

Investor Reaction to Extreme Price Shocks in Stock Markets

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Abstract— Investor reaction to extreme price shocks in stock markets is a critical area of study in financial economics, as it provides insights into market dynamics and investor behavior. Extreme price shocks, often triggered by unexpected events or economic news, can lead to significant volatility and uncertainty in the markets. These shocks challenge the traditional assumptions of rational behavior and efficient markets, revealing a more complex interplay of psychological, institutional, and informational factors that drive investor decisions. This study explores how different types of investors, ranging from individual retail investors to large institutional players, respond to extreme price shocks and the subsequent impact on market stability and efficiency. The research indicates that investor reactions to extreme price shocks are highly heterogeneous. Retail investors often exhibit panic selling or herding behavior, driven by fear and uncertainty, which can exacerbate market volatility. In contrast, institutional investors, equipped with more resources and sophisticated risk management strategies, may adopt a more measured approach, either by taking advantage of the price dislocations to buy undervalued assets or by implementing strategies to hedge against further risks. This divergence in behavior between retail and institutional investors can lead to temporary market inefficiencies, creating opportunities for arbitrage but also posing risks for systemic stability if not properly managed.

Index Terms- Stock Markets, Financial Economics, Volatility, & Uncertainty

I. INTRODUCTION

The Efficient Market Hypothesis (EMH) claims that stock values accurately reflect their true worth and account for available market information. According to EMH, it is impossible to outperform the market consistently through timing or stock picking. However, studies have shown that EMH does not always accurately reflect the market. These deviations from fair value are known as EMH anomalies. One anomaly is the "over-reaction effect," discovered by

De Bondt and Thaler in 1985. They observed that stock prices often reverse course after experiencing extreme fluctuations. They concluded that investors overreact to information, leading to subsequent price corrections that restore equilibrium.

This research examines whether the world's top 10 stock markets (based on market value) react excessively or insufficiently to significant market shocks (extreme price changes). When the actual daily return of a market index exceeds two standard deviations from its average daily return, an "event" is defined as such a shock. A reversal in stock prices following an event indicates overreaction bias, whereas a continuation of the trend suggests underreaction. Markets are considered informationally efficient if no unusual returns follow price shocks. If markets exhibit under- or over-reactions, profitable trading strategies can be developed by exploiting this information.

This study offers two notable contributions to financial research. Firstly, it is the pioneer study to conduct a comparative analysis of over- or under-reaction bias across ten major global stock markets (USA, UK, Japan, China, Hong Kong, Canada, Germany, India, Switzerland, and Australia). Secondly, in contrast to earlier studies that focused on daily price movements, this study incorporates intra-day price data. This allows for a more comprehensive examination of market behavior over shorter periods. Notably, market corrections can occur within short durations, such as minutes or hours. Consequently, intra-day analysis becomes essential to capture these dynamic changes. In our study, we discovered signs of excessive or insufficient market reactions in every stock market we analyzed, with the exception of Japan and the United Kingdom. The pace at which markets adjust their prices after major events varies. In China, markets

correct price biases within hours of shocks, while in Switzerland and India, the correction can take up to six days. Notably, most markets respond differently to positive and negative shocks. This implies that investors' reactions to price changes depend on whether they are gains or losses. This research endeavors to focus on cross-country reactions to extreme price shocks on stock markets. There are underlying assumptions that this would highlight underlying patterns of country-specific differences in investor behavior during such more volatile periods of the market. Specific research questions to be addressed are:

1. How does extreme price shocks in stock markets differ in the trading volume, price volatility, and sentiment of investors in various countries?
2. What is the underlying influence of financial market development, regulatory framework, and institutional quality that make investors react to the extreme price shocks across the countries?
3. Have there been considerable differences in investor behavior between developed and emerging markets in the response to extreme price shocks?
4. What are the implications of our findings for investors, policymakers, and market regulators for the management and mitigation of extreme market events?

By using a multi-method approach of combining quantitative market data with qualitative insights from regulatory frameworks and institutional contexts in each country, we attempt to answer these questions. Therefore, through comparative study of extreme price shocks across the countries, the paper contributes to existing research on financial markets' dynamics and policy discussion on the resilience of markets and investors' protection within a continuously developing interconnected global financial system.

Key aspects include:

1. Investors Behavior:

Investigate how, in extreme cases of price shock, investors emotionally and cognitively react—to panic selling, herding behavior, or rational decision-making.

2. Market Dynamics:

Exploring the impact of extreme price shocks on market liquidity, volatility, and trading volume, as

well as the transmission of shocks across different asset classes and markets.

3. Institutional Factors:

Examining the role of regulatory frameworks, market infrastructure, and investor protection mechanisms in shaping investor reactions to extreme market events.

4. Cross Country Variations:

Identifying differences in investor behavior across countries with different levels of economic development, financial market sophistication, and cultural norms.

5. Policy Implications:

Assessing the effectiveness of policy interventions, such as circuit breakers, trading halts, and regulatory reforms, in mitigating the adverse effects of extreme price shocks and maintaining market stability.

II. REVIEW OF LITERATURE

Vaibhav Lalwani – 2019

This study explores if stock markets in the world's top 10 most valuable countries overreact or underreact after extreme price movements (called "events"). It uses data from 2009 to 2016 and examines stock returns every 10 minutes. The researchers calculated how average returns changed over six days after an event. They found that in eight out of ten countries, investors seemed to overreact or underreact emotionally, creating opportunities for profit.

Madhumita Chakraborty – 2019

This study examines stock market behavior in the top ten countries based on their market capitalization after significant price fluctuations. Events are classified as extreme price movements that exceed a specified threshold. Researchers analyzed intra-day stock returns for a period from June 2009 to May 2016. Using average cumulative returns and abnormal returns over a six-day period following the event, the study reveals that psychological biases among investors resulted in over- or under-reactions in eight out of the ten countries, offering potential profit opportunities.

Shahid Raza – 2023

In emerging stock markets, news events greatly influence market behavior. This study examines how economic conditions, financial policies, and political news affect the KSE-100 index in Pakistan using daily market news signals. Through regression analysis, the study identifies the best model for predicting index movements. The findings show that political and global news strongly impact the KSE-100 index. While blue-chip stocks are perceived as safer investments,

III. RESEARCH METHODOLOGY

RESEARCH GAP

Although there is a large body of empirical research on investor behaviors during stock market fluctuations, there remains a clear research gap regarding the cross-country analysis of investor reactions to extreme price shocks. Although some such studies have been conducted across individual countries, there is scarce comparative analysis across different markets. The gap is even more apparent in light of the globalization of financial markets and the interconnectedness of economies, suggesting that understanding investor responses to extreme price shocks in a given market may not necessarily capture the dynamics at play in others

NEED OF THE STUDY

This study on investors' reactions to extreme price shocks in stock markets across the board is interesting on several counts. First, understanding how investors react to sudden and drastic fluctuations in the prices of stocks is important to comprehend how to manage risk and forecast market dynamics. By analyzing cross-country variations in investor behaviors, we may uncover some unique market characteristics, regulatory environments, and sentiments among investors regarding the reactions to extreme events. For one, this will help in the development of better risk assessment models and investment strategies that consider global interlinkages. The study may also inform policymakers and market participants of possible vulnerabilities and areas for market infrastructure and regulation improvement. Besides, the study may become very important in the increasingly integrated global economy, given that the study finds commonalities and differences in investor reactions across various countries. As a result, this

study meets an important need not only in academics but also in practice, as it provides broad insights into investor behaviors during extreme price shocks in different stock markets.

PURPOSE OF THE STUDY

This paper intends to analyze the impact of extreme price shocks on stock markets in a multi-country setting, which will try to explain how the investors react to such extreme price shocks. The study explores investor behavior with regard to extreme price shocks, such as sudden market crashes and rapid price surges, and their implications for market stability and regulation. Conducting the same research in a cross-country setting will bring together differences and similarities in investors' reactions within diverse market environments, regulatory regimes, and cultural contexts. Such a study will help the development of more resilient markets, improvement of risk management practices, and investor confidence. The important contribution of this study to our knowledge of investor behavior under stress is to perform rigorous empirical analysis and comparative assessments for developing more robust and effective risk management strategies in global financial markets.

PROBLEM STATEMENT

The phenomenon of extreme price shocks in stock markets poses an important but complex area of research, particularly regarding the reactions of investors across different countries. There is an amazing dearth of investigation into the fact that every investor, irrespective of their socio-economic and cultural background, reacts differently in extreme movements of the stock price. This research work aims to fill a significant hole in the existing literature by analyzing the response of investors to extreme movements in the stock price across various national markets. Such research will help to understand the various forms in which different investor classes react to sudden and drastic changes in stock prices. This research will look at how investors from different nations react to extreme movements in stock prices and try to find the factors that cause diverse reactions, including their implications for market stability, investor decision-making, and regulatory arrangements. Findings from this investigation will provide pragmatic recommendations for investors,

policymakers, and market participants across the world.

OBJECTIVES OF THE STUDY

1. This paper investigates cross-country variation in investor reaction.
2. To Assess the Impact of Market Characteristics on Investor Behavior During Extreme Price Shocks.

RESEARCH DESIGN

The empirical model to assess investor response to extreme price shocks in the stock markets of various countries will incorporate an integrated and structured approach to the research methodology. First, the study will be scoped to identify which countries will be involved and what timeframe—that is, whether the study will focus on one day or a period of days or weeks—is going to be under examination. In this study, any extreme price shock will be of interest, whether a sudden market crash or a rapid rise in stock prices, in an attempt to capture as much diversity as possible of investor responses. The data required includes daily or intra-day stock prices from the selected countries, and it includes the indices of trading volumes and such sentiment indicators as the VIX or news-specific indices.

From the literature review, a number of hypotheses will be formulated, and to account for other factors influencing the results, appropriate control variables will be incorporated. Finally, each hypothesis will be tested using appropriate statistical techniques—be it the event study methodology or regression analysis—to find what relationship, if any, there is between extreme price shocks and the response of the investor. The relationships also would be associated with country-specific analyses to find out the variability across different markets. Finally, based on its significance and implications, the results will be interpreted and will prove very important to investors, policymakers, and market participants at large.

RESEARCH TYPE

Descriptive in nature

Sampling Technique: Random sampling technique was utilized for the purpose of the study.

Random Sampling: Random sampling is a technique where participants are selected from a population in a purely random manner, ensuring that each member has an equal chance of being included.

IV. DATA COLLECTION METHODS

Primary data are those that have been personally collected or have been obtained with direct observation. It refers to original information collected specifically for a study from the field of inquiry. It mainly obtained through the survey method using a questionnaire as the tool.

Secondary data refers to information that has already been gathered and subjected to statistical analysis. It developed through different articles, publications, journals and websites for the company.

Population: 100

Sample Size: 50

Sample Unit: Bora bandha.

QUESTIONNAIRE

For data collection, a well-designed questionnaire with clear questions was utilized. The survey instrument consisted of closed-ended questions, multiple-choice options, and Likert-scale items.

TOOLS USED: Google forms, Microsoft Excel, Charts, Bar graphs and Chi-square test.

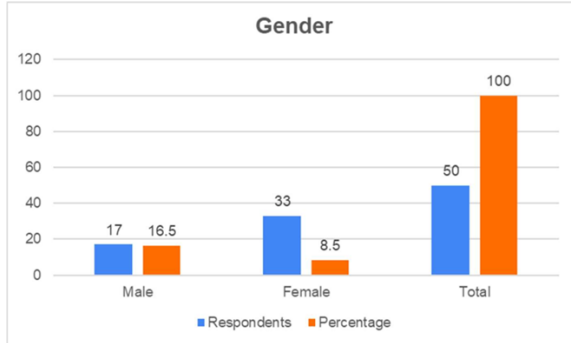
HYPOTHESIS:

HO: Investors in countries with higher levels of financial market development and investor protection are expected to exhibit more resilient reactions to extreme price shocks compared to investors in countries with less developed financial markets and weaker investor protection.

H1: Investors in countries with higher levels of financial market development and investor protection are not expected to exhibit more resilient reactions to extreme price shocks compared to investors in countries with less developed financial markets and weaker investor protection.

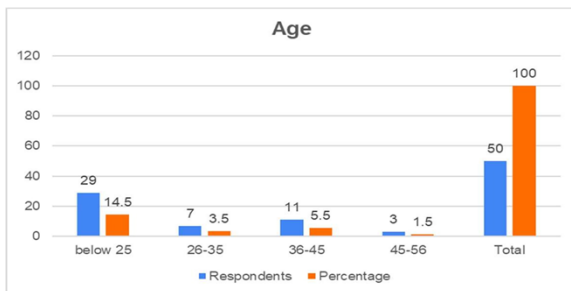
DATA ANALYSIS

1. Gender	Male	Female	Total
Respondents	17	33	50
Percentage	16.5	8.5	100



Interpretation: The total respondents are 50 out of which male are 16.5% and female are 8.5%

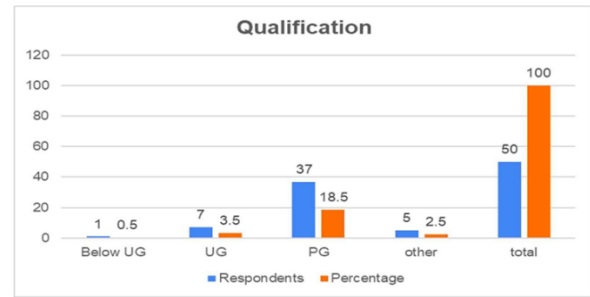
2. Age	below 25	26-35	36-45	45-56	Total
Respondents	29	7	11	3	50
Percentage	14	35	5.5	15	100



Interpretation: Majority of the respondents followed in range below 25 with 14.5%

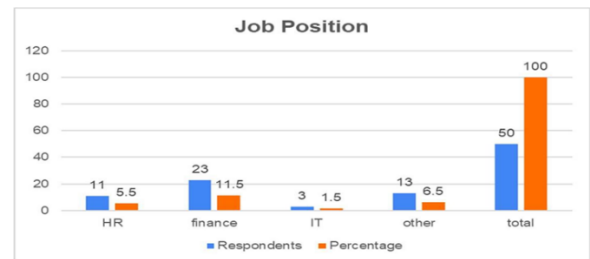
3. Qualification	Below UG	UG	PG	other	total
Respondents	1	7	37	5	50
Percentage	0.5	3.5	18.5	2.5	100

Interpretation: The most respondents are from PG of 18.5 as UG of 3.5% which follows with the difference of 15%



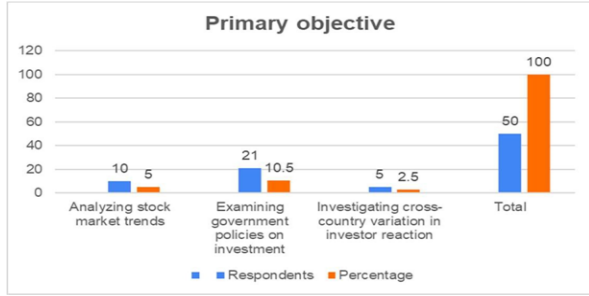
Interpretation: Most of the respondents are which finance with 11.5% and next follows with other of 6.5%.

4. Job Position	HR	finance	IT	other	total
Respondents	11	23	3	13	50
Percentage	5.5	11.5	1.5	6.5	100

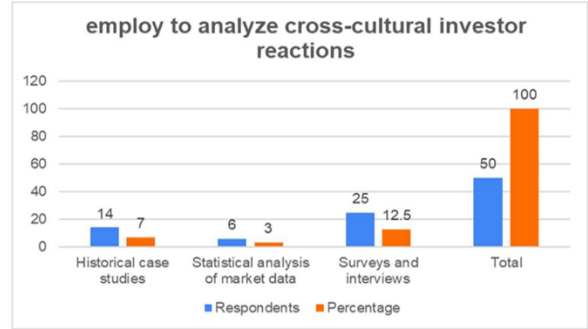


Interpretation: Most of the respondents are which finance with 11.5% and next follows with other of 6.5%.

5. What is the primary objective of the paper?	Analyzing stock market trends	Examining government policies on investment	Investigating cross-country variation in investor reaction	Total
Respondents	10	21	5	50
Percentage	5	10.5	2.5	100



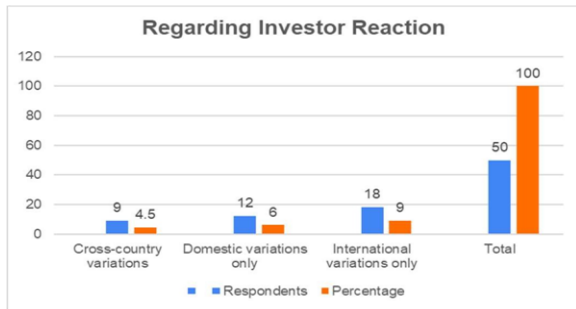
Interpretation: Most of the respondents are examining government policies on investment with 10.5%.



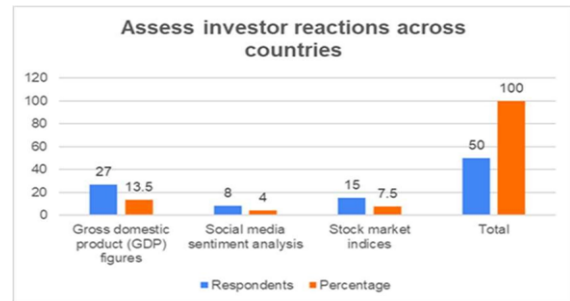
Interpretation: Most of the respondents are analyzed with surveys and interviewed with 12.5%.

6. What does the paper focus on regarding investor reaction?	Cross-country variations	Domestic variations only	International variations only	Total
Respondents	9	12	18	50
Percentage	4.5	6	9	100

8. What type of data is likely to be used to assess investor reactions across countries?	Gross domestic product (GDP) figures	Social media sentiment analysis	stock market indices	Total
Respondents	27	8	15	50
Percentage	13.5	4	7.5	100



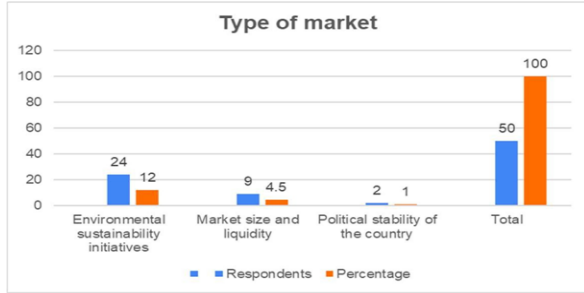
Interpretation: Most of the respondents came through international variations with 9%.



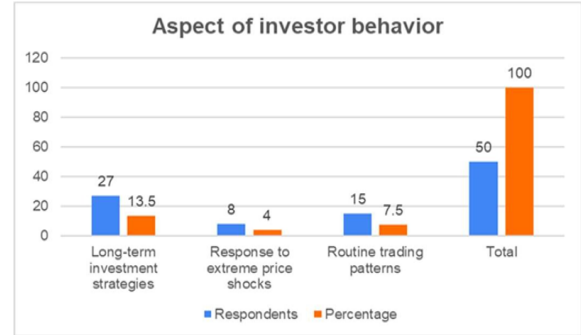
Interpretation: Most of the respondents are with 13.5% in GDP figures

7. Which method does the paper likely employ to analyze cross-country investor reactions?	Historical case studies	Statistical analysis of market data	Surveys and interviews	Total
Respondents	14	6	25	50
Percentage	7	3	12.5	100

9. What type of market characteristics might be considered in the study	Environmental sustainability initiatives	Market size and liquidity	Political stability of the country	Total
Respondents	24	9	2	50
Percentage	12	4.5	1	100



Interpretation: Most of the respondents are with 12% for environmental sustainability initiatives.



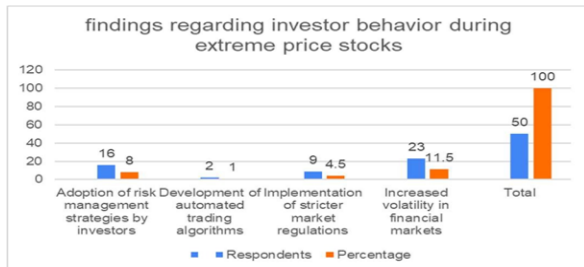
Interpretation: Most of the respondents with 13.5% in long-term investment strategies

10.What could be a potential implication of the findings regarding investor behavior during extreme price shocks	Adoption of risk management strategies by investors	Development of automated trading algorithms	Implementation of stricter market regulations	Increased volatility in financial markets	Total
Respondents	16	2	9	23	50
Percentage	8	1	4.5	11.5	100

STATISTICAL TOOL FOR ANALYSIS

HO: Investors in countries with higher levels of financial market development and investor protection are expected to exhibit more resilient reactions to extreme price shocks compared to investors in countries with less developed financial markets and weaker investor protection.

H1: Investors in countries with higher levels of financial market development and investor protection are not expected to exhibit more resilient reactions to extreme price shocks compared to investors in countries with less developed financial markets and weaker investor protection.



Interpretation: Most of the respondents with 11.5% for increasing volatility in financial markets.

	High Impact	Low Impact	Marginal Rows Total
Male	19(10.58) [6.7]	4 (12.42) [5.71]	23
Female	4(12.42) [5.71]	23 (14.58) [4.86]	27
Marginal columns Total	23	27	50

11.Which specific aspect of investor behavior does the study focus on	Long-term investment strategies	Response to extreme price shocks	Routine trading patterns	Total
Respondents	27	8	15	50
Percentage	13.5	4	7.5	100

The chi-square statistic is 22.9801. The p-value is < 0.00001. Significant at $p < .05$.

The chi-square statistic with Yates correction is 20.3319. The p-value is < 0.00001. Significant at $p < .05$.

CONCLUSION

Since p value is less than 0.5, H1 is Rejected and H0 is Accepted. So, there Investors in countries with higher levels of financial market development and investor protection are expected to exhibit more resilient reactions to extreme price shocks compared to investors in countries with less developed financial markets and weaker investor protection.

FINDINGS

- The total respondents are 50 out of which male are 16.5% and female are 8.5%. Majority of the respondents followed in range below 25 with 14.5%.
- The most respondents are from PG of 18.5 as UG of 3.5% which follows with the difference of 15%.
- Most of the respondents are which finance with 11.5% and next. follows with other of 6.5%.
- Most of the respondents are examining government policies on investment with 10.5%. Most of the respondents came through international variations with 9%.
- Most of the respondents are analyzed with surveys and interviewed with 12.5%. Most of the respondents are with 13.5% in GDP figures.
- Most of the respondents are with 12% for environmental sustainability initiatives. Most of the respondents with 11.5% for increasing volatility in financial markets. Most of the respondents with 13.5% in long term investment strategies.

SUGGESTIONS

To systematically investigate the hypothesis regarding investor resilience to extreme price shocks based on the level of financial market development and investor protection, a multifaceted research methodology should be adopted. Firstly, a thorough data collection process is essential, encompassing metrics of financial market development such as market liquidity, depth, and efficiency, alongside measures of investor protection like legal frameworks, regulatory oversight, and enforcement mechanisms across a diverse range of countries. This data forms the foundation for comparative analysis, enabling the identification of

correlations and trends between market maturity, investor safeguards, and responses to significant price fluctuations.

Integrating quantitative analysis through statistical modelling further strengthens the research framework. By constructing regression models that incorporate variables representing financial market development, investor protection, historical price shock data, and investor reactions, it becomes possible to discern statistically significant relationships and infer potential causal links. This holistic research approach not only validates or refutes the initial hypothesis but also generates actionable insights for policymakers, financial institutions, and investors aiming to navigate and mitigate the impact of extreme market events.

CONCLUSION

In conclusion, the objective of assessing the impact of market characteristics on investor behavior during extreme price shocks underscores the intricate interplay between financial market development, investor protection, and the reactions of investors to volatile market conditions. Through a comprehensive research approach encompassing data collection, case studies, surveys, interviews, and statistical modelling, significant insights have been gained.

The findings from this research shed light on the crucial role of regulatory frameworks, market transparency, and investor safeguards in shaping investor behavior during turbulent market phases. Furthermore, the mixed-methods approach employed in this study not only validates the initial hypothesis but also contributes nuanced understandings of investor sentiments, risk perceptions, and decision-making strategies amidst market uncertainties. These insights have practical implications for policymakers, financial institutions, and investors, emphasizing the importance of continuous efforts to enhance market stability, transparency, and investor protections to foster resilient and informed investment behavior in the face of extreme market fluctuations.

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