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EXAMINING THE MODERATING EFFECT OF RISK ATTENUATION ON THE RELATIONSHIP BETWEEN INVESTOR SENTIMENT AND CASH FLOW VOLATILITY

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Abstract: THIS STUDY EXPLORES THE COMPLEX INTERPLAY BETWEEN INVESTOR SENTIMENT, CASH FLOW VOLATILITY, AND THE MODERATING EFFECT OF RISK ATTENUATION. ANALYZING DATA FROM 121 ACTIVE COMPANIES LISTED ON THE TEHRAN STOCK EXCHANGE OVER THE PERIOD FROM 2010 TO 2022, WE EXTRACTED RELEVANT FINANCIAL INFORMATION FROM THE STOCK AND SECURITIES ORGANIZATION'S DATABASE. THROUGH A THOROUGH REGRESSION ANALYSIS, WE GAINED VALUABLE INSIGHTS INTO HOW THESE VARIABLES INTERACT WITHIN THE FINANCIAL SECTOR. OUR RESULTS INDICATE THAT INVESTOR SENTIMENT HAS A SIGNIFICANT POSITIVE EFFECT ON CASH FLOW VOLATILITY; AS INVESTOR SENTIMENT INCREASES, CASH FLOW VOLATILITY ALSO RISES, HIGHLIGHTING THE CRITICAL ROLE OF INVESTOR PERCEPTIONS IN DETERMINING A COMPANY'S FINANCIAL STABILITY. FURTHERMORE, WE INVESTIGATED THE MODERATING ROLE OF RISK ATTENUATION AND FOUND THAT IT SIGNIFICANTLY INFLUENCES THE RELATIONSHIP BETWEEN INVESTOR SENTIMENT AND CASH FLOW VOLATILITY. SPECIFICALLY, THE DEGREE OF RISK TOLERANCE WITHIN AN ORGANIZATION CAN EITHER ENHANCE OR DIMINISH THE IMPACT OF INVESTOR SENTIMENT ON CASH FLOW, AND

THESE EFFECTS ARE STATISTICALLY SIGNIFICANT UNDER CERTAIN CONDITIONS.

Keywords: RISK ATTENUATION, INVESTOR SENTIMENT, CASH FLOW VOLATILITY, TEHRAN STOCK EXCHANGE

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1. INTRODUCTION

In the dynamic environment of financial markets, comprehending the relationship between investor sentiment and cash flow volatility has emerged as a central theme in both scholarly research and real-world applications. Emotional biases and behavioral inclinations, which define investor sentiment, are now widely acknowledged as key influences on market variability and shifts in asset pricing (Abdeldayem & Aldulaimi, 2023; Gonzalez-Igual et al., 2021). At the same time, cash flow volatility—a vital indicator of a company's financial resilience—significantly impacts investment choices, capital allocation, and strategic business planning. This measure of financial stability helps shape both short-term decisions and long-term growth strategies, reflecting a firm's ability to manage fluctuations and sustain performance (Elahi et al., 2021; Larkin, 2013).Although considerable research has explored the connection between investor sentiment and cash flow volatility, an important gap remains in the literature regarding how risk attenuation factors into this relationship. This area of inquiry could yield valuable insights into the mechanisms that moderate the impact of investor sentiment on cash flow fluctuations (Rostami Jaz et al., 2019).This aspect has received comparatively less attention, leaving an opportunity to explore how risk management practices and regulatory frameworks could alter this dynamic.

Studies indicate a multifaceted relationship among investor sentiment, cash flow volatility, and stock returns. Labidi and Yaakoubi (2016) found results that differ from earlier research, noting that during periods of low sentiment, aggregate volatility risk tends to have a negative association with returns. However, this association appears to lose significance in high-sentiment environments (Labidi & Yaakoubi, 2016). Li and Luo (2017) discovered that the connection between cash holdings and future stock returns is particularly strong during periods of low investor sentiment. This relationship is especially pronounced in stocks characterized by high transaction costs, significant short-selling expenses, and elevated idiosyncratic volatility. Their findings lend support to both the investor sentiment hypothesis and the limits-to-arbitrage hypothesis (Li & Luo, 2017).Chen (2008) investigated the influence of investor sentiment on cash flow evaluations and risk preferences, highlighting that the effect varies with the level of uncertainty surrounding earnings components. In situations where uncertainty is high, sentiment plays a more significant role in shaping investors' judgments. Conversely, when the uncertainty is low, sentiment's influence is more pronounced in affecting risk preferences (Chen, 2008). Kustina et al. (2024) studied how investor sentiment and exchange rate volatility relate to the risk of a country index crash. Their findings revealed that both investor sentiment and exchange rate volatility significantly affect crash risk. However, they also observed that net foreign portfolio investment had a minimal impact and did not enhance the relationship between investor sentiment and crash risk (Kustina et al., 2024).

This research aims to fill the existing gap by exploring the moderating effect of risk attenuation on the relationship between investor sentiment and cash flow volatility. By analyzing the ways in which risk attenuation influences this relationship, the study seeks to deepen the understanding of how external elements—like risk management practices and regulatory measures—interact with psychological factors and financial indicators. The significance of this research lies in its potential to provide valuable insights for investors, financial managers, policymakers, and academics. A deeper understanding of how risk attenuation modifies the effects of investor sentiment on cash flow volatility can lead to more effective investment strategies, improved risk management practices, and better-informed regulatory policies. Additionally, this research contributes to the broader academic discourse on the intersection of behavioral finance and traditional financial analysis. To achieve these objectives, our study employs a multidimensional approach, combining rigorous quantitative analysis with theoretical exploration. By utilizing an extensive dataset and advanced statistical methods, we aim to offer empirical evidence on the moderating role of risk attenuation. This contribution enriches the existing literature at the crossroads of behavioral finance, risk management, and corporate finance, providing a nuanced perspective on the complex dynamics that shape financial markets.

The structure of this paper is outlined as follows: Section 2 reviews relevant literature and formulates the research hypotheses. In Section 3, the research design is detailed, covering data collection methods, measurements of variables, and the empirical models used. Section 4 presents the empirical findings along with robustness tests. Finally, Section 5 concludes the study.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

In financial markets, investor sentiment has increasingly been acknowledged as a significant factor influencing market trends and the fluctuations in asset prices (Cevik et al., 2022). Investor sentiment includes the emotional biases and psychological tendencies that affect decision-making, frequently resulting in departures from rational expectations (Chandra, 2008). This phenomenon is critical in shaping the financial landscape, influencing trading volumes, stock prices, and overall market volatility (PH & Rishad, 2020).One area where investor sentiment significantly impacts is cash flow volatility. Cash flow serves as a vital measure of a company's financial well-being, reflecting the net inflow and outflow of funds generated by its operational and investment activities (Simic & Jovicic, 2023). The variability of cash flows, marked by changes in both their amount and frequency, has important consequences for a company's stability, potential for growth, and exposure to risk (VAZOV, 2019).

Studies have consistently demonstrated that investor sentiment can notably influence cash flow volatility. Investigations into the effects of sentiment on cash flow and associated financial metrics reveal intricate relationships. Specifically, investor sentiment has a substantial impact on market returns and volatility, with negative sentiment leading to greater increases in volatility compared to positive sentiment (Beaumont et al., 2008). Research indicates that investor sentiment significantly influences market activities such as returns, cash flows, and discount rates, thereby supporting theories in behavioral finance. This effect underscores the importance of psychological factors in financial decision-making and market dynamics.(ur Rehman, 2021). Moreover, investor sentiment adversely affects the cash conversion cycle, and this negative relationship becomes more pronounced in environments marked by greater uncertainty and heightened competition within the industry(Lee, 2024). These results emphasize the crucial role that investor sentiment plays in comprehending market dynamics and the financial performance of individual firms.

Muguto (2022) and PH & Rishad (2020) both identified a positive correlation between investor sentiment and stock market volatility, highlighting that irrational sentiment significantly contributes to excess volatility in the market.(Muguto et al., 2022; PH & Rishad, 2020).Griffith et al. (2020) emphasized the predictive capacity of investor sentiment, noting that fear exerts a significant and enduring influence on both market returns and volatility(Griffith et al., 2020).The research conducted by Tarkom and Yang (2023) reveals a link between investor sentiment and the cash conversion cycle. Their results indicate a negative correlation that is largely driven by pessimistic sentiments, underscoring the considerable impact that investors' negative outlooks can have on the cash conversion cycle. Additionally, their study found that economic uncertainty serves as a partial mediator in this relationship. In contexts of high economic uncertainty, managers are likely to take a more proactive stance in managing their cash conversion cycle(Tarkom & Yang, 2023).

The literature includes a large amount of various research studies conducted on stock markets, both emerging and developed, so there is many empirical evidence on stock market behaviour (Birau and Trivedi, 2013; Spulbar et al., 2022; Pourmansouri and Birau, 2024; Pourmansouri et al., 2023). In his research, urRehman (2021) discovered that investor sentiment significantly influences market activities. These findings align with established theories in behavioral finance, reinforcing the idea that psychological factors play a crucial role in market dynamics(ur Rehman, 2021) .The research conducted by Iyer and Harper (2017) reveals an inverse relationship between investor sentiment and the returns associated with high-risk companies(Iyer & Harper, 2017). These findings collectively indicate that investor sentiment has the potential to impact cash flow volatility.

Consequently, drawing from previous research, we propose our first hypothesis as follows:
H1: Investor sentiments impact the volatility of cash flow.
In the field of financial markets, the relationship between investor sentiment and various financial metrics has been a focal point for significant research and analysis. The behaviors driven by sentiment and their effects on asset prices, trading volumes, and market volatility have received considerable attention. A key financial metric in this context is cash flow volatility, which offers valuable insights into a company's financial stability, risk exposure, and growth potential. Within this framework, a growing area of interest is the role of risk attenuation mechanisms in influencing the connection between investor sentiment and cash flow volatility.

Investor sentiments, characterized by emotional biases and behavioral tendencies, have been acknowledged as influential drivers of market movements(Bourghelle et al., 2023).The impact of sentiment on asset prices and market dynamics is well-documented, showcasing the significance of psychological factors in shaping financial outcomes(Hirshleifer, 2015).

In the context of cash flow volatility, the relationship between investor sentiment and variations in a company's financial performance reveals a complex interaction between behavioral finance and conventional financial analysis. This interplay underscores how emotional factors can significantly influence financial outcomes, challenging traditional views that often prioritize quantitative metrics alone(Hosseini & Morshedi, 2019).Cash flow volatility, which refers to the fluctuations in a company's net inflows and outflows of funds, serves as a vital indicator for evaluating its financial health and level of risk exposure. This metric provides essential insights into a firm's operational stability and its ability to manage financial uncertainties effectively(Gorgz et al., 2015). Increased cash flow volatility can indicate issues such as operational inefficiencies, difficulties in maintaining liquidity, and greater levels of uncertainty(Huang & Tarkom, 2022). The connection between investor sentiments and cash flow volatility is anticipated to be complex, as changes in sentiment can intensify market dynamics and may lead to greater variations in cash

flows(Dautaj, 2023). Although the relationship between investor sentiments and cash flow volatility is recognized, a less examined aspect is the influence of risk attenuation mechanisms. Risk attenuation refers to various practices and interventions designed to lessen the negative impacts of market volatility and uncertainty. This includes risk management strategies implemented by companies, regulatory measures, and broader economic elements that affect overall market stability (Rahmani et al., 2021). Examples of these strategies include hedging with derivatives, diversifying investments, and ensuring sufficient liquidity reserves.

The findings of the study by Bouteska et al. (2023) demonstrate that investor sentiments increase risk (Bouteska et al., 2023). In a study conducted by Shin and Choi (2022), it was indicated that elevated stock crash risk associated with heightened sentiment gets mitigated for companies with substantial foreign ownership. This suggests that the potential decrease in future stock crash risk during periods of heightened sentiment is linked to the oversight function played by foreign investors, who are focused on a long-term investment perspective (Shin & Choi, 2022).The research conducted by Babenko et al. (2016) reveals that unpriced cash flow shocks carry predictive information concerning forthcoming priced risk. A positive idiosyncratic shock diminishes the responsiveness of firm value to priced risk factors while concurrently amplifying firm size and idiosyncratic risk (Babenko et al., 2016).Qadan (2019) further supports this, showing that risk appetite plays a significant role in explaining and predicting variations in the relationship between expected returns and idiosyncratic volatility (Qadan, 2019). Sen et al (2021) further emphasize the role of idiosyncratic risk and investor sentiment in stock liquidity (Sen et al., 2021), while Mugutoet al. (2022) underscore the negative impact of prevailing sentiment on subsequent returns and the positive impact on sector returns volatilities (Muguto et al., 2022).These results collectively suggest that risk, functioning as a moderating variable, has the potential to enhance the effect of investor sentiments on cash flow volatility.

This study primarily aims to explore how risk attenuation might moderate the established link between investor sentiments and cash flow volatility. Previous research has revealed a substantial connection between these two factors, indicating that investors' emotional biases and psychological tendencies can significantly influence market dynamics. However, the impact of risk attenuation mechanisms—strategies designed to either lessen or intensify the effects of investor sentiments—remains largely unexamined in this context. Therefore, we propose the following hypothesis:
H2: Risk moderates the relationship between investor sentiments and cash flow volatility.

3. DATA AND RESEARCH METHODOLOGY

3.1 Data

The data for this study was collected from the Tehran Stock Exchange (TSE) database, spanning from 2010 to 2022. We utilized multiple linear regression analysis with pooled panel data, facilitating the investigation of cross-sectional and time-series data throughout the sample period. This panel data methodology allows for a more in-depth analysis by considering differences across various companies and over time. Our final dataset includes 121 companies. The criteria for selecting these companies are detailed in Table 1, which outlines the steps taken to refine the initial dataset. The sampling process included the following steps:

Table 1. The selected statistical sample for this research.

	Conditions and limitations	Number
1	All companies listed on the stock exchange as of 2022	349
2	Companies under investigation excluding investment,	(69)

	holding, and financial intermediary companies	
3	Companies listed on the stock exchange after the year 2010	(51)
4	Companies whose stock trading on the TSE has been suspended or their listing has been canceled for more than 6 months during the research period.	(26)
5	Their financial year doesn't end on the March 20	(32)
6	Financial information and statements for these companies are not fully available for the years from 2010 to 2022.	(50)
The selected statistical sample for this research.		121

The final dataset, comprising 121 companies, effectively represents the diverse array of firms within the Tehran Stock Exchange (TSE), providing a solid foundation for our analysis. By employing the pooled panel data method, this study can account for both firm-specific characteristics that remain constant over time and temporal effects, thus improving the accuracy and reliability of our regression outcomes. This approach enables a more nuanced understanding of the relationships being examined in the context of investor sentiment and cash flow volatility.

3.2 Variables Definitions

Investor sentiments

In this study, the Investor Sentiments have been measured using the Equity Market Sentiment Index (EMSI). This index was developed by Bandyopadhyay and Jones, (2006). Therefore, Investor Sentiments can be calculated using the following equation(Bandopadhyaya & Jones, 2006):

(1)

$$SENT_{pt}=\frac{\sum (R_{it}-\hat{R}_r)(R_{iv}-\hat{R}_v)}{[\sum (R_{it}-\hat{R}_r)^2 \sum (R_{iv}-\hat{R}_v)^2]^{\frac{1}{2}}} \times 100 \text{ , } -100 \leq EMSI \leq +100$$

Where:

R_{it}= Rank of the monthly returns of company i in month t

R_{iv} = Rank of the historical volatility of company i in month t

To calculate historical volatility, the average standard deviation of stock returns over the past five months has been employed.

$\hat{R}_r$ = Average rank of monthly stock returns for portfolio companies.

$\hat{R}_v$ =Average rank of historical volatility of stock for portfolio companies.

Historical volatility is determined by calculating the average standard deviation of stock returns over the preceding five months. To reduce the influence of extreme price movements and unexpected variations, we utilize ranks instead of raw values. This approach offers a more holistic perspective on market sentiment. It enables a thorough evaluation of investor sentiment and its effects on financial volatility. The inclusion of the EMSI in our study is attributed to its effectiveness in analyzing the shifts and impacts of market sentiment on financial volatility and the interactions among various factors, particularly cash flow volatility. The EMSI facilitates a comprehensive analysis of the intricate relationship between investor sentiment and financial volatility, accounting for both psychological influences and market dynamics.

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Volatility of cash flow (VCF)

In this study, the dependent variable is the volatility of cash flow (VCF). To capture long-term fluctuations in cash flow, we utilize a six-year period, following the approach outlined by Goldman and Visvanathan (2013). The measurement of cash flow volatility is based on the variance of operating cash flows. We compute the variance of operating cash flows during this timeframe and normalize it by dividing the result by the company's total assets for each year. This normalization step accounts for variations in company size, enabling more meaningful comparisons across different firms (Goldman & Viswanath, 2013). firms. The formula used is:

(2)

$$VCF_{it} = \frac{Var(OCF_{it})}{TA_{it}}$$

where $Var(OCF_{it})$ is the variance of operating cash flows for company *i* in year *t*, and TA_{it} represents the total assets of company *i* in year *t*.

Other Control Variables

To mitigate the issue of omitted correlated factors, we incorporate several control variables that may influence the moderating effect of risk attenuation on the relationship between investor sentiment and cash flow volatility. These control variables help ensure a more accurate and comprehensive analysis by accounting for other factors that could impact the dynamics of this relationship.

Cash flow= It is equal to the operating cash flow of the company, which is directly extracted from the company's cash flow statement(Barth et al., 2001; Nallareddy et al., 2018).

Size=It represents the size of the company and is obtained from the natural logarithm of the company's market capitalization(Fama & French, 2001; Grullon & Michaely, 2002).

Lev=It represents the financial leverage of the company, which is calculated using the ratio of total debt to total assets of the company(Fama & French, 2001; Grullon & Michaely, 2002).

(3)

$$Lev_{it} = \frac{TD_{it}}{TA_{it}}$$

Where:

TD_{it}:The total debt of company i in year t.

TA_{it}: The total assets of company i in period/year t.

The adjusting variable

Systematic risk is determined by calculating the covariance between a company's stock returns and the overall market returns, which is then divided by the variance of the market returns. This relationship is mathematically represented in Equation 4.

(4)

$$Risk_{it} = \frac{cov(R_i . R_m)}{\delta_m^2}$$

3.3 Empirical Model

To test H1, according to we use the following OLS fixed effects model 1.

model (1)

$$\delta VCF_{it} = \alpha + B_1 Sentiment_{t-1} + B_2 cashflow_{i-t} + B_3 Size + B_4 Lev + \varepsilon_i$$

Where:VCF = volatility of cash flow; Sentiment=Investor sentiments; Cash flow= cash flow of the company; Size = the size of the company; Lev=the financial leverage of the company.

In the continuation of this study, to test H2, the following regression model 2 is utilized:

model (2)

$$\delta VCF_{it} = \alpha + B_1 Sentiment_{t-1} + B_2 Risk + B_3 Risk \times Sentiment_{t-1} + B_4 Size + B_5 Lev + \varepsilon_i$$

Where:VCF = volatility of cash flow; Sentiment=Investor sentiments; Risk =Systematic risk; Size= the size of the company; Lev = the financial leverage of the company.

4. EMPIRICAL RESULTS

4.1 Descriptive Statistics

Table 2 provides descriptive statistics for the variables utilized in the empirical analysis, offering insights into the distribution and variability of the data. The average volatility of cash flow (VCF) is reported at 1.614, indicating a relatively high level of cash flow volatility across the companies examined. The median value stands at 1.144, which signifies that half of the observations for VCF fall below this threshold while the other half exceed it. A comparison of the mean and median values suggests a right-skewed distribution, as the mean is higher than the median. The standard deviation of VCF is 0.505, reflecting the degree of dispersion around the mean; a larger standard deviation suggests greater variability in cash flow volatility among the firms. For the variable representing investor sentiment, the mean is recorded as zero, with a median of -0.364. The values range from a minimum of -2.431 to a maximum of 3.586, and the standard deviation is 1.276. This indicates a broad spectrum of investor sentiments, highlighting varied opinions within the market. The zero mean suggests that the data has undergone standardization. Regarding cash flow, the mean is 0.129, while the median is 0.115. The values span from a minimum of -0.504 to a maximum of 0.735, with a standard deviation of 0.130. These figures imply that cash flow values are generally clustered near the mean, although some companies do report negative cash flows.

The mean systematic risk (Risk) is calculated at 0.787, with a median value of 0.823. The range of this variable extends from a minimum of 0.000 to a maximum of 1.327, accompanied by a standard deviation of 0.296. These statistics illustrate a significant variation in systematic risk among the companies, with some exhibiting no risk at all, while others display notably high levels of risk. For the variable representing company size (Size), the mean value is 13.582, with the median at 13.247. The minimum and maximum sizes recorded are 11.816 and 17.437, respectively, and the standard deviation stands at 0.244. This indicates that while there is variability in company sizes, it is less pronounced compared to the systematic risk variable.In terms of financial leverage (Lev), the mean value is 0.590, with a median of 0.604. The range for this variable extends from a minimum of 0.096 to a maximum of 0.934, resulting in a standard deviation of 0.160. This suggests that the

companies exhibit diverse levels of financial leverage, although the degree of dispersion is relatively moderate.

The presence of non-zero standard deviations for these variables indicates variability in the data, which is essential for their incorporation into the regression model. This variability enhances the model's capacity to effectively capture the relationships among the variables.

Table 2. Descriptive Statistics

Variables	Mean	Median	Maximum	Minimum	Std. Dev.
VCF_{it}	1.614	1.144	5.133	0.218	0.505
***Sentiment*$_{t-1}$**	0.000	-0.364	3.586	-2.431	1.276
Cashflow	0.129	0.115	0.735	-0.504	0.130
Risk	0.787	0.823	1.327	0.000	0.296
Size	13.582	13.247	17.437	11.816	0.244
Lev	0.590	0.604	0.934	0.096	0.160

Variable definitions:

Where:VCF = volatility of cash flow; Sentiment=Investor sentiments; Cash flow= cash flow of the company; Risk=Systematic risk; Size= the size of the company; Lev=the financial leverage of the company.

The descriptive statistics indicate that the variables—VCF, Sentiment, Cash Flow, Risk, Size, and Lev—exhibit a well-distributed range with varying levels of dispersion. This diversity enhances the suitability of these variables for inclusion in the regression analysis, as they provide meaningful variation that can clarify the relationships among investor sentiment, systematic risk, and cash flow volatility.

To evaluate multicollinearity among the explanatory variables in this study, the Variance Inflation Factor (VIF) was employed. A VIF value below 10 for any variable suggests that multicollinearity is not a concern among the explanatory variables. Additionally, the correlation coefficient table was utilized to further investigate the presence or absence of multicollinearity among the independent variables. This analysis ensures the robustness of the regression model by confirming that the variables are sufficiently independent of one another.

Table 3. Variance Inflation Factor (VIF) Test for the Model

Variable	VIF
VCF_{it}	1.461562
Sentiment$_{t-1}$	3.034655
Cashflow	1.416191
Risk	2.835870
Size	1.642576
Lev	1.461562
C	3.034655

Since the VIF values are less than 5, it can be concluded that there is no multicollinearity.

4.2. The effect of investor sentiments on the volatility of cash flow

Table 4 illustrates the influence of investor sentiments on cash flow volatility. The results indicate that the significance levels for investor sentiment, cash flow, and company size are all below 0.05, suggesting that their effects are statistically significant. In contrast, the significance level for the effect of financial leverage (Lev) does not reach this threshold, indicating it is not significant. Consequently, we can conclude that investor sentiment exerts a positive and significant influence on fluctuations in cash flow.

Table 4. The effect of investor sentiments on the volatility of cash flow

Variable	Coefficient	t-Statistic	Prob.
$Sentiment_{t-1}$	0.54250	4.27821	0.000***
$cashflow_{i-t}$	-1.18649	-2.28438	0.011**
Size	0.01060	2.40275	0.023**
Lev	-0.01407	-3.03940	0.987
C	0.80336	10.94973	0.000***
Year fixed effects	Yes	Industry fixed effects	Yes
R-squared	0.140141	Adjusted R-squared	0.134252
Durbin-Watson stat		2.038197	
F-statistic	16.093859	Prob(F-statistic)	0.000000

Notes:
1. ***, ** and * denote significance at the 1, 5 and 10 percent levels respectively.
2. Variable definitions: Where: VCF = volatility of cash flow; Sentiment=Investor sentiments; Cashflow= cash flow of the company; Size= the size of the company; Lev= the financial leverage of the company.

Investor sentiment exerts a positive and statistically significant influence on cash flow volatility, with a coefficient of 0.54250 and a t-statistic of 4.27821. The significance level ($p < 0.01$) confirms the robustness of this result, indicating that increases in investor sentiment lead to corresponding increases in cash flow volatility. Conversely, cash flow itself demonstrates a negative and significant effect on its volatility, as evidenced by a coefficient of -1.18649 and a t-statistic of -2.28438. This finding, significant at the $p < 0.05$ level, suggests that higher cash flow levels are linked to reduced volatility, underscoring the stabilizing effect that larger cash flows can have.

Company size demonstrates a positive and significant effect on cash flow volatility, reflected in a coefficient of 0.01060 and a t-statistic of 2.40275. The significance level ($p < 0.05$) indicates that larger firms typically experience greater volatility in their cash flows, likely due to the complexities and scale associated with their operations. In contrast, financial leverage does not significantly influence cash flow volatility, as shown by a coefficient of -0.01407 and a t-statistic of -3.03940, accompanied by a high p-value (0.987). This finding suggests that leverage is not a meaningful predictor of cash flow volatility in this analysis. Additionally, the constant term is both positive and highly significant, with a coefficient of 0.80336 and a t-statistic of 10.94973, indicating a baseline level of cash flow volatility when all other variables are controlled.

The model fit is assessed through an R-squared value of 0.140141, indicating that roughly 14% of the variability in cash flow volatility can be attributed to the predictors in the model. The adjusted R-squared value of 0.134252 further confirms that the model's fit remains modest even after accounting for the number of predictors used. The Durbin-Watson statistic stands at 2.038197, which suggests that there is no significant autocorrelation present in the residuals. Moreover, the overall model demonstrates statistical significance, as evidenced by an F-statistic of 16.093859 (with a p-value of

0.000000), indicating that the independent variables collectively have a meaningful impact on the dependent variable.
These findings collectively emphasize the significance of taking into account investor sentiment and company-specific factors, such as cash flow and company size, when evaluating cash flow volatility. In contrast, financial leverage does not appear to have a substantial impact within this analysis.

4.3. The moderating effect of risk on the relationship between investor sentiment and cash flow volatility

Table 5 displays the findings from the regression analysis, which investigates how systematic risk moderates the relationship between investor sentiment and cash flow volatility (VCF). The model as a whole is statistically significant, evidenced by an F-statistic of 17.828089 and a corresponding p-value of 0.000000. This indicates that the independent variables together account for a notable portion of the variance in cash flow volatility. Furthermore, the Durbin-Watson statistic, recorded at 2.293655, lies within the acceptable range of 1.5 to 2.5, suggesting that there is no autocorrelation present in the residuals of the model. The coefficient for investor sentiment (Sentimentt-1) is 0.68686, with a t-statistic of 2.17975 and a p-value of 0.029. This positive coefficient is statistically significant at the 5% level, indicating that an increase in investor sentiment corresponds with an increase in cash flow volatility.

Table 5. The moderating effect of risk on the relationship between investor sentiment and cash flow volatility

Variable	Coefficient	t-Statistic	Prob.
$Sentiment_{t-1}$	0.68686	2.17975	0.029**
Risk	0.068119	2.178848	0.0306**
$Risk \times Sentiment_{t-1}$	0.075927	3.005554	0.0003***
Size	0.82587	2.05865	0.039**
Lev	-1.51764	-0.77645	0.445
C	0.00162	0.08775	0.930
Year fixed effects	Yes	Industry fixed effects	Yes
R-squared	0.025122	Adjusted R-squared	0.024960
Durbin-Watson stat		2.293655	
F-statistic	17.828089	Prob(F-statistic)	0.000000

1. ***, **, and * denote significance at the 1, 5, and 10 percent levels respectively.
2. Variable definitions:VCF = volatility of cash flow; Sentiment=Investor sentiments; Risk =Systematic risk; Size= the size of the company; Lev= the financial leverage of the company

The coefficient for systematic risk (Risk) stands at 0.0681, accompanied by a t-statistic of 2.1788 and a p-value of 0.0306. This finding, which is statistically significant at the 5% level, indicates that systematic risk has a direct positive effect on cash flow volatility; as systematic risk increases, so does cash flow volatility. Furthermore, the interaction term (Risk × Sentimentt-1) shows a coefficient of 0.0759, a t-statistic of 3.0056, and a p-value of 0.0003. This result is highly significant at the 1% level, confirming that systematic risk serves as a moderator in the relationship between investor sentiment and cash flow volatility, meaning that higher systematic risk intensifies the impact of investor sentiment on cash flow fluctuations.Regarding the size of the company (Size), its coefficient is 0.8259, with a t-statistic of 2.0587 and a p-value of 0.039. This positive and

statistically significant coefficient at the 5% level indicates that larger firms tend to experience greater cash flow volatility, suggesting that company size contributes to variability in cash flows. Conversely, the leverage (Lev) coefficient is -1.5176, with a t-statistic of -0.7765 and a p-value of 0.445. The high p-value signifies that leverage does not have a statistically significant effect on cash flow volatility in this model. Finally, the constant term (C) has a coefficient of 0.0016, a t-statistic of 0.0878, and a p-value of 0.930. This result indicates that, when all other variables are held at zero, the mean level of cash flow volatility is not statistically distinguishable from zero.

The regression results indicate that investor sentiment has a positive and significant effect on cash flow volatility. Additionally, systematic risk not only positively influences cash flow volatility but also significantly moderates the relationship between investor sentiment and cash flow volatility, thereby enhancing this effect. Furthermore, company size is shown to contribute to increased cash flow volatility, while leverage appears to have no significant impact. These findings provide support for hypothesis H2, which posits that risk moderates the relationship between investor sentiment and cash flow volatility.

5. CONCLUSIONS

In this research, we explored the intricate relationships between investor sentiment, cash flow volatility, and the moderating influence of risk attenuation. The goal was to determine how investor sentiment impacts cash flow volatility and how risk tolerance modifies this interaction. The findings yield several important insights. Firstly, we established that investor sentiment has a significant effect on cash flow volatility. The regression analysis revealed a positive coefficient for investor sentiment, suggesting that as investor sentiment rises, cash flow volatility also increases. This finding supports the assertions of Hirshleifer (2015) and Dautaj (2023), who emphasize that psychological factors and sentiment among investors can play a critical role in shaping market behavior and financial stability. Our results highlight that investor attitudes and perceptions are not merely fleeting but can have a substantial impact on a company's financial volatility.

Secondly, the research investigated how risk attenuation moderates the relationship between investor sentiment and cash flow volatility. The significant coefficient associated with risk tolerance indicates that an organization's risk management practices can modify the effect of investor sentiment. This finding supports the conclusions of Shin and Choi (2022), who emphasized that effective risk management strategies can alleviate the negative consequences of elevated investor sentiment. It also aligns with the insights of Rahmani et al. (2021), who examined various risk attenuation approaches and their critical role in stabilizing financial outcomes. The statistical significance of the coefficients related to both investor sentiment and risk attenuation suggests that these variables play a meaningful role in our analysis, rather than being the result of random fluctuations. Additionally, the Durbin-Watson statistic confirms the absence of autocorrelation, further enhancing the credibility of our findings. This robustness indicates that the relationships identified in the study are genuine and not merely artifacts arising from data dependencies.

In conclusion, this research substantiates our second hypothesis, which asserts that risk attenuation moderates the relationship between investor sentiment and cash flow volatility. This finding underscores the vital importance of risk management in financial decision-making, as it has the potential to either magnify or mitigate the impact of investor sentiment on cash flow dynamics. Such insights are particularly useful for financial managers and policymakers, providing direction on how to maintain financial stability in the face of fluctuating investor sentiments and varying risk

profiles. Future studies could investigate industry-specific contexts or consider additional moderating variables to enhance our comprehension of this complex relationship.

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