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Innovation, Sentiments, Great Market Crash and Stock Market Value Reflection: A Case of Over-Confidence and Attribution Bias of Stock Investors

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ABSTRACT

This study investigates how technological innovations and sentiments of the investors influenced the stock market, which may lead to the great market crashes. This investigative research inspected what and how over-confidence and attribution biases of the investors in the stock market and determined the factors that influenced the act of investors in the market which ultimately affects the market. This study used the case-study interview approach to get the wide range of the data from the diverse and well equipped respondents. The practical implication of the study is that it delineates the factors and how they can be controlled so that the market conditions can be improved.

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Introduction

On a closer note, we can see that the stock market has positively affected the flow of cash and tangible income. Thomas (1900) concluded that return on invested capital clearly shows the company's growth and standing. The capital and the cash flow should positively have indicated to allow the common factors to intervene and get benefits from the shares (Conant, 1905). The earnings from shares usually based on the overall perception that plays a fundamental role for the buyers, which instead of blocking (saving) his money in bank have to be positively - indicated enough to invest. This process increases the trust and allows the market to portray positive values. There are reasons, theoretical factors that determine the outlook of the stock. Usually, the observers in the market assumes that Stock Market is different from any other market and transaction done varies from others.

The meter indicates the supply of un-invested capital and demand for it. The different classes of the all indicators excites the buyers to invest on proper and upwards trends to earn more profit (Chakraborti, 2006). Coronnello, Tumminello, Lillo, Micciche, and Mantegna (2007, June) reported that all types of prices whether commodities or properties have significant values and index, which defines the buyer attitude towards buying and selling. Certainly, nobody will look to buy share if the value is going down. The denominators and numerators are the main factors in determining the ratio of values among the purchasable shares e.g. if the value of HP Machine is 80 cents to 100 and Dell is 90 over 100 than the positive option is to go with dell as the rational value is higher and profitable.

In stock markets, "*Active Stocks"* plays a role as it fluctuates almost totally and marginally on perception, which based on global socio-political and eco-political changes (Easley, Kiefer, O'hara, & Paperman, 1996; Karoui & Patel, 2020). The most recent example of *Oil Prices, which* have plunges and now are slightly higher to production cost. There is no committed element involved in Oil pricing; it is very dependent on eco-political changes. On the contrary, the Oil production and distribution giant "ARAMCO" has hinted to sell the shares to meet the high expenses. Easley, Kiefer, and O'Hara (1997) reported that despite the low prices algorithm and unseen scenario, companies are still competing to buy the shares. This process is the main example of "*Active Stock*". The buyers know about the fluctuation but on the same time, they are aware that this property has passed the criticism test and in future, it will affect positively. They are more tilted towards speculation and amount of free capital in market.

On the other hand, *"Gilt Edged"* securities require tangible and solid grounds for investment as they are not linked with Speculated Values Margins (Kenny, 2020). They meant for "trust fund" investment (Wormell, 2012). They are slightly dependent on the changes that occur or influenced by the economic situation- prosperity. It progresses more when the community pay taxes and established a well-maintained budget. The market flow will increase if the investor buys a share when initially the money is in the form of fixed amount (saving). They buy new shares and it opens the room for more investment. This increases the price of "*securities*, as demand increases supplies". This factor increases if prolonged reaches the point where supply of capital equals the demand. Capital should never have applied beyond its actual amount (Easley, Hvidkjaer, & O'hara, 2002), if it happens, the Bank equalizes its cash flow by foreign reserves and direct investment (Oliver & Rutterford, 2020). The banks then have to dilute the financial pressure and the speculated factors becomes the market reality. This scenario most of the time resulted in negative outcome and stocks fall in price along with the capital which failed to show their appearance in stock market for "Security Bonds bidding or purchase" (Logue & Jarrow, 1978). The security prices go down, as the demand is limited.

In this case, where the cash flow has stuck, the bank helps the government by using the term "Public Borrowing" through taxes or by putting in the bank in the form of cash deposit (Gao, Lee, & Murphy, 2020; Heller, 1975). In this phase and relation to Gold-supply in the form of credit, it directly reflects the supply of free capital and causes immediate fluctuation in the market. The markets takes immediate actions by increasing the interest rates and halts the loan. This measure makes more difficult for the buyer to attain profit on margin. The debt payment or a foreign bill can have adjusted thru Gold as it replaces the securities.

A very well maintained balance has to put in place in order to derive the economy. There should be equal measures taken to demonstrate the limit of each economical-parameters. A Market is always available for free flowing capital. This capital, if not properly balanced (economically) can create certain panic and negative outcome and this scenario can become very hard for the banks to absorb (Bosworth, Collins, & Reinhart, 1999; Choi, 2020). Buyers will introduce themselves to "Stock Shares" when they feel monetary comfort and trust regardless of any economical term. Minimum and Maximum threshold level should be determined to validate the intent of the transaction from all perspectives (Fried & Spamann, 2020). Many economically crunched situations can have reinstated with appropriate measures as Gold-Credit is always available for all sorts of economies but utilizing this source will open the speculations and harms the capital and investment related institutes for the long run.

Cooke (1964) discussed about companies that distribute their earnings to investor in the form of dividend this in most cases they get in return on yearly basis. There is no tangible security for this type of investment. Market can fall despite the reasonable standing of the corporation result in complete or partial loss. Security ownership in a corporation is signified by the possession of a security. Those who hold common stock exert influence through the election of a board of directors and participation in corporate decision-making, with each share carrying one voting right (Cole, 1966). Common stockholders occupy the lowest rung in the ownership hierarchy, and in the event of liquidation, their claim to the company's assets is subordinate to that of bondholders, preferred shareholders, and other debt holders who must be fully satisfied first.

As per Foster and Stine (2006), the simulated study exercised by students to get the result of risk and wealth management when investing by using dice simulation in three categories. Actual investment can have derived by simulated investment (Kristiansen & Severin, 2020). One investment is conservative and compressed as it is affect by inflation. On the other side, second investment matches as risky stock, which perceived performing in late 1990's during the dotcom bubble. A third is extremes in between the two and behaves normally like the overall stock market. To simulate the value of these investments, the student employed a method involving the use of three dice, each of a distinct color. These investments were denoted as Red, White, and Green, a choice influenced by the convenience of obtaining dice in these specific colors through Microsoft Excel. All participants not only gained an understanding of the significance of statistical variances but also acquired insight into the statistical similarities that exist in the real world through this exercise. Consequently, this exercise fostered an appreciation among all participants for the relevance of variance when analyzing data. The consolidated outcome of this practice surprise many as RED, which is the least-expected portfolio; have become the leader at the end of the simulation. Same rules were used to derive the result for all dices even the simulator accelerated the time just to add the volatility factor with a hope that this will wipe the lucky factor.

This whole process demonstrated to let the participant/students knows that Warren Buffet is not just lucky. He has invested a lot in stocks like others and earned thru conservative investment. In this exercise, it is only to point out that, it is difficult in many ways to differentiate between Skill and luck.

Literature Review

Psychologist usually distinguished between individualistic and collectivistic cultures. In Individualistic culture, individual consider themselves independent person and have free approach towards any entity, whereas many aspects of social contexts (Huppert, Cowell, Cheng, Contreras-Ibáñez, Gomez-Sicard, Gonzalez-Gadea, & Malcolm-Smith, 2019) link collectivistic culture. Some survey shows that US believes that they are above average and have more capabilities than others, they are overconfident. Same goes for overconfidence in cross-culture societies such as Taiwan, Singapore and Japan it is noticed that they are overconfident when it comes to general knowledge but in peer-comparison overconfidence is stronger in US (Ortoleva & Snowberg, 2019).

The variations in momentum profits across different countries pose challenges for both behavioral and conventional risk-based theories. Several questions remain for risk theorists to address. They must clarify why momentum returns are perceived as risky in the United States and Europe but not in Japan and most East Asian nations. Additionally, they should investigate why individuals in certain countries exhibit the psychological biases responsible for momentum effects while those in other countries do not. It is well-established in behavioral research that culture significantly influences stock return patterns. The interpretations and behaviors of investors differ across diverse cultures and are susceptible to distinct biases (Weiger, 2023).

Cultural base plays an extremely significant role in the development of investor's sentiments in the market (Parveen, Satti, Subhan, Riaz, Baber, & Bashir, 2023). Sentiment is defined as the variations in risk tolerance or the tendency to exhibit either an exceedingly optimistic or pessimistic outlook when considering cash flow projections (Edelen, Marcus, & Tehranian, 2010). It has impact on asset pricing. Sentiment increment is directly proportionate to investors who immediately started to seek investment allocations. Similarly, a decline in sentiment has a contrasting impact, resulting in an elevation of the anticipated return linked to a specific set of fundamentals. There is a wide thought that Sentiment affects the value in terms of asset allocation and pricing. As we noticed in common markets that tangible allocation of risk increases the factors of fluctuation thus enables the market to flow towards the lines given equal volatility in sentiments. In addition to this, over-confidence sentiment causes beta herding (Gustiarum & Kusumawardhani, 2023).

Put plainly, market volatility is substantially affected by the risk factor associated with the various kinds of investor's sentiments (Liu & Lu, 2023). This dependency on risk is based on various factors, which can be divided into two main categories. The first category consists of research that associates various sentiment indicators with the returns of individual stocks. The second category focuses on connecting proxies for overall sentiment to broader market returns or returns within a market sector susceptible to sentiment influences. The first category is more transient in nature, requiring swift and concrete outcomes and being influenced by the trading actions of retail investors. The second category has a lasting influence and is contingent on specific sectors rather than the overall market movement or outcome, such as small-capitalization stocks or stocks that do not pay dividends.

Relative Sentiment applies to the market return average and it has been noticed that the retail segment is always higher even in past years when the Market flow was not as fast as today. Various outcomes were derived and put forward to get the accurate results and there is some interpretation of the results which shows that retail investors periodically drive market valuations away from fundamentals, resulting in extra or over added money or /underinvested without any proper limitation and position as prices started to decline/rise periodically back to original value. This scenario is because of so many factors which involves overconfidence, attribution, and heuristics. People with overconfidence and attribution bias most of the time ignore the fundamentals at the time of decision making (Michael, 2023).

Conversely, there exists a straightforward formula that applies to common stocks, which are self-reliant and flexible. It does not require or involve market sentiment. Consequently, stock prices are influenced solely by factors such as corporate earnings, public relations announcements, and the overall economic and financial health of institutions (Cole, 1966). There are two primary avenues for earning money from stocks: through dividend payments, as previously discussed, or by selling the stock when its price increases. The price of the share will definitely rise if there is expected growth in revenue. This increase will be determined by stock holders by looking at the overall outlook of the corporation. Stocks are initially released as Initial Public Offering (IPO). Before the IPO, the company initially entitles are senior executive to participate and buy as an incentive to gain profit with company momentum. The company promises and give surety to the stock/share holder that it grows in future and gives maximum revenue which will result in increase in stocks/shares prices (Duruigbo, 2011). Overall, we have followed the literature writing structure from top tier research papers in the field (e.g., hmed, Nawaz, & Rasheed, 2019; Anser et al., 2022; Anser et al., 2020; Chang et al., 2022; Gulzar, Ahmad, Hassan, & Rasheed, 2022; Hameed et al., 2019; Hameed, Muhammad Naeem, Rasheed, & Moin, 2023; Iqbal et al., 2021; Kanwal, Pitafi, Rasheed, Pitafi, & Iqbal, 2022; Kanwal, Rasheed, Pitafi, Pitafi, & Ren, 2020; Khalid, Weng, Luqman, Rasheed, & Hina, 2022, 2023; Khan, Liu, Khan, Liu, & Rasheed, 2020; Khizar, Iqbal, & Rasheed, 2021; Rasheed, Pitafi, Mishra, & Chotia, 2023; Rasheed & Weng, 2019; Rasheed, Weng, Umrani, & Moin, 2021; Rasheed, Yousaf, & Noor, 2011).

Methodology

In this research, a qualitative approach was employed to gain a comprehensive understanding of respondents' perspectives. It was ensured that no prior information or potential responses were disclosed to the participants. The study utilized an interview-based multi-case study methodology, following the principles outlined by Eisenhardt (1989) and Eisenhardt & Graebner (2007). Data were collected through semi-structured interviews to acquire in-depth insights into market investors. Employing multiple cases allowed for the identification of recurring patterns and underlying relationships by closely examining thematic elements and evidence. A detailed case study procedure, as presented in Table 1, guided the research (Haddock-Millar, Sanyal, & Müller-Camen, 2016).

The primary focus of the interviews centered on the study's theme: understanding investor stress and their tendency toward loss-averse behavior, as well as the utilization of game theories to mitigate these tendencies. The study explored various context-specific perspectives, enabling a comparative analysis of approaches to applying game theory in situations where investors exhibit a loss-averse bias, especially during periods of heightened stress. The study's population comprised stock market experts from Pakistan and the USA. Semi-structured interviews were conducted to extract comprehensive information. In total, 22 interviews were scheduled, consisting of 16 face-to-face interviews and 6 open-ended interviews with top executives and market experts (refer to Table 2). However, only 16 respondents provided detailed and logically aligned responses, meeting the study's requirements. As a whole researchers followed the methodology as recommended in previous research in social sciences (e.g., Luqman, Masood, Shahzad, Imran Rasheed, & Weng, 2020; Luqman, Masood, Weng, Ali, & Rasheed, 2020; Masood, Feng, Rasheed, Ali, & Gong, 2021; Moin, Omar, Ali, Rasheed, & Abdelmotaleb, 2022; Moin, Omar, Wei, Rasheed, & Hameed, 2021; Murtza & Rasheed, 2023; Naeem, Weng, Hameed, & Rasheed, 2020; Nand, Pitafi, Kanwal, Pitafi, & Rasheed, 2020; Nisar & Rasheed, 2020; Nisar, Rasheed, & Qiang, 2018; Rasheed, Malik, et al., 2020; Rasheed & Murtza, 2023; Rasheed, Okumus, Weng, Hameed, & Nawaz, 2020).

Table 1. Case study procedures

Case study steps

1. Clarification of Research Focus and Scope
2. Selection of Individual Holdings to Form 'Multiple Cases'
3. Refinement of Research Questions
4. Determination of Suitable Research Tools and Protocols, Including Qualitative Data Collection Methods Such as Semi-Structured Interviews and Focus Groups
5. Identification of Suitable Participants: A Diverse Range of Participants with Experience in Environmental and Human Resource Management/Development Initiatives, Representing Different Aspects of the Case Studies
6. Data Collection Period for PSX Pakistan: November - December 2019
7. In-Depth Data Analysis Within Each Case at the Single Subsidiary Level for PSX
8. Development of Overarching Themes for PSX
9. Data Collection Period for NYSE USA: February 2012
10. Detailed Data Analysis Within Each Case at the Single Subsidiary Level for NYSE
11. Development of Overarching Themes for NYSE
12. Comparative Analysis Across Cases – PSX and NYSE
13. Comparison with Existing Literature: Identification of Commonalities and Discrepancies
14. Achievement of Data and Literature Saturation
15. Dissemination of Findings: Preparation of Reports and Articles

Table 2. Interview respondents.

Job role	***Pakistan***	***USA***
Category		
Investment Analyst	4	1
Mutual Fund Manager	2	1
Stock Regulatory body Executive	1	1
Experienced investor(s)	4	2
Total participants	11	5

The job roles outlined in Table 2 indicate that all participants possess extensive knowledge of stock market investment strategies, procedures, and an overall understanding of market fluctuations. The primary interview questions were derived from existing literature in the fields of loss aversion, stress, and game theory in the context of investments. These interview questions can be found in Table 3.

The interview sessions commenced with a broad-ranging discussion covering topics such as investor biases in the stock market, pivotal life-altering decisions made by investors, the psychological perspectives of investors, the market's sensitivity, and the inclination of investors toward risk-taking. Subsequently, the interviews delved into specific areas well-documented in the literature, including the utilization of statistical tools to mitigate risks associated with investments. These one-on-one interview sessions typically spanned between 25 and 45 minutes, with some extending up to 45 minutes for each participant.

Table 3. Interview protocol and questions.

Interview protocol
Introduction of the Interviewer/s and Participants
Explanation of the Research Procedure
Presentation of the Research's Purpose, encompassing its Goals and Objectives
Deliberation on Potential Research Results, Ethical Considerations, and Obtaining Informed Consent
Overview of the Interview/Focus Group Structure

Research themes and specific questions
Biases among Investors in the stock market
1. What are the primary types of biases that investors may exhibit when making stock investments?
2. Could you please discuss the diverse impacts of these biases on market returns?
3. To what degree are investors' strategies influenced by the policies enforced by regulatory bodies in the stock market, such as SECP in Pakistan?

The life-shaping decisions of the investors
1. In your view, do you believe that the decisions investors make regarding stock investments have a profound impact on their lives?
2. What makes stock investment favorable in the context of Pakistan and the USA?

Psychological aspects of Investors' perceptions
1. Could you please identify the two or three critical psychological perceptions that investors typically hold when making stock investments?
2. To what degree do investors acknowledge their potential biases in the market? How important is it for them to address these biases? What role do you play in assisting them with these challenges, and what are the implications of your involvement in such circumstances?

Stock market's sensitivity
1. To what extent is the PSX/NYSE responsive to external factors?
2. Within the PSX/NYSE, what level of market efficiency, whether it's weak, semi-strong, or strong, do you perceive to exist?

Risk-taking propensity of investors

1. Do you believe that a significant portion of investors tends to exhibit a loss-averse disposition? If so, what strategies can be employed to motivate them toward a more risk-tolerant outlook?

2. When investors are under stress, do you think they tend to lean either toward higher or lower risk?

About you

1. Could you please elaborate on the statistical techniques that hold significance for you when making investment decisions in the context of PSX/NYSE?

2. From your perspective, what are the key factors that enable rational investments without the

Results & Discussion

As per the expert's opinion, stock options could mitigate financial limitations by substituting cash wages at the point of issuance. Employee stock option exercises, which are equity grants by firms to their employees, generate significant cash flows for the firm. The exercise of the said option is based on the investor's response towards the market movements. And this response is based on the type of bias exist at the time of taking investment decision in the market. Moreover, these cash flows can replace the high external financing costs, especially in regions where the demand for investment is substantial. The utilization of stock options would result in heightened investments in cash flows. The responsiveness of investment to the proceeds from option exercises tended to be more pronounced in companies expected to encounter elevated financing costs (Babenko, Lemmon, & Tserlukevich, 2011).

Remarkably, the stock repurchase actions did not exhibit a significant connection with cash inflows originating from option exercises in companies characterized by substantial external financing requirements when compared to those facing elevated marginal financing expenses. In contrast, it was observed in firms that had ready access to external financing. On the contrary, there was insufficient substantial evidence to support the notion that companies redirected resources from investments to share repurchases as a means of mitigating dilution effects resulting from stock option exercises, a proposal previously suggested by Bens et al. (2003).

In terms of biases of the investors in the stock market, experts think that there are so many types of biases exist in the investors at the time of investment in the stock market, but most prominent are overconfidence and attribution biases. Because, people think that they can make their own decision in an efficient based on the information they have but at the time of adverse consequences they blame to the market factors and someone else, instead of learning. Secondly, a prolonged market downturn that prevents investment may result if analysts and investors continue to exhibit overconfidence bias and the stock price falls. Lastly, in terms of proper implication of policies from the regulatory body, the investor would properly ensure it.

In terms of life shaping decision of the investors, they think you may diversify your risk and increase your growth potential by investing in various asset classes. Numerous well-known corporations, including: Apple, Disney, and Coca-Cola, are publicly traded, providing ordinary people the chance to acquire stock in these significant and prosperous enterprises. Investors have the option of purchasing smaller businesses with the potential for future growth in addition to large-cap equities. The primary market function of the stock market is to raise long-term capital for firms, while the secondary market serves as a venue for the trading of securities. By combining resources, stock exchanges promote investment and give companies access to capital for company growth. Moreover, the stock market also functions as an economic barometer and can provide crucial cues to economic policymakers about the effects of their decisions on interest rates, taxation, and currency volatility on various economic sectors. In the past, the KSE has been a good predictor of growth and a leading indicator of changes in the actual economy. Lastly, domestic businesses can access international savings through foreign flows thanks to the stock exchange. This is crucial for Pakistan, where there is a significant saving-to-investment gap of about 5% of GDP. Therefore, maintaining a healthy level of foreign portfolio inflow is crucial for maintaining the optimal level of capital accumulation required to sustain real GDP growth of 4%+.

In terms of investor's perception, they think according to popular belief, despite several democratic reforms over the past ten or so years, Pakistan has not managed to achieve appreciable stability. Investors continue to view Pakistan as a nation where military involvement and frequent political changes are the norm. On the plus side, they see Prime Minister Imran Khan as a sign of progress in the area of economic governance. A common investor's perception of brokers as still in charge on the trading floor endures despite the demutualization of the stock exchange and the addition of a Chinese consortium that owns 40% of the Pakistan Stock Exchange (PSX) and the separation of ownership and management of the exchange. On the other hand, Tuesday saw a dramatic decline in US markets. The Dow dropped 454 points, or 1.3%, marking the worst drop since March and moving into negative territory for 2023. Given the persistence of Russia's war in Ukraine and the precarious state of US-China ties, geopolitical dangers are still high. Meanwhile, oil prices are still not far from their highest point in more than a year. However, despite the mounting problems, several analysts still believe that seasonality is the primary cause of this drop.

In terms of risk-taking propensity of investors, they think US markets opened higher and closed Monday's session in a narrow range. Small- and micro-cap stocks, however, provided the direction for the upward movement and closed above their respective trend lines. This might be a hint that investors are much more risk-averse than they have been in recent months. For the first time this year, the iShares Microcap ETF (IWC) and the iShares Russell 2000 ETF (IWM) for small- and micro-cap stocks outperformed the large-cap indexes for the month of October. Investors are eager to pursue gains, maybe as a result of the major U.S. stock market indexes' extension of their run of quiet trading days. The S&P 500 (SPX), Nasdaq 100 (NDX), and Dow Jones Industrial Average (DJX) all displayed a downward trend in their average true ranges for the sixteenth consecutive trading day. This is frequently a bullish indicator, but it can also mean that markets are not increasing as quickly as they were in earlier weeks and months. Investors become impatient and look for bigger development prospects when such behavior occurs. On the other hand, in Pakistan majority of the investors are highly risk-averse in nature because of high level of uncertainty in the market. Overall, authors have discussed results in accordance with the previous studies' recommendations (e.g., Peng, Liang, Fatima, Wang, & Rasheed, 2023; Pitafi, Rasheed, Kanwal, & Ren, 2020; Rana, Gaur, Singh, Awan, & Rasheed, 2022; Rasheed, Aslam, & Sarwar, 2010; Rasheed, Hameed, Kaur, & Dhir, 2023; Rasheed, Humayon, Awan, & Ahmed, 2016; Rasheed, Jamad, Pitafi, & Iqbal, 2020; Saleem, Rasheed, Malik, & Okumus, 2021; Sarwar, Aslam, & Rasheed, 2010; Sarwar, Danyal Aslam, & Imran Rasheed, 2012; Umrani et al., 2022; Hong, Rasheed, Sigala, & Ahmad, 2023; Wang, Azam, Murtza, Shaikh, & Rasheed, 2023; Weng, Rasheed, & Yue, 2020; Yousaf, Humayon, Rasheed, Ahmed, & Danish, 2014; Yousaf, Rasheed, Hameed, & Luqman, 2020; Yousaf, Rasheed, Kaur, Islam, & Dhir, 2022; Zhang, Rasheed, & Luqman, 2020; Zhang, Wu, & Rasheed, 2020).

Conclusion

The concept that technological revolutions can elucidate significant fluctuations in stock market values has gained increasing prominence in the literature on financial market economics (Nicholas, 2008). According to the prevailing perspective in this body of work, the soaring stock market prices of the 1920s are often attributed to speculation and irrational exuberance. This research offers insights, into the world of stock markets. It sheds light on how various factors impact cash flow and influence investor decision making. Notably it becomes evident that investor biases, those related to overconfidence and attribution play a role in shaping investment choices. These biases often lead investors to make decisions that may not align with evaluation ultimately contributing to fluctuations in stock prices. Additionally, the cultural context in which investors operate significantly influences their sentiments and behavior within the market. Therefore, this research highlights the importance of investors being aware of their biases and considering the influence of factors. Moreover, it underscores the significance of diversifying risk and making informed decisions when participating in the stock market.

Furthermore, this study emphasizes how stock options have the potential to alleviate constraints for firms in regions where there is high demand for investment. This presents a strategy to boost cash flow and enhance investments within a dynamic market environment. Understanding these intricacies is crucial, for both investors and policymakers as it equips them with navigation tools to tackle the complexities of the stock market successfully. Investors who acknowledge the influence of biases, cultural factors and the changing dynamics of markets can make wiser decisions that ultimately contribute to a stronger and more prosperous stock market ecosystem.

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