resonance. For Malaysia, the responses are 84.4 versus 6.2 while for Pakistan these are 81.3 versus 12.5. When a person possesses a too restrictive frame of reference from which to formulate an objective estimate, then narrow range of experience bias often results; question 18 gauges the narrow range of experience. 81.3 versus 11.5 are the responses for Malaysia and 84.1 versus 7.6 are ones for Pakistan. Presence of narrow range of experience among investors is further confirmed by asking question 19. Responses from Malaysia and Pakistan are 11.4 versus 19.8 and 17.4 versus 13.2 respectively. Finally, question 20 confirms the presence of narrow range of experience among investors for which responses are 89.7 versus 8.3 and 86.8 versus 6.9 for Malaysia and Pakistan.

Overall, the sum of “agree” and “strongly agree” responses dominates the sum of “disagree” and “strongly disagree” options in nearly all of the questions for each of the heuristics. The respondents' agreement in general to all questions supports the presence of the heuristics. The questions are posed to gauge whether or not the investors behave in predicted ways under anchoring and adjustment, representativeness and availability heuristics. Their agreement to such statements thus suggests that they are likely to make decisions which are under the influence of these heuristics. Moreover, the responses from the investors in Malaysia and Pakistan are on average similar, therefore we conclude that investors' vulnerability to these three heuristics is similar across these two countries.

### 4.2. Correlation and regression analysis

In order to support the results of descriptive analysis, we also perform the correlation and regression analyses. For this purpose, we take the median of responses from each respondent for each variable. For instance, there are 7 questions (items) for anchoring and adjustment, each respondent answers to all the 7 questions on a scale of 1 to 5. The median of these 7 responses from a single respondent constitutes the anchoring and adjustment variable. Thus, we have as many observations of anchoring and adjustment as the number of respondents. A similar procedure has been applied to each variable i.e. representativeness, availability and stock buying

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Table 3

<table>
<thead>
<tr>
<th>Questions for Availability</th>
<th>Responses in %</th>
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<td></td>
<td>Malaysia</td>
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<tr>
<td>15 Suppose you hear about a great stock tip from your friend who has a good stock market sense, he recommends you to purchase the stock of ABC Company. You are likely to buy some shares because your friend is usually right about these things.</td>
<td>SDA DA N A SA</td>
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<tr>
<td></td>
<td>1.0 3.1 4.2 34.2 37.5</td>
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<tr>
<td>16 Suppose you recently studied a success report about a generic drug maker company and you plan to purchase 100 shares of it. Right before you do, you hear on popular financial news that another drug maker company just reported great earnings and its stock is up by 10%. You are likely to take this information as confirmation that generics are a good area for investment and proceed with the purchase.</td>
<td>SDA DA N A SA</td>
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<td></td>
<td>1.0 8.3 1.0 47.9 41.7</td>
</tr>
<tr>
<td>17 What type of music do you like? In your opinion, the percentage of people who have similar taste in music as yours is more than the percentage of people who like the other types.</td>
<td>SDA DA N A SA</td>
</tr>
<tr>
<td></td>
<td>3.1 3.1 9.4 79.2 5.2</td>
</tr>
<tr>
<td>18 In your opinion, USA provides the best investment opportunities.</td>
<td>SDA DA N A SA</td>
</tr>
<tr>
<td></td>
<td>4.2 7.3 7.3 75.0 6.3</td>
</tr>
<tr>
<td>19 Suppose during a visit to a Hi Tech Company, you meet many of your college fellows who studied mathematics at college and were very good at it. You can conclude from this experience that good mathematics students tend to join the Hi Tech companies.</td>
<td>SDA DA N A SA</td>
</tr>
<tr>
<td></td>
<td>2.1 17.7 68.8 8.3 3.1</td>
</tr>
<tr>
<td>20 Suppose you are working in a fast growing Hi Tech company and you are asked which industry generates most successful investments? You are likely to refer to Hi Tech industry because you have witnessed this industry generating very good investments in the past.</td>
<td>SDA DA N A SA</td>
</tr>
<tr>
<td></td>
<td>0.0 8.3 2.1 87.5 2.1</td>
</tr>
</tbody>
</table>

***SDA=Strongly Disagree, DA= Disagree, N=Neutral, A=Agree, SA=Strongly Agree***
decision to compute the data for correlation and regression analysis. Results for the correlation analysis are reported in Table 4. The last row shows the relationship of stock buying decision with anchoring and adjustment, representativeness and the availability heuristics. These relationships are significant implying that heuristics are related to the stock buying decision.

In the next step, we perform the regression analysis based on Equation (1) which represents the stock buying decision as a function of three heuristics. The abbreviations $SBD$, $ANC$, $REP$ and $AVA$ respectively represent the stock buying decision, anchoring and adjustment, representativeness and the availability; $\lambda_1$, $\lambda_2$ and $\lambda_3$ are the regression coefficients for three heuristics, and $\epsilon$ is the error term.

$$SBD = \lambda_0 + \lambda_1 ANC + \lambda_2 REP + \lambda_3 A VA + \epsilon$$ (1)

The estimation results from regression analysis are reported in Table 5. Model 1 represents the main estimation model where the stock buying decision is regressed on three heuristics without considering the interactions of investors' type and the demographic factors such as country, level of education, level of income, and experience. The coefficients on all three heuristics are significant implying that the investors are influenced by the heuristics while investing in stocks. Although, it is difficult to interpret the magnitude and the direction of coefficients for the heuristics, the significance of these coefficients can be interpreted in term of the likelihood of the investors to make less than optimal decision due to the presence of the heuristics.

4.3. The interactive role of demographic characteristics

In addition to main regression, we estimate five more models to observe if the impact of heuristics on stock buying decision differs across, a) the sample countries b) the types of investors c) the education of the investors, d) the income level and, e) the level of experience. The details of these models along with the discussion of the results are given next.

$$SBD = \lambda_0 + \lambda_1 ANC + \lambda_2 REP + \lambda_3 A VA + \gamma_1 ANC*D(C) + \gamma_2 REP*D(C) + \gamma_3 A VA*D(C) + \epsilon$$ (2)

Equation (2) is structured to capture the differences among investors with respect to their vulnerability to the heuristics based on their economic association. Where, $D(C)$ is a dummy variable which equals 1 if the respondent is from Pakistan and 0 otherwise; $\gamma_1$, $\gamma_2$ and $\gamma_3$ are coefficients on the interaction term between the dummy variable and heuristics. The estimation results from Equation (2) are reported under model 2 in Table 5. The coefficients on all interaction terms are insignificant, indicating that the impact of heuristics on investors’ buying behavior is similar for investors across both the countries. Subsequently, the Equation (3) is constructed to examine the impact of heuristics on stock buying decision for different types of investors.

$$SBD = \lambda_0 + \lambda_1 ANC + \lambda_2 REP + \lambda_3 A VA + \gamma_1 ANC*D(Inv) + \gamma_2 REP*D(Inv) + \gamma_3 A VA*D(Inv) + \epsilon$$ (3)

where, $D(Inv)$ is a dummy variable which equals 1 if the respondent is an individual investor (uses his own money) and 0 otherwise; $\gamma_1$, $\gamma_2$ and $\gamma_3$ are coefficients on the interaction term between the dummy variable and heuristics. The results from Equation (3) are reported under model 3 in Table 5. The coefficients on the interaction terms of investors’ type with three heuristics are insignificant suggesting that the heuristics influence the stock buying decisions across all types of investors. The investors’ vulnerability to heuristics across different income group is determined through Equation (4).

$$SBD = \lambda_0 + \lambda_1 ANC + \lambda_2 REP + \lambda_3 A VA + \gamma_1 ANC*D(Edu) + \gamma_2 REP*D(Edu) + \gamma_3 A VA*D(Edu) + \epsilon$$ (4)

where, $D(Edu)$ is a dummy variable which equals 1 if the respondent’s education is higher than the median education level and 0 otherwise; $\gamma_1$, $\gamma_2$ and $\gamma_3$ are coefficients on the interaction term between the dummy variable and heuristics. The results from estimation of Equation (4) are reported under model 4. The coefficients on interaction terms are significant with signs opposite to the ones for the heuristics. These findings imply that the investors with higher level of education are less influenced by heuristics. The influence of heuristics on stock purchase decision across different income groups has been analyzed through Equation (5).

$$SBD = \lambda_0 + \lambda_1 ANC + \lambda_2 REP + \lambda_3 A VA + \gamma_1 ANC*D(Inc) + \gamma_2 REP*D(Inc) + \gamma_3 A VA*D(Inc) + \epsilon$$ (5)

where, $D(Inc)$ is a dummy variable which equals 1 if the respondent’s income is higher than the median income and 0 otherwise; $\gamma_1$, $\gamma_2$ and $\gamma_3$ are coefficients on the interaction term between the dummy variable and heuristics. The estimation results from Equation (5) are shown under model 5. The coefficients on interactions terms are not significant.

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7 We are thankful to the anonymous referees for the suggestion. Questions 12 to 27 are intended to capture the investors’ stock buying behavior. Median value of these questions gives the variable “stock buying decision” which has been used as dependent variable in regression analysis.
implying that the influence of heuristics is similar across investors with different income levels. Lastly, we construct Equation (6) to examine if the investors with more/less experience are affected differently.

\[
SBD = \lambda_0 + \lambda_1 AN + \lambda_2 RE + \lambda_3 A + \gamma_1 AN \times D(Exp) + 
\gamma_2 RE \times D(Exp) + \gamma_3 A \times D(Exp) + \epsilon
\]  

where, \(D(Exp)\) is a dummy variable which equals 1 if the respondent’s experience is higher than the median years of experience and 0 otherwise; \(\gamma_1, \gamma_2\) and \(\gamma_3\) are coefficients on the interaction term between the dummy variable and heuristics. The estimation results for Equation (6) are shown under model 6. The coefficients on the interactions terms are significant and have sings opposite to those on heuristics. This implies that the investors with more experience are less likely to fall prey to the heuristics.

Table 5
Regression analysis.

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
<th>Model 5</th>
<th>Model 6</th>
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<tbody>
<tr>
<td>Anchoring</td>
<td>-0.274***</td>
<td>-0.268**</td>
<td>-0.131**</td>
<td>-0.235**</td>
<td>-0.211**</td>
<td>-0.197**</td>
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<td></td>
<td>(0.088)</td>
<td>(0.125)</td>
<td>(0.057)</td>
<td>(0.075)</td>
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<td>(0.034)</td>
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<td>0.359***</td>
<td>0.349**</td>
<td>0.316**</td>
<td>0.377**</td>
<td>0.298**</td>
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<td></td>
<td>(0.096)</td>
<td>(0.149)</td>
<td>(0.147)</td>
<td>(0.152)</td>
<td>(0.109)</td>
<td>(0.139)</td>
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<tr>
<td>Availability</td>
<td>0.548**</td>
<td>0.588***</td>
<td>0.459***</td>
<td>0.556***</td>
<td>0.561***</td>
<td>0.595***</td>
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<td></td>
<td>(0.088)</td>
<td>(0.159)</td>
<td>(0.140)</td>
<td>(0.187)</td>
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<tr>
<td>Constant</td>
<td>1.432***</td>
<td>1.413***</td>
<td>1.441***</td>
<td>1.378***</td>
<td>1.339***</td>
<td>1.355***</td>
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<tr>
<td></td>
<td>(0.263)</td>
<td>(0.272)</td>
<td>(0.267)</td>
<td>(0.475)</td>
<td>(0.331)</td>
<td>(0.387)</td>
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<tr>
<td>Adjusted R-Squared</td>
<td>0.53</td>
<td>0.71</td>
<td>0.73</td>
<td>0.69</td>
<td>0.75</td>
<td>0.68</td>
</tr>
<tr>
<td>No. of Observations</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
<td>240</td>
</tr>
<tr>
<td>Shapiro–Wilk W Test (Probability)</td>
<td>0.073</td>
<td>0.109</td>
<td>0.089</td>
<td>0.136</td>
<td>0.191</td>
<td>0.117</td>
</tr>
<tr>
<td>Breusch–Pagan (Chi Square)</td>
<td>12.05**</td>
<td>11.48**</td>
<td>7.48**</td>
<td>9.13**</td>
<td>9.98**</td>
<td>11.01**</td>
</tr>
<tr>
<td>Multicollinearity (VIF)</td>
<td>2.29</td>
<td>18.8</td>
<td>13.5</td>
<td>16.1</td>
<td>21.5</td>
<td>19.2</td>
</tr>
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</table>

Note: The table reports the results of regression analysis. Model 1 through 6 show the estimation results corresponding to Equation (1) through (6). The corrected standard errors are reported in the parenthesis, subscripts ***, ** and * show the significance of relationships at 1%, 5% and 10% levels respectively. Breusch–Pagan test rejects the null hypothesis of no heteroscedasticity therefore we use robust standard errors for calculation of z value. Variance inflation factor (VIF) is high for model 2 to 6, however these models include dummy variables and their products in which case we can ignore the higher values of VIF. Insignificant values of Shapiro–Wilk W Test suggest that the dependent variable is normally distributed.
Overall evidence from correlation and regression analysis supports the results from items’ descriptive analysis and we conclude that three heuristics namely anchoring and adjustment, representativeness and availability, influence the investors while buying the stocks in the stock market. However, this effect is lesser for the investors with higher level of education and higher experience.

5. Conclusion

The influence of heuristics on investors’ decisions is well recognized in the behavioral finance literature. However, the focus has mostly been on the developed markets. A direct linkage between heuristics and stock buying decisions has not been established so distinctly in the developing countries, as their economies are different from the developed ones in many aspects, such as political stability, law and order situations, technological developments, the use of information technology, the financial structure, income level and the education etc. In the same vein, the stock markets and investors across developing and developed economies are likely to differ. Investors’ attitudes and behaviors are shaped by environmental factors and it is likely that such behaviors are reflected in their decision making. For example, Pompian (2006) considers education is an important tool to overcome heuristics and biases. Therefore, the behavioral biases may work differently due to differences in education levels between developed and developing countries. Moreover, early research in behavioral finance has mostly focused on a single heuristic and considered it to be operating independently. Nevertheless, the developments in behavioral decision theory specify that different heuristics often operate collectively and influence decisions and estimations (Czaczkes & Ganzach, 1996; Ganzach & Krantz, 1990, 1991).

In this study, we apply quantitative and qualitative approaches to study the influence of three heuristics (anchoring and adjustment, representativeness and availability) on investors’ stock buying decisions in the context of Malaysia and Pakistan. In doing so, we examine the differences in investors’ vulnerability to these heuristics across the sample countries and the investor types. We also examine the influence of demographic factors such as education, income and experience. The data has been collected through a self-constructed questionnaire from investors in the Malaysian and Pakistani stock exchanges. An items descriptive analysis has been used as the main approach to analyze the data, while correlation and regression analyses have been used as a supplementary approach to support the findings from the descriptive analysis.

The results from the descriptive analysis support the presence of all three heuristics, and are also supported by the correlation and regression analyses where all three heuristics are significantly correlated to and have a strong influence on investors’ stock buying decisions. The influence of heuristics on stock buying decisions is similar across the sample countries, the type of investors, and the income groups. However, the investors with a higher level of education and more experience are less affected by the heuristics.

The implications of these heuristics can be far reaching for investors. First, investors who are biased in relation to anchoring and adjustment are more likely to purchase a stock that may behave against their expectations. For example if investors are anchored to historical high stock prices and expect the stock to recover, they may continue holding their losing stocks for too long (Odean, 1998). Similarly they may become anchored to historical percentage increase in prices and expect a similar trend in the future may lead them to buying the overvalued stock. Investors can also become anchored to historical performance of companies which may actually deviate from their trends of past performance because of certain uncontrollable economic factors. Second, the investors who are exposed to representativeness bias are more likely to buy a wrong stock for their portfolio. For example, they may base their buying decision on insufficient past data, this may lead them to buy a stock that may not have the potential to meet their expectation in future (sample size neglect). Investor may also fall prey to another type of representativeness bias (base rate neglect), for example, looking for a long-term investment stock they may end up with stock that is not in fact a long-term investment (i.e. New IPO companies). Third, most investors, if asked to identify the “best” mutual fund company, are likely to select a firm that engages in heavy advertising. In addition to maintaining a high public relations profile, these firms also “cherry pick” the funds with the best results in their fund lineups, which makes this belief more “available” to be recalled. In reality, the companies that manage some of today’s highest-performing mutual funds undertake little to no advertising. Investors who overlook these funds in favor of more widely publicized alternatives may exemplify retrievability/availability bias. Investors will choose investments based on information that is available to them (advertising, suggestions from advisors, friends, etc.) and will not engage in disciplined research or due diligence to verify that the investment selected is a good one.

Heuristics are also likely to influence other areas of financial decisions making such as investing, financing, asset management, and dividend policy decisions. The study can be extended to cover these areas of corporate finance as well. Moreover, given the limitations of a primary data gathering technique such as questionnaire, it would be worthwhile to consider an alternative measure such as investors’ trading data, to capture the heuristics.

Acknowledgement

We are thankful to the editor Borsa Istanbul Review, the anonymous referees and the participants of Postgraduate Conference on Economics, Public Administration and Business (PCEPAB) for the valuable suggestions and comments.
Appendix

Questionnaire

Dear respondent
Assalam o Alaikum

This questionnaire is aimed at investigating the impact of heuristics (anchoring and adjustment, representativeness and availability) on investor’s stock buying decision. The information obtained through this questionnaire will be kept confidential and used solely for educational purposes within the scope of this study. We are grateful for your cooperation.

You are requested to read the questions and answer using scale 1 through 5.

Demographic Characteristics

<table>
<thead>
<tr>
<th>Gender</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Experience (Years)</td>
<td></td>
</tr>
<tr>
<td>Years of Education</td>
<td></td>
</tr>
<tr>
<td>Monthly Income (Dollars)</td>
<td></td>
</tr>
</tbody>
</table>

Investor Type

Your decision to invest in stocks applies to
1. Yourself (Your Own Money) 2. Your Clients (Other People’s Money)

anchoring and Adjustment

1. Suppose that KSE-100 Index is currently at 13500, in your opinion, KSE-100 index at the end of year 2012 would be somewhat closer to the current level.

2. Suppose you own a stock that is now at 52 weeks highest price level, you are likely to sell the security at this price level because in your opinion, it has achieved the maximum price level.

3. Suppose price of a stock increased by 17% during the last year. Then the expected increase in this stock till the end of current year would be somewhat closer to 17%.

4. Overall economic growth of Pakistan has been declining for the past many years. You foresee a similar trend of growth in coming years.

5. Suppose you bought the stock of ABC Corporation at RS 12. Couple of months ago, the stock reached at RS 20. You thought to sell it then but somehow you could not. Unfortunately the stock dropped to RS 15 and currently trading at 15. Now to sell this stock, you are likely to wait until it returns to RS 20.

6. Suppose you want to sell your house. Your real estate agent prices your home at 900,000. You did not receive any bids for some days. One day your agent tells you that local real estate prices are down by 10% on average and that you must also revise your ask price. Your new price is most likely to be closer to:
   1. 810,000 2. 825,000 3. 840,000 4. 855,000 5. 870,000

7. Suppose that stock of ABC Corporation has outperformed the market for past several years, considering its past, this stock is expected to show similar performance in future.
Representativeness

8. Suppose you are not satisfied with your analyst’s tips about stock purchase. Your friend tells you about his own analyst that he gave him three great stock picks over the past month. You are likely to consider your friend’s analyst as “successful” and decide to switch to this analyst.

9. Suppose you analyzed the performance of a stock for last 10 quarters. You found that its performance during the initial 4 or 5 quarters has been poor but for last four quarters it has been excellent so you expect the same excellent performance from the stock in future.

10. Troubled steel companies can either be (A) The companies that will go out of business; or (B) The companies that are likely to recover. In your opinion, a 75 year old steel manufacturing company, which is currently facing some business difficulties, belongs to category (A) because recently there have been many bankruptcies in steel industry.

11. Suppose you are looking for a long term investment stock. You are told by your friend about a new IPO Company ABC and that most firms have placed a buy rating on this stock. You are likely to buy this stock.

12. New IPOs can either be (A) the stocks constituting successful long term investment or (B) the stocks that will fail as long term investment. In your opinion, ABC Company (the new IPO) belongs to category (A) because IPOs are good long term investments.

13. AAA rated municipal bonds can either be (A) safe municipal bonds or (B) risky municipal bonds. In your opinion, AAA rated bond issued by inner city of a racially divided country belongs to (B) because of potential riskiness of the country (racial disputes).

14. Analysis of track record of a money manager for past six months suggests that on average money manager has performed better. Thus you are likely to conclude that his performance is result of skilled allocation and security selection.

Availability Bias

15. Suppose you hear about a great stock tip from your friend who has a good stock market sense, he recommends you to purchase the stock of ABC Company. You are likely to buy some shares because your friend is usually right about these things.

16. Suppose you recently studied a success report about a generic drug maker company and you plan to purchase 100 shares of it. Right before you do, you hear on popular financial news that another drug maker company just reported great earnings and its stock is up by 10%. You are likely to take this information as confirmation that generics are a good area for investment and proceed with the purchase.

17. What type of music do you like? In your opinion, the percentage of people who have similar taste in music as yours is more than the percentage of people who like the other types.

18. In your opinion, USA provides the best investment opportunities.
19. Suppose during a visit to a Hi Tech Company, you meet many of your college fellows who studied mathematics at college and were very good at it. You can conclude from this experience that good mathematics students tend to join the Hi Tech companies.


20. Suppose you are working in a fast growing Hi Tech company and you are asked which industry generates most successful investments? You are likely to refer to Hi Tech industry because you have witnessed this industry generating very good investments in the past.


**Stock Buying Decision**

21. With the given investment opportunities, you would prefer to invest in stocks rather than the fixed income securities.


22. You base your stock buying decisions on stock’s historical information such as historical returns, highest or lowest historical prices etc.


23. Your stock buying decisions are based on company’s fundamentals such as dividend payout, cash flows and earnings growth etc.


24. You are likely to buy the stocks that have high trading volumes.


25. You prefer to invest in stocks that are frequently advertised or cited in news.


26. You are likely to buy the stocks that recently outperformed the market.


27. You would buy the stock that has been a loser in recent past because you expect it to recover in future.


**Thank you Indeed**

References


