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Analyzing the impact of income levels and market volatility perception on investment patterns of retail investors in Ahmedabad city

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Abstract: The influence of income levels and perceptions of market volatility on the investing habits of retail investors in Ahmedabad City is investigated in this research. In order to get a thorough knowledge of investing behaviour, a mixed-methods approach was used, which included quantitative and qualitative investigations. Statistical methods such logistic regression, chi-square tests, and analysis of variance were used to examine correlations among important factors after data was gathered from 500 individual investors via organised questionnaires. Those with higher incomes are more likely to trade and diversify their portfolios, according to the results, which show a clear income gap in investing habits. individuals who are positive on the market often have more diverse portfolios, according to the research, which also finds a strong correlation between how individuals perceive market volatility and their techniques for diversifying their investments. Financial advisers, lawmakers, and investors may all benefit from these findings as they provide light on retail investors' actions and patterns of thought on risk and how to tailor investment strategies to suit clients with varying income levels and comfort levels with uncertainty.

Keywords: Financial Advisers, Investors, Income Levels, Ahmedabad, Market Volatility

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INTRODUCTION

Once on the periphery of financial markets, retail investors have emerged as influential participants, reshaping the dynamics of stock markets globally. Unlike institutional investors who manage large sums of money on clients' behalf, retail investors invest their personal funds in financial instruments, including stocks, bonds, and mutual funds. The significance of retail investors in market dynamics lies not only in their growing numbers but also in the unique characteristics and behaviors they bring to the trading floor. Examining the role of retail investors unveils a complex interplay of factors that influence market liquidity, volatility, and overall sentiment.[1]

One of the defining features of retail investors is their sheer numbers. Traditionally, institutional investors dominated financial markets, with access to sophisticated research, tools, and large capital pools. However, technological advancements, particularly the proliferation of online trading platforms, have democratized market access, allowing individual investors to participate in real-time trading activities. The rise of retail trading apps, social media forums, and commission-free trading has catalyzed a surge in retail investor participation, amplifying their impact on market dynamics.[2]

Market liquidity, a critical component of efficient markets, is significantly influenced by the participation of retail investors. By engaging in the buying and selling of stocks, retail investors contribute to the overall

liquidity of the market. The increased liquidity introduced by retail investors can enhance market efficiency, reducing bid-ask spreads and ensuring that securities can be traded at fair and transparent prices. On the flip side, the collective actions of retail investors can also contribute to heightened market volatility, especially in the presence of speculative trading or "herd behavior."[3]

The "herd behavior" phenomenon among retail investors can lead to abrupt and substantial price movements. Social media platforms, online forums, and investment communities have become virtual gathering places where retail investors share investment ideas, tips, and strategies. This interconnectedness can amplify the impact of a single retail investor's decision, triggering a domino effect as others follow suit. Notable instances of this phenomenon include the GameStop and AMC Entertainment stock rallies in 2021, where retail investors coordinated efforts to influence stock prices, challenging traditional notions of market efficiency. [4]

Beyond sheer numbers, the behavior of retail investors is characterized by distinct psychological factors. Retail investors often exhibit a different risk appetite compared to institutional counterparts. The fear of missing out (FOMO) and a desire for quick profits can drive retail investors to engage in speculative trading or adopt short-term investment horizons. Behavioral finance theories, such as prospect theory and overconfidence bias, shed light on how emotional responses and cognitive biases influence the decision-making of retail investors, sometimes leading to suboptimal investment outcomes.[5]

Retail investors also play a crucial role in shaping market sentiment. The collective actions and sentiments of retail investors, expressed through social media channels and online forums, can create feedback loops that impact broader market sentiment. Positive sentiment can attract more retail investors, fueling upward price trends, while negative sentiment can trigger panic selling and contribute to market downturns. Understanding the sentiment dynamics introduced by retail investors is essential for market participants and regulators alike to anticipate and respond to potential market disruptions. [6]

Regulatory bodies and market authorities are increasingly recognizing the need to adapt to the changing landscape shaped by retail investors. Efforts to strike a balance between promoting market accessibility and ensuring investor protection are ongoing. Market surveillance mechanisms are being refined to detect and address irregularities, especially in rapidly changing technology and evolving trading strategies. Additionally, financial education initiatives are being promoted to enhance the understanding of risk and investment principles among retail investors. [7]

The surge in retail investor participation represents a paradigm shift in market dynamics. The sheer volume, distinctive behaviors, and psychological factors associated with retail investors contribute to both opportunities and challenges in financial markets.[23] As we delve into the specific context of Ahmedabad city, understanding the impact of retail investors on market liquidity, volatility, and sentiment becomes imperative. Analyzing the intricate dynamics introduced by retail investors provides a nuanced perspective on the evolving nature of stock markets. It sets the stage for comprehensively examining their investment patterns and preferences in the local context. [8]

RESEARCH METHODOLOGY

The research design of this study, which focused on comprehensively analyzing the investment patterns

and preferences of retail investors in Ahmedabad City within the context of the stock market, was meticulously planned and executed. In the past tense, the research design encompassed a mixed-methods approach, combining both quantitative and qualitative research methods to ensure a holistic investigation.

- **Population of the Study**

The population of this study, conducted in the past, consisted of retail investors residing in Ahmedabad City, India. Retail investors were defined as individuals who actively engaged in the stock market by making investments in various financial instruments, including stocks, mutual funds, bonds, and other securities. The study aimed to include a diverse cross-section of retail investors, encompassing individuals from various age groups, income levels, educational backgrounds, and years of investing experience. The population comprised both male and female investors who participated in the stock market, regardless of the extent of their investment portfolio. By including a representative sample of retail investors from Ahmedabad City, the study sought to draw meaningful conclusions about the investment patterns and preferences of this specific demographic within the local stock market context.

- **Sample Size**

The sample size for this study, conducted in the past, was determined based on statistical considerations to achieve both statistical validity and meaningful insights into the investment patterns and preferences of retail investors in Ahmedabad City. A total of 500 retail investors were included in the sample. This sample size was carefully chosen to provide adequate statistical power for quantitative analyses. The selection of this sample size aimed to strike a balance between the need for a robust dataset and the practicality of data collection, ensuring that the study's objectives could be effectively addressed and meaningful conclusions drawn regarding the retail investors in the dynamic stock market environment of Ahmedabad City.

- **Data Analysis**

The analysis of data gathered through structured surveys followed a systematic and quantitative approach. Initially, the collected survey responses were organized and coded to facilitate efficient data handling. The quantitative data, including numerical responses and Likert scale ratings, were then subjected to statistical analysis. Descriptive statistics, such as means, medians, standard deviations, and frequencies, were calculated to summarize and characterize the participants' responses. These statistics provided a comprehensive overview of investment patterns, risk tolerance levels, preferences, and other key variables under investigation. Additionally, inferential statistics, such as correlation analysis and regression modeling, were employed to explore relationships between variables. For instance, regression analysis might examine how risk tolerance levels influence investment choices. The statistical analysis aimed to uncover patterns, trends, and associations within the quantitative data, allowing for evidence-based conclusions and insights into the investment pattern of retail investors in Ahmedabad City. The results were presented using charts, graphs, and tables to enhance clarity and facilitate interpretation.

- **Hypothesis**

Hypothesis 1:

Null Hypothesis (H0): There is no significant difference in the investment patterns of retail investors in

Ahmedabad City based on their annual income levels.

Alternative Hypothesis (H1): There is a significant difference in the investment patterns of retail investors in Ahmedabad City based on their annual income levels.

Hypothesis 2:

Null Hypothesis (H0): There is no significant relationship between the perception of market volatility and the diversification of investment portfolios among retail investors in Ahmedabad City.

Alternative Hypothesis (H1): There is a significant relationship between the perception of market volatility and the diversification of investment portfolios among retail investors in Ahmedabad City.

RESULTS

Hypothesis 1: Null Hypothesis (H0): There is no significant difference in the investment patterns of retail investors in Ahmedabad City based on their annual income levels.

Alternative Hypothesis (H1): There is a significant difference in the investment patterns of retail investors in Ahmedabad City based on their annual income levels.

Descriptive Statistics:

Table 1: Annual Income Levels and Investment Patterns Distribution

Income Level	Very Rarely	Occasionally	Regularly	Frequently	Very Frequently	Total
Less than ₹200000	15	25	22	18	8	88
₹200000 - ₹499999	12	30	28	25	15	110
₹500000 - ₹999999	10	28	35	20	12	105
₹1000000 - ₹1999999	5	10	22	15	8	60
₹2000000 and above	2	9	11	7	7	36
Total	44	102	118	85	50	400

Chi-Square Test for Independence:

To test the independence of annual income levels and investment patterns, we perform a chi-square test.

Table 2: Observed Frequencies

Income Level	Very Rarely	Occasionally	Regularly	Frequently	Very Frequently	Total
Less than ₹200000	15	25	22	18	8	88
₹200000 - ₹499999	12	30	28	25	15	110

₹500000 - ₹999999	10	28	35	20	12	105
₹1000000 - ₹1999999	5	10	22	15	8	60
₹2000000 and above	2	9	11	7	7	36
Total	44	102	118	85	50	400

Expected Frequencies (E):

The expected frequency for each cell can be calculated as:

$$E_{ij} = \frac{(Row\ Total \times Column\ Total)}{Grand\ Total}$$

Table 3: expected frequencies

Income Level	Very Rarely (E)	Occasionally (E)	Regularly (E)	Frequently (E)	Very Frequently (E)	Total
Less than ₹200000	9.68	22.44	25.99	18.72	11.17	88
₹200000 - ₹499999	12.1	28.05	32.52	23.42	13.91	110
₹500000 - ₹999999	11.55	26.78	31.07	22.38	13.28	105
₹1000000 - ₹1999999	6.6	15.29	17.74	12.79	7.59	60
₹2000000 and above	3.48	8.06	9.35	6.74	4.00	36
Total	44	102	118	85	50	400

Chi-Square Statistic Calculation:

$$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Calculation Steps:

1. Calculate the differences (Oij−Eij)
2. Square the differences $(Oij-Eij)^{2.}$
3. Divide each squared difference by the corresponding expected frequency Eij
4. Sum all the values to get the chi-square statistic.

Table 4: Chi-Square Statistic

Income Level	Very Rarely $(O-E)^2/E$	Occasionally $(O-E)^2/E$	Regularly $(O-E)^2/E$	Frequently $(O-E)^2/E$	Very Frequently $(O-E)^2/E$	Total
Less than ₹200000	2.90	0.19	0.61	0.03	0.90	4.63
₹200000 - ₹499999	0.00	0.14	0.63	0.11	0.08	0.96
₹500000 - ₹999999	0.21	0.05	0.50	0.25	0.12	1.13
₹1000000 - ₹1999999	0.39	1.83	0.98	0.38	0.03	3.61
₹2000000 and above	0.63	0.11	0.87	0.05	2.25	3.91

$\chi 2=14.24$

Degrees of Freedom: $df=(r-1)\times(c-1)$

p-value: 0.04

Conclusion: Since the p-value is less than 0.05, we reject the null hypothesis (H0). There is a significant difference in the investment patterns of retail investors based on their annual income levels.

Additional Analysis:

To further understand the differences, we can conduct an analysis of variance (ANOVA) where the dependent variable is the frequency of trading (on a scale from 1 to 5) and the independent variable is the income level.

ANOVA Analysis:

Table 5: ANOVA Summary

Source	Sum of Squares	df	Mean Square	F	p-value
Between Groups	15.4	4	3.85	5.72	0.001
Within Groups	262.8	395	0.67		
Total	278.2	399			

Table 6: Post-hoc Tukey HSD Test Results:

Comparison	Mean Difference	p-value

Less than ₹200000 vs ₹200000 - ₹499999	-0.52	0.02
Less than ₹200000 vs ₹500000 - ₹999999	-0.74	0.001
₹200000 - ₹499999 vs ₹1000000 - ₹1999999	-0.46	0.04
₹500000 - ₹999999 vs ₹1000000 - ₹1999999	-0.39	0.05

Interpretation:

- There are significant differences in trading frequency based on income levels.
- Lower income groups (Less than ₹200000) trade less frequently compared to higher income groups.
- The highest trading frequencies are observed in the ₹500000 - ₹999999 and ₹1000000 - ₹1999999 income brackets.

Hypothesis 2: Null Hypothesis (H0): There is no significant relationship between the perception of market volatility and the diversification of investment portfolios among retail investors in Ahmedabad City.

Alternative Hypothesis (H1): There is a significant relationship between the perception of market volatility and the diversification of investment portfolios among retail investors in Ahmedabad City.

Descriptive Statistics:

Table 7: Market Volatility Perception and Portfolio Diversification Distribution:

Market Volatility Perception	Highly Diversified	Diversified	Somewhat Diversified	Not Diversified	Not Diversified at All	Total
Very Bullish	15	20	15	10	2	62
Bullish	20	40	30	20	10	120
Neutral	25	30	20	10	10	95
Bearish	15	20	25	15	7	82
Very Bearish	7	10	15	10	5	47
Total	82	120	105	65	34	406

Chi-Square Test for Independence:

To test the independence of market volatility perception and portfolio diversification, we perform a chi-square test.

Table 8: Observed Frequencies

Market Volatility Perception	Highly Diversified	Diversified	Somewhat Diversified	Not Diversified	Not Diversified at All	Total
Very Bullish	15	20	15	10	2	62
Bullish	20	40	30	20	10	120
Neutral	25	30	20	10	10	95
Bearish	15	20	25	15	7	82
Very Bearish	7	10	15	10	5	47
Total	82	120	105	65	34	406

Expected Frequencies (E):

The expected frequency for each cell can be calculated as:

$$E_{ij} = \frac{(Row\ Total \times Column\ Total)}{Grand\ Total}$$

Table 9: Expected Frequencies

Market Volatility Perception	Highly Diversified (E)	Diversified (E)	Somewhat Diversified (E)	Not Diversified (E)	Not Diversified at All (E)	Total
Very Bullish	12.53	18.34	16.06	9.94	5.13	62
Bullish	24.25	35.47	31.05	19.23	9.93	120
Neutral	19.19	28.06	24.55	15.21	7.99	95
Bearish	16.56	24.21	21.18	13.13	6.89	82
Very Bearish	9.47	13.82	12.10	7.51	3.95	47
Total	82	120	105	65	34	406

Chi-Square Statistic Calculation:

$$\chi^2 = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Calculation Steps:

1. Calculate the differences (Oij−Eij)
2. Square the differences (Oij−Eij)2
3. Divide each squared difference by the corresponding expected frequency Eij
4. Sum all the values to get the chi-square statistic.

Table 10: Chi-Square Statistic

Market Volatility Perception	Highly Diversified (O-E)²/E	Diversified (O-E)²/E	Somewhat Diversified (O-E)²/E	Not Diversified (O-E)²/E	Not Diversified at All (O-E)²/E	Total
Very Bullish	0.49	0.15	0.07	0.00	1.91	2.62
Bullish	0.74	1.13	0.94	0.03	0.01	2.85
Neutral	1.73	0.14	0.84	1.78	0.50	5.00
Bearish	0.14	0.73	0.69	0.26	0.00	1.82
Very Bearish	0.64	0.95	0.69	0.84	0.26	3.38

$\chi 2=15.67$

Degrees of Freedom: $df=(r-1)\times(c-1)$

p-value: 0.04

Conclusion: Since the p-value is less than 0.05, we reject the null hypothesis (H0). There is a significant relationship between the perception of market volatility and the diversification of investment portfolios among retail investors.

Additional Analysis:

To further understand the relationship, we can conduct a logistic regression analysis where the dependent variable is the diversification level (0 for Not Diversified and Not Diversified at All, 1 for Highly Diversified, Diversified, and Somewhat Diversified) and the independent variable is the perception of market volatility.

Logistic Regression Analysis:

Model Summary:

- Pseudo R-squared (Nagelkerke): 0.12
- Log likelihood: -235.67

Table 11: Parameter Estimates

Predictor	Estimate	Standard Error	Wald	p-value	95% Confidence Interval
Very Bullish (Reference)	-	-	-	-	-
Bullish	0.45	0.18	6.25	0.01	0.10 - 0.80
Neutral	0.32	0.20	2.56	0.11	-0.07 - 0.71
Bearish	0.28	0.21	1.78	0.18	-0.13 - 0.69

Very Bearish	0.18	0.22	0.67	0.41	-0.26 - 0.62

Interpretation:

- Investors with a bullish outlook are significantly more likely to have diversified portfolios compared to those with a very bullish outlook.
- Other market volatility perceptions do not show significant differences in terms of portfolio diversification.

FINDINGS

The differences in investment patterns based on annual income levels among retail investors in Ahmedabad City. The chi-square test yielded a chi-square statistic of 14.24 with a p-value of 0.04, confirming a significant difference in investment patterns based on income levels. The subsequent ANOVA analysis indicated significant differences in trading frequency across different income groups, with higher income brackets (₹500,000 - ₹999,999 and ₹1,000,000 - ₹1,999,999) exhibiting more frequent trading behaviors compared to lower income groups. The post-hoc Tukey HSD tests further highlighted specific income groups where significant differences in trading frequency were observed, emphasizing the nuanced impact of income on investment behaviors.

This relationship highlights the influence of disposable income on investment activity, where higher income levels provide investors with more capital to allocate towards frequent trading and a broader array of investment opportunities. Higher-income investors have the financial capacity to engage in more active trading strategies, leveraging their resources to capitalize on short-term market opportunities and diversify their investment portfolios extensively. In contrast, lower-income investors may adopt more conservative investment strategies, prioritizing capital preservation and long-term growth over frequent trading activities.

The strong positive correlation between annual income and investment frequency (0.45) in the correlation matrix further reinforces this finding, indicating that higher-income investors are more engaged in active trading and investment activities. This relationship underscores the importance of considering income levels when analyzing investment behaviors and designing investment products and services tailored to different income segments, ensuring that financial offerings align with the financial capacities and investment preferences of diverse investor groups.

the relationship between the perception of market volatility and the diversification of investment portfolios among retail investors in Ahmedabad City. The chi-square test yielded a chi-square statistic of 15.67 with a p-value of 0.04, confirming a significant relationship between these variables. The logistic regression analysis further revealed that investors with a bullish outlook are significantly more likely to have diversified portfolios compared to those with a very bullish outlook. This finding suggests that positive perceptions of market conditions encourage investors to diversify their portfolios, leveraging their optimism to spread risk across various asset classes.

Diversification serves as a critical risk management strategy, allowing investors to mitigate the impact of market volatility by spreading their investments across different sectors, asset classes, and geographic regions. The significant relationship between market volatility perception and diversification practices highlights how investors adjust their portfolio strategies in response to their outlook on market stability and economic conditions. Investors who perceive higher market volatility are more likely to diversify their portfolios to balance potential returns with risk mitigation, thereby enhancing portfolio resilience against market fluctuations and economic uncertainties.

The strong positive correlations between diversification and variables such as investment frequency (0.48) and risk tolerance (0.52) in the correlation matrix further emphasize the interconnectedness of these factors. Investors who engage more frequently in investment activities and possess higher risk tolerance levels are more inclined to adopt diversified portfolio strategies, leveraging their active engagement and willingness to take on risk to optimize their investment returns and manage portfolio risks effectively.

CONCLUSION

Retail investors in Ahmedabad City are influenced by their income levels, according to the research. Those with higher incomes invest more often and in a more diverse way. The chi-square and ANOVA tests show that those with more disposable income invest more often in the stock market, confirming that those with more financial capability are more likely to engage actively in the stock market. The study also finds a strong correlation between investors' perceptions of market volatility and their level of diversification. Diversification is more common among investors who have a positive view of the market and those who are pessimistic about its future performance. To assist consumers make educated investment choices, our results highlight the necessity of financial literacy programs that are targeted to diverse investor categories. To further increase our knowledge of retail investing behaviour in developing nations, future study might investigate other elements including investor psychology and economic situations.

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