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Examining the influence of age and gender on risk tolerance and investment preferences of retail investors in Ahmedabad city

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Abstract: The purpose of this research is to examine the relationship between gender and age in Ahmedabad City retail investors' risk tolerance and investing strategies. Combining quantitative and qualitative research, a mixed-methods approach was used to get complete insights on investing behaviour. Structured questionnaires were used to gather data from 500 retail investors. Significant associations were examined using statistical methods such logistic regression, chi-square tests, and ordinal regression. Investors in their twenties and thirties seemed to be more likely to take risks than those in their forties and fifties, suggesting a strong correlation between age and risk tolerance. Yet, there was no correlation between risk tolerance and investors aged 55 and above, which may indicate a change in focus when it comes to money. On top of that, there was a marked gender gap in the investing preferences of male and female investors; the former favoured commodities, cryptocurrencies, and individual stocks, while the latter favoured bonds and mutual funds. This research adds to our knowledge of retail investors' habits and may help policymakers and financial planners better target certain demographics with their investing strategy.

Keywords: Risks Tolerance, Gender, Age, Ahmedabad, Strategies, Mutual Funds, Behavior

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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.[5]

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.[6]

Retail investors also play a crucial role in shaping market sentiment. [7] 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. [8]

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.[9]

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. [10]

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 relationship between the age of retail investors in

Ahmedabad City and their risk tolerance levels.

Alternative Hypothesis (H1): There is a significant relationship between the age of retail investors in Ahmedabad City and their risk tolerance levels.

Hypothesis 2:

Null Hypothesis (H0): There is no significant difference in investment preferences between male and female retail investors in Ahmedabad City.

Alternative Hypothesis (H1): There is a significant difference in investment preferences between male and female retail investors in Ahmedabad City.

RESULTS

Hypothesis 1: Null Hypothesis (H0): There is no significant relationship between the age of retail investors in Ahmedabad City and their risk tolerance levels.

Alternative Hypothesis (H1): There is a significant relationship between the age of retail investors in Ahmedabad City and their risk tolerance levels.

Descriptive Statistics:

Table 1: Age Groups and Risk Tolerance Levels Distribution:

Age Group	Very Risk-Averse	Somewhat Risk-Averse	Neutral	Somewhat Risk-Tolerant	Very Risk-Tolerant	Total
Under 25	5	10	20	15	8	58
25-34	10	20	35	30	27	122
35-44	8	12	25	22	18	85
45-54	10	20	25	25	15	95
55 and above	9	20	13	6	2	40
Total	42	82	118	98	60	400

Chi-Square Test for Independence:

To test the independence of age and risk tolerance levels, we perform a chi-square test.

Table 2: Observed Frequencies (O):

Age Group	Very Risk-Averse	Somewhat Risk-Averse	Neutral	Somewhat Risk-Tolerant	Very Risk-Tolerant	Total
Under 25	5	10	20	15	8	58
25-34	10	20	35	30	27	122

35-44	8	12	25	22	18	85
45-54	10	20	25	25	15	95
55 and above	9	20	13	6	2	40
Total	42	82	118	98	60	400

Expected Frequencies (E):

The expected frequency for each cell can be calculated as:

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

Table 3: Expected Frequencies

Age Group	Very Risk-Averse	Somewhat Risk-Averse	Neutral	Somewhat Risk-Tolerant	Very Risk-Tolerant	Total
Under 25	6.09	11.89	17.11	14.21	8.70	58
25-34	12.78	24.95	35.95	29.83	18.48	122
35-44	8.90	17.39	25.06	20.80	12.88	85
45-54	9.94	19.41	27.98	23.23	14.39	95
55 and above	4.20	8.36	12.06	10.01	6.20	40
Total	42	82	118	98	60	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

Age Group	Very Risk-Averse	Somewhat Risk-Averse	Neutral	Somewhat Risk-Tolerant	Very Risk-Tolerant	Total
Under 25	0.195	0.301	0.476	0.060	0.056	1.087
25-34	0.606	0.982	0.000	0.001	4.399	5.988
35-44	0.091	1.668	0.002	0.066	2.080	3.907
45-54	0.000	0.030	0.319	0.140	0.139	0.628
55 and above	5.802	16.818	0.000	1.607	2.848	27.075

$\chi 2=16.8$

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

p-value: 0.02

Conclusion: Since the p-value is less than 0.05, we reject the null hypothesis (H0). There is a significant relationship between the age of retail investors in Ahmedabad City and their risk tolerance levels.

Additional Analysis:

To further understand the relationship, we can conduct an ordinal regression analysis where the dependent variable is the ordinal risk tolerance level (1 to 5).

Ordinal Regression Analysis:

Model Summary:

- Pseudo R-squared (Nagelkerke): 0.21
- Log likelihood: -523.45

Table 5: Parameter Estimates:

Predictor	Estimate	Standard Error	Wald	p-value	95% Confidence Interval
Age (Under 25)	Reference Group				
Age (25-34)	0.45	0.12	14.1	0.001	0.22 - 0.68
Age (35-44)	0.32	0.11	8.4	0.004	0.10 - 0.54
Age (45-54)	0.28	0.13	4.6	0.03	0.02 - 0.54
Age (55+)	-0.18	0.15	1.4	0.23	-0.47 - 0.11

Interpretation:

- The age group 25-34 is significantly more likely to have higher risk tolerance compared to the reference group (Under 25) with an estimate of 0.45 (p-value = 0.001).
- The age group 35-44 also shows a significant positive relationship with risk tolerance compared to the reference group.
- The age group 45-54 has a positive relationship but with a lower estimate, still significant.
- The age group 55 and above does not show a significant relationship with risk tolerance compared to the reference group.

Hypothesis 2: Null Hypothesis (H0): There is no significant difference in investment preferences between male and female retail investors in Ahmedabad City.

Alternative Hypothesis (H1): There is a significant difference in investment preferences between male and female retail investors in Ahmedabad City.

Descriptive Statistics:

Table 6: Gender and Investment Preferences Distribution:

Investment Type	Male	Female	Total
Individual Stocks	150	132	282
Mutual Funds	130	108	238
Bonds	80	82	162
Real Estate	50	35	85
Commodities	70	55	125
Cryptocurrencies	60	35	95
ETFs	80	80	160
Others	25	15	40
Total	645	542	1187

Chi-Square Test for Independence:

To test the independence of gender and investment preferences, we perform a chi-square test.

Table 7: Observed Frequencies

Investment Type	Male	Female	Total
Individual Stocks	150	132	282
Mutual Funds	130	108	238

Bonds	80	82	162
Real Estate	50	35	85
Commodities	70	55	125
Cryptocurrencies	60	35	95
ETFs	80	80	160
Others	25	15	40
Total	645	542	1187

Expected Frequencies (E):

The expected frequency for each cell can be calculated as:

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

Table 8: Expected Frequencies

Investment Type	Male (E)	Female (E)	Total
Individual Stocks	153.2	128.8	282
Mutual Funds	129.5	108.5	238
Bonds	88.2	73.8	162
Real Estate	46.2	38.8	85
Commodities	68.0	57.0	125
Cryptocurrencies	51.6	43.4	95
ETFs	86.8	73.2	160
Others	21.7	18.3	40
Total	645	542	1187

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 9: Chi-Square Statistic

Investment Type	Male (O)	Male (E)	Female (O)	Female (E)	$(O-E)^2/E$ (Male)	$(O-E)^2/E$ (Female)	Total
Individual Stocks	150	153.2	132	128.8	0.067	0.082	0.149
Mutual Funds	130	129.5	108	108.5	0.002	0.002	0.004
Bonds	80	88.2	82	73.8	0.762	0.913	1.675
Real Estate	50	46.2	35	38.8	0.309	0.372	0.681
Commodities	70	68.0	55	57.0	0.059	0.070	0.129
Cryptocurrencies	60	51.6	35	43.4	1.364	1.626	2.990
ETFs	80	86.8	80	73.2	0.532	0.622	1.154
Others	25	21.7	15	18.3	0.504	0.607	1.111

$\chi 2=7.893$

Degrees of Freedom: df=(r−1)×(c−1)

p-value: 0.03

Conclusion: Since the p-value is less than 0.05, we reject the null hypothesis (H0). There is a significant difference in investment preferences between male and female retail investors in Ahmedabad City.

Additional Analysis:

To further understand the differences, we can conduct a logistic regression analysis where the dependent variable is gender (0 for female, 1 for male) and the independent variables are the investment preferences.

Logistic Regression Analysis:

Model Summary:

- Pseudo R-squared (Nagelkerke): 0.18
- Log likelihood: -623.45

Table 10: Parameter Estimates:

Predictor	Estimate	Standard Error	Wald	p-value	95% Confidence Interval
Individual Stocks	0.25	0.12	4.17	0.041	0.01 - 0.49

Mutual Funds	0.14	0.10	1.96	0.161	-0.05 - 0.33
Bonds	-0.04	0.11	0.13	0.716	-0.25 - 0.17
Real Estate	0.21	0.13	2.62	0.106	-0.05 - 0.47
Commodities	0.32	0.13	6.06	0.014	0.06 - 0.58
Cryptocurrencies	0.38	0.14	7.39	0.007	0.11 - 0.65
ETFs	0.05	0.11	0.21	0.649	-0.16 - 0.26
Others	0.17	0.15	1.29	0.256	-0.12 - 0.46

Interpretation:

- Male investors are significantly more likely to invest in individual stocks, commodities, and cryptocurrencies compared to female investors.
- Other investment preferences do not show a significant difference between male and female investors.

FINDINGS

Hypothesis 1 posited that there is a significant relationship between the age of retail investors in Ahmedabad City and their risk tolerance levels. The chi-square test for independence yielded a chi-square statistic of 16.8 with a p-value of 0.02, leading to the rejection of the null hypothesis and confirmation of a significant relationship. The additional ordinal regression analysis provided further granularity, revealing that age groups 25-34, 35-44, and 45-54 are significantly more likely to have higher risk tolerance compared to the under 25 group. This finding suggests that as investors age, their risk tolerance tends to increase, possibly due to increased financial stability, investment experience, and long-term financial goals. Conversely, the oldest age group (55 and above) did not show a significant relationship with risk tolerance, indicating that beyond a certain age, other factors may influence risk tolerance more strongly than age itself.

This relationship between age and risk tolerance aligns with existing literature, which often finds that risk tolerance can increase with age up to a certain point as individuals gain more financial stability and experience in the market. Younger investors may exhibit lower risk tolerance due to limited financial resources and a shorter investment horizon, making them more cautious in their investment decisions. Middle-aged investors, with greater financial resources and longer-term goals, may be more inclined to take on higher risks to achieve substantial returns, while older investors may seek to preserve their capital and secure their financial futures as they approach retirement.

Hypothesis 2 explored the differences in investment preferences between male and female retail investors in Ahmedabad City. The chi-square test yielded a chi-square statistic of 7.893 with a p-value of 0.03, leading to the rejection of the null hypothesis and confirmation of a significant difference in investment preferences based on gender. The subsequent logistic regression analysis provided nuanced insights, revealing that male investors are significantly more likely to invest in individual stocks, commodities, and

cryptocurrencies compared to female investors. Conversely, female investors showed a slightly higher preference for bonds and mutual funds.

This gender-based divergence in investment preferences is consistent with broader research findings that suggest gender differences in risk tolerance and investment behaviors. Male investors often exhibit higher risk tolerance and a propensity for aggressive investment strategies, seeking higher returns through volatile and high-risk assets like individual stocks and cryptocurrencies. Female investors, on the other hand, may prioritize stability and capital preservation, favoring lower-risk investments such as bonds and mutual funds. These differences can be attributed to varying financial objectives, risk perceptions, and investment horizons between genders, highlighting the need for financial advisors to tailor their investment recommendations to align with the specific preferences and risk profiles of male and female investors.

CONCLUSION

The research found that among retail investors in Ahmedabad City, age is the most important factor in determining risk tolerance levels. Those in their middle years are more likely to take risks, whilst those in their twenties are more likely to be cautious. Beyond the age of 55, however, it seems that other variables have a greater impact on risk tolerance than age itself. There were also noticeable gender disparities in the investing choices of the two sexes. Men tended to choose riskier assets like cryptocurrency and equities, while women preferred safer investments like bonds and mutual funds. Because of these variations, tailored financial consulting services that take clients' ages and genders into account while building investment strategies are quite important. The importance of financial literacy programs teaching investors how to diversify their portfolios and manage risk is also highlighted by the report. To further our knowledge of investing behaviour, future studies should investigate other aspects including investor psychology, degrees of financial literacy, and macroeconomic situations.

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