News Sentiment and Abnormal Stock Returns: Evidence from the Qatar Stock Exchange

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Abstract

This paper examines how emotion-specific news sentiment affects short-term stock price reactions in an emerging market. Using 7,624 firm-level news headlines from the Qatar Stock Exchange and daily stock price data covering the time period 2010-2024, the study analyzes how distinct emotional dimensions influence abnormal returns around news release dates. Sentiment is measured using syuzhet which is a multi-dimensional lexicon that captures emotions.

The empirical design combines standard event-study regressions with regression tree models to capture both average effects and non-linear interactions across emotions. This framework allows the analysis to distinguish between emotions that signal adverse information and those that reflect forward-looking expectations, while accounting for delayed price adjustment in a market characterized by limited liquidity and high information asymmetry.

By focusing on emotion-level sentiment rather than aggregate polarity measures, the paper provides theory-driven evidence on short-term price formation in the Qatar Stock Exchange. The findings contribute to the literature by showing that multi-dimensional sentiment contains economically relevant information that is not captured by conventional positive or negative sentiment indicators in emerging markets.

1. Introduction

Financial markets react to news because news changes investor beliefs, expectations, and perceptions of risk. A large literature shows that sentiment extracted from textual information can explain stock return movements beyond standard risk factors (Xue & Comite, 2020; Kim & Ryu, 2020). While this link is well documented in developed markets, much less is known about how specific emotions in news affect stock prices in emerging markets. This gap is important because emerging markets often exhibit lower liquidity, higher information asymmetry, and stronger behavioral trading, which can amplify sentiment effects (Anusakumar et al., 2017; Ahmed, 2018).

This paper studies the Qatar Stock Exchange, an emerging market where firm-specific news plays an important role in price discovery. Prior work shows that domestic sentiment has measurable effects on trading activity and returns in Qatar, which suggests that investor behavior is sensitive to news content (Ahmed, 2020). In such markets, qualitative information can influence prices more strongly and may persist for several days after the initial announcement.

Instead of using a single positive or negative sentiment score, this paper applies a multi-dimensional sentiment framework that distinguishes between emotions such as anger, anticipation, fear, joy, and trust. Recent studies show that different emotions produce different financial outcomes because they reflect different types of investor reactions and expectations (Deng et al., 2025; Huang et al., 2025). Anger signals blame and negative shocks, anticipation reflects forward-looking expectations, and fear captures uncertainty. These differences matter for understanding how markets interpret news.

The main research question is: how do different dimensions of news sentiment affect abnormal stock returns on the event day and in the days that follow on the Qatar Stock Exchange?

This paper makes three contributions. First, it develops a behavioral framework linking specific emotions to investor reactions and price formation. Second, it provides clean event-study evidence on the immediate and short-term effects of multi-dimensional sentiment at the firm level. Third, it offers new empirical evidence from the Qatar Stock Exchange, an understudied emerging market where sentiment effects may be stronger due to market structure. The analysis uses both linear regressions and regression trees to capture persistence, drift, and non-linear interactions between emotions.

The literature shows that news sentiment plays an important role in explaining stock return movements. In particular, sentiment embedded in firm-specific news has been shown to influence short-horizon abnormal returns around information events. Early studies show that sentiment extracted from textual data improves the explanatory power of return models beyond standard risk factors, especially at short horizons. Xue and Comite (2020) show that text-based sentiment helps explain price movements, while Kim and Ryu (2020) find that investor sentiment predicts returns at both daily and monthly horizons. These findings show that markets do not always incorporate qualitative information immediately or fully. Evidence from emerging markets suggests that these effects may be even stronger. Such as Anusakumar et al. (2017), who show that both firm-level and market-wide sentiment are positively related to stock returns in emerging Asian markets. And in the context of Qatar specifically which is what this paper

focuses on, Ahmed (2020) finds that domestic sentiment significantly affects market performance including in countries with characteristics similar to Qatar. These studies suggest that sentiment is priced more strongly in markets with higher information frictions and more behavioral trading. This insight is particularly relevant for event-based analyses in emerging markets, where firm-level news may generate sharp and persistent abnormal price movements.

While this literature establishes that sentiment matters, it remains less clear which specific emotional components drive short-term price reactions. Most existing work treats sentiment as a single positive or negative measure, but recent research highlights the importance of studying different types of emotions. Deng et al. (2025) propose a multi-dimensional sentiment framework and show that different sentiment components have distinct effects on stock returns. This framework is especially relevant for short-horizon event studies, where different emotions may trigger different immediate trading responses. Huang et al. (2025) further show that the impact of sentiment depends on the relevance of the news and the return horizon, and that aggregating sentiment can hide meaningful variation across emotions. Gambarelli and Muzzioli (2025) also find that sentiment constructed from multiple dimensions helps explain cross-sectional return differences after controlling for standard risk factors. Taken together, these studies suggest that emotions convey different information about expectations and risk, implying that emotions such as anger and anticipation may generate distinct abnormal return patterns around news events.

Event-study research is particularly useful for isolating the timing and persistence of sentiment-driven price effects. Event-study research provides additional evidence that news sentiment

generates strong price reactions around announcement dates. Song et al. (2015) find that extreme firm-specific sentiment leads to large and asymmetric abnormal returns, and trading strategies based on such cases earn abnormal profits. Seok et al. (2021) use intraday data and show that sentiment shocks affect prices, volatility, and trading activity immediately, and that part of the effect persists. Kim and Ryu (2020) also show that sentiment predicts returns for several weeks, although the magnitude declines over time. This gradual decay motivates examining post-event abnormal returns over multiple trading days rather than focusing solely on the event day. Evidence from emerging markets points to stronger persistence, as shown by Anusakumar et al. (2017). Huang et al. (2025) document that pessimistic news can predict higher future returns over longer horizons, which is consistent with initial overreaction followed by correction. Together, these studies show that sentiment affects both event-day abnormal returns and post-event dynamics, particularly in markets where price adjustment is gradual.

Market microstructure plays an important role in shaping sentiment effects. In markets with lower liquidity and higher retail participation, sentiment-driven trading can produce larger and more persistent price movements. Ahmed (2018) shows that the Qatar Stock Exchange exhibits a strong relationship between trading volume and price changes, with higher volatility around information events. Ahmed (2020) also shows that domestic sentiment affects market returns and volatility. These findings suggest that the Qatar Stock Exchange is sensitive to news and sentiment, and that firm-specific news is likely to influence price formation. This market structure makes the Qatar Stock Exchange a suitable setting for firm-level event studies that examine emotion-driven abnormal returns.

Despite these insights, important gaps remain in understanding how sentiment affects short-term abnormal returns in emerging markets. First, there is limited evidence on how specific emotions, rather than aggregate sentiment, affect short-term abnormal returns. Second, firm-level evidence from the Qatar Stock Exchange using event-based abnormal returns is scarce. Third, few studies examine both event-day and post-event dynamics using a consistent abnormal return framework. This paper addresses these gaps by studying multi-dimensional news sentiment and abnormal stock returns in the Qatar Stock Exchange using a symmetric event window. By linking specific emotions to firm-level abnormal returns around news events, this paper provides clearer evidence on the behavioral mechanisms underlying sentiment-driven mispricing in an emerging market. These gaps motivate a framework that links emotion-specific sentiment to event-day and post-event abnormal returns in the Qatar Stock Exchange.

2. Conceptual Framework and Hypothesis Development

Investor reactions to news are not purely rational. Behavioral finance shows that emotions influence how investors process information and trade (Kartini et al., 2021). Different emotions trigger different behavioral responses.

Anger is associated with certainty, blame, and aggressive decision-making (Barnum, 2019). In financial markets, anger-related news can lead to selling pressure as investors react quickly and strongly to perceived negative signals. In markets with limited liquidity, such reactions can push prices below fundamental value.

Anticipation reflects forward-looking expectations. News containing anticipation often signals upcoming positive events such as earnings growth or dividends. Investors may respond by gradually building positions, leading to modest but positive abnormal returns.

Market microstructure further amplifies these effects in emerging markets. Lower liquidity and higher retail participation increase the impact of sentiment-driven trades on prices. As a result, emotional reactions may persist beyond the event day.

Based on this framework, the paper tests the following hypotheses:

H1: News headlines containing anger are associated with negative abnormal returns on the event day.

H2: The negative effect of anger persists for several trading days after the news release.

H3: News headlines containing anticipation are associated with positive abnormal returns.

3. Data and Methodology

3.1 Data Sources

The data for this study is collected from multiple sources. Firm-level news headlines are obtained directly from the Qatar Stock Exchange website. These headlines span the period from 2006 to 2025 and were provided by QSE management. This ensures that the news data reflects official and market-relevant disclosures.

Stock price and trading volume data for QSE-listed firms are collected from LSEG (2025) Refinitiv using the Refinitiv API. The price data covers the period from 2010 to the end of 2024.

The overlap between news and price data determines the final sample used in the empirical analysis. After merging the datasets and applying standard filters, the final sample consists of 7,624 firm-specific news events.

3.2 Return and Abnormal Return Calculation

To measure the price impact of news events, daily stock returns are calculated using closing prices. For each news event, returns are computed for the five trading days before the news release, the event day, and the five trading days after the event.

Abnormal returns are calculated using a firm-specific benchmark. For each event, I compute the average daily return over the eleven trading days before the news release. The event day is day 0, and the expected return is the average return from day −14 to day −6. This average reflects what the firm's return would have been in the absence of new information.

Abnormal returns for the five days before the event, event day, and subsequent five days are then computed as the difference between the realized daily return and this benchmark. Formally, the abnormal return for firm i on day t is defined as the realized return on day t minus the average return over days $t - 14$ to $t - 6$. This approach isolates price movements that are attributable to the news event rather than normal price variation.

The analysis focuses on abnormal returns from day five pre-event, denoted as day −5, through day +5. This symmetric event window allows the study to examine both immediate market reactions and short-term persistence.

3.3 Sentiment Measurement

After preprocessing, sentiment is extracted using the syuzhet library in R. The analysis focuses on eight emotion dimensions: anger, anticipation, disgust, fear, joy, sadness, surprise, and trust. The positive and negative sentiment categories provided by the lexicon are not used in the analysis, as they overlap conceptually with the emotion-specific measures and do not provide additional information.

Each headline can be associated with multiple emotions. For example, a single news item may express both trust and anger. Sentiment scores are computed at the headline level and used directly in the regression analysis.

The use of multi-dimensional sentiment allows the study to distinguish between emotions that reflect negative reactions, such as anger and fear, and emotions that capture forward-looking expectations, such as anticipation and trust. This distinction is central to understanding the behavioral mechanisms driving price reactions.

Table 1: Average Abnormal Returns by Emotion (%)

Emotion	Emotion Status	Count	Day +1	Day +2	Day +3	Day +4	Day +5
Anger	No	7,197	-0.093	-0.016	-0.022	-0.007	-0.009
	Yes	427	-0.237	-0.336	-0.125	0.113	0.047
Anticipation	No	3,974	-0.126	-0.034	0.001	0.006	-0.013
	Yes	3,650	-0.074	-0.034	-0.059	-0.006	0.002
Disgust	No	7,519	-0.103	-0.037	-0.021	0.003	-0.009
	Yes	105	0.016	0.198	-0.484	-0.230	0.210
Fear	No	7,181	-0.090	-0.016	-0.020	-0.006	-0.003
	Yes	443	-0.275	-0.315	-0.151	0.102	-0.054
Joy	No	6,647	-0.085	-0.008	-0.019	-0.011	-0.014
	Yes	977	-0.209	-0.206	-0.085	0.072	0.049
Sadness	No	7,484	-0.098	-0.038	-0.020	0.004	-0.006
	Yes	140	-0.269	0.209	-0.432	-0.219	-0.008

Surprise	No	7,290	-0.100	-0.042	-0.021	0.006	-0.008
	Yes	334	-0.133	0.139	-0.169	-0.137	0.045
Trust	No	3,291	0.031	0.077	0.021	0.027	0.018
	Yes	4,333	-0.202	-0.118	-0.065	-0.020	-0.024
All		**7,624**	**-0.101**	**-0.034**	**-0.028**	**0**	**-0.006**

Table 1 reports average abnormal returns from day +1 to day +5 following news events, grouped by whether a specific emotion is present in the headline. For each sentiment dimension, the table provides a descriptive comparison between events classified as emotion Yes and emotion No. This comparison is intended to document systematic differences in post-event return behavior and to motivate the subsequent regression analysis.

News headlines containing anger or fear are followed by more negative abnormal returns across the post-event window relative to headlines where these emotions are absent, with differences persisting for several trading days. In contrast, anticipation and surprise are associated with less negative or occasionally positive abnormal returns when the emotion is present, particularly at longer horizons within the five-day window. Disgust and sadness display weaker and less stable patterns, with abnormal returns varying in sign across days and showing limited persistence. For joy and trust, abnormal returns are generally higher when the emotion is not present, suggesting that positive or confidence-related language does not translate into stronger short-term abnormal performance when explicitly expressed in headlines.

The day after the anouncement on average the return is negative by 10 basis points which indicates that, on average, prices tend to decline in the immediate post-event period even after adjusting for firm-specific benchmarks. This pattern suggests that news releases are followed by short-term downward price pressure rather than immediate abnormal gains. Importantly, this average decline masks substantial heterogeneity across emotions. While anger and fear are

associated with larger and more persistent negative abnormal returns, emotions such as anticipation and surprise are linked to smaller losses and, in some cases, partial reversals at longer horizons. This heterogeneity highlights that post-event abnormal return dynamics are not uniform across news events but depend critically on the emotional content of the headline.

Overall, these descriptive patterns indicate that post-event abnormal returns vary systematically with the emotional content of news headlines and that such differences often persist beyond the immediate trading day. The presence of multi-day variation across emotions supports the use of an extended event window and a multi-dimensional sentiment framework in the empirical analysis, consistent with prior evidence that emphasizes sentiment heterogeneity and delayed market adjustment in short-term return dynamics (Ahmed, 2018, 2020; Kim & Ryu, 2020; Xue & Comite, 2020).

Table 2: Average Daily Returns by Emotion (%)

Emotion	Emotion Status	Count	Day +1	Day +2	Day +3	Day +4	Day +5
Anger	No	7,197	-0.036	0.041	0.035	0.050	0.048
	Yes	427	-0.141	-0.239	-0.028	0.210	0.143
Anticipation	No	3,974	-0.065	0.028	0.063	0.067	0.048
	Yes	3,650	-0.017	0.023	-0.002	0.050	0.059
Disgust	No	7,519	-0.042	0.024	0.040	0.064	0.052
	Yes	105	-0.052	0.130	-0.552	-0.298	0.141
Fear	No	7,181	-0.034	0.040	0.036	0.050	0.053
	Yes	443	-0.167	-0.206	-0.042	0.210	0.054
Joy	No	6,647	-0.028	0.048	0.038	0.046	0.043
	Yes	977	-0.134	-0.131	-0.009	0.148	0.125
Sadness	No	7,484	-0.037	0.023	0.041	0.065	0.055
	Yes	140	-0.301	0.177	-0.464	-0.251	-0.040
Surprise	No	7,290	-0.040	0.018	0.039	0.066	0.051
	Yes	334	-0.083	0.189	-0.120	-0.087	0.094
Trust	No	3,291	0.059	0.105	0.049	0.055	0.046

	Yes	4,333	-0.119	-0.035	0.019	0.063	0.059
All		**7,624**	**-0.042**	**0.025**	**0.032**	**0.059**	**0.053**

Table 2 reports average daily stock returns from day +1 to day +5 following news announcements, grouped by whether a specific emotion is present in the headline. For each emotion, the table compares post-event return behavior between observations classified as emotion present and emotion absent. The final row reports average returns across all observations.

Several clear patterns emerge. First, news headlines containing anger or fear are followed by substantially more negative returns on day +1 and day +2 compared to headlines where these emotions are absent. For anger-related news, the average return on day +1 is −0.139 percent, compared to −0.036 percent when anger is not present. A similar pattern is observed for fear, where day +1 returns equal −0.190 percent when fear is present versus −0.033 percent otherwise. These differences indicate that emotionally negative news is associated with stronger short-term selling pressure immediately after the announcement.

Second, emotions related to expectations and uncertainty show more mixed dynamics. Anticipation is associated with less negative returns on day +1 and slightly higher returns on days +2 through +4 relative to the no-anticipation group. This pattern suggests that expectation-driven sentiment may soften immediate price declines and support modest recovery over subsequent days. Surprise also exhibits heterogeneous behavior, with positive average returns on day +2 and day +5 when surprise is present, but weaker or negative returns on other days. These

fluctuations indicate that novelty-related sentiment does not generate a uniform post-event return pattern.

Third, emotions such as sadness, disgust, and joy display high volatility and limited consistency across days. For sadness-related news, returns are sharply negative on day +1 at −0.305 percent, but positive on day +2, followed by renewed declines on day +3 and day +4. Disgust and joy show similarly unstable behavior, with large negative returns on some days and partial reversals on others. These patterns suggest that these emotions do not produce systematic post-event drift but may instead be associated with episodic and noisy price responses.

Finally, trust-related news is followed by lower returns on day +1 and day +2 relative to headlines without trust, despite higher returns at later horizons. On day +1, trust-related announcements generate an average return of −0.109 percent compared to a positive return of 0.018 percent when trust is absent. This finding suggests that explicitly confidence-related language may coincide with weaker short-term performance, potentially because optimistic sentiment is already incorporated into prices at the time of release.

Overall, Table 2 provides descriptive evidence that post-event return behavior varies meaningfully with the emotional content of news headlines. Negative emotions such as anger and fear are associated with sharper immediate declines, while anticipation and surprise exhibit more mixed and less persistent effects. These patterns motivate the subsequent regression analysis, which formally tests whether these differences remain statistically significant after controlling for other sentiment dimensions and examines whether such effects persist beyond the immediate post-event period.

3.4 FinBERT Sentiment Classification

As an alternative lexicon, sentiment is re-assesed using FinBERT, a transformer-based language model specifically trained for financial text classification (Araci, 2019). FinBERT is designed to capture domain-specific language, contextual meaning, and subtle tone variations that are often missed by general-purpose sentiment models. Unlike the baseline approach, which relies on multi-dimensional emotional signals, FinBERT classifies each headline into one of three mutually exclusive categories: positive, negative, or neutral. Using FinBERT allows the analysis to verify whether the main results are sensitive to the sentiment extraction method or remain stable when sentiment is measured using a pretrained financial language model. This approach is consistent with prior literature that emphasizes the importance of domain-adapted models in financial sentiment analysis due to the specialized and cautious nature of financial disclosures (Araci, 2019). The table below reports the distribution of sentiment labels generated by the FinBERT model.

Table 3. FinBERT Sentiment Classification Distribution

Sentiment	Count
Neutral	7,422
Positive	99
Negative	103
All	7,624

Table 3 reports the distribution of FinBERT sentiment classifications across all firm-level news observations. The results show that the majority of headlines are classified as neutral, with 7,422 neutral observations, compared to 99 positive and 103 negative observations. This distribution is expected in the context of corporate press releases and official news disclosures. Firms have

strong incentives to maintain a neutral tone in public communications to reduce legal risk, avoid market overreaction, and comply with disclosure regulations. As a result, financial announcements often emphasize factual reporting, balanced language, and cautious phrasing rather than explicitly positive or negative sentiment. This pattern is well documented in the financial text analysis literature, which shows that neutral sentiment dominates firm-issued communications even when the underlying information content is economically meaningful (Araci, 2019). The small but non-trivial share of positive and negative classifications reflects cases where language deviates from this neutral baseline, making these observations particularly informative for testing the robustness of sentiment–return relationships.

3.5 Empirical Design

The empirical analysis is conducted in four stages. This design follows the literature on sentiment-driven price reactions, which shows that news affects stock returns through both immediate responses and short-term dynamics, and that these effects may be non-linear. By combining event-day regressions, forward return regressions, and regression tree models, the analysis captures both average effects and interaction-driven outcomes that are emphasized in recent sentiment research.

3.5.1 Event-Day Regression

The first stage examines the immediate market reaction to firm-specific news. Event-day regressions are widely used in the literature to capture how quickly markets incorporate new information (Song et al., 2015; Seok et al., 2021). In the context of sentiment, this approach

allows us to test whether emotional content embedded in news headlines is priced on the day of release.

For each news event, the abnormal return on the event day is regressed on the sentiment scores extracted from the corresponding headline:

$$(1)\ AR_{i,0} = \alpha + \sum_{k=1}^{8} \beta_k\ Sentiment_{i,k} + \varepsilon_i$$

where $AR_{i,0}$ is the abnormal return of firm i on the news release date, and $Sentiment_{i,k}$ represents the eight emotion scores: anger, anticipation, disgust, fear, joy, sadness, surprise, and trust. The error term ε_i captures unexplained return variation.

This specification follows studies that model sentiment as a direct input into price formation rather than as a latent factor (Xue and Comite, 2020). The coefficients β_k measure the marginal effect of each emotion on abnormal returns. This setup is consistent with behavioral finance theory, which predicts that different emotions convey different signals about expectations, risk, and investor confidence.

3.5.2 Forward Abnormal Return Regressions

The second stage examines whether sentiment effects persist beyond the event day. Prior research shows that sentiment-driven price reactions may not fully reverse immediately, especially in markets with lower liquidity and higher information asymmetry (Kim and Ryu, 2020; Anusakumar et al., 2017).

For each horizon $i = 1, \ldots, 5$, the following regression is estimated:

$$(2)\ AR_{i,+i} = \alpha + \sum_{k=1}^{8} \beta_k\ Sentiment_{i,k} + \varepsilon_i$$

where $AR_{i,+i}$ denotes the abnormal return of firm i on day $+i$ relative to the news release. The sentiment variables are identical to those used in the event-day regression, which ensures comparability across horizons.

Estimating these regressions separately for each post-event day allows the analysis to trace the dynamic adjustment of prices. Persistent significance of sentiment coefficients is consistent with delayed market adjustment or investor underreaction, while declining effects indicate gradual correction. This approach mirrors the methodology used in studies that document sentiment persistence and reversal patterns (Song et al., 2015; Huang et al., 2025).

3.5.3 Backward Abnormal Return Regressions

The third stage examines whether price adjustments related to sentiment begin before the news release date. Prior research shows that sentiment effects may appear before formal announcements due to information leakage, anticipatory trading, or slow information diffusion, especially in markets with lower liquidity and higher information asymmetry. Evidence from emerging markets indicates that sentiment effects are stronger and more persistent in these settings (Anusakumar et al., 2017). Kim and Ryu (2020) also show that sentiment predicts returns over several weeks, which suggests that part of the sentiment effect may occur before the event day. Song et al. (2015) find that extreme sentiment generates asymmetric abnormal returns, which can reflect both pre-event drift and post-event adjustment. Market-specific evidence from Qatar shows that trading activity responds strongly to information and sentiment, which may

contribute to earlier price movements (Ahmed, 2018, 2020). These findings motivate examining the days before the news release to test for potential anticipatory effects.

For each horizon $i = -5, \ldots, -1$, the following regression is estimated:

$$AR_i = \alpha + \sum_{k=1}^{8} \beta_k \text{ Sentiment}_k + \varepsilon_i$$

where AR_i denotes the abnormal return of firm i on day i relative to the event date. The sentiment variables are the same as those used in the event-day regression, which ensures comparability across horizons.

Estimating these regressions separately for each pre-event day allows the analysis to test whether sentiment contains information that affects prices before the official news release. Persistent significance of sentiment coefficients would be consistent with information leakage or anticipatory trading, while weaker or insignificant effects would indicate that sentiment influences prices primarily at or after the event date. This approach follows studies that document pre-event drift and delayed information processing in markets with higher frictions (Anusakumar et al., 2017; Kim & Ryu, 2020; Song et al., 2015).

3.5.4 Regression Tree Analysis

The next stage of the methodology introduces regression tree models to account for non-linear relationships and interaction effects between emotions. Recent work shows that sentiment effects can be asymmetric and threshold-based, which means that average linear effects may hide economically important extremes (Deng et al., 2025; Song et al., 2015). Regression trees are well

suited to detecting such patterns because they split observations based on cutoffs that best explain variation in abnormal returns.

For each day in the event window, a separate regression tree is estimated. This includes the event day and ten additional days from day −5 to day +5, resulting in a total of eleven trees. The dependent variable in each model is the abnormal return for that specific day, and the independent variables are the eight sentiment scores. All trees are estimated using the rpart library in R. To reduce overfitting, the tree depth is limited and a minimum number of observations is required for each split. The rpart algorithm selects splits by choosing the sentiment variable and cutoff that produce the largest reduction in squared error at each step. This procedure identifies dominant emotions, threshold values, and meaningful interactions that influence abnormal returns.

3.5.5 Interpretation of Regression Tree Structure

The regression tree design provides a structured way to identify which emotions are most influential at different points in the event window. The first split in a tree represents the most important sentiment dimension for explaining variation in abnormal returns. Later splits show how emotions interact and which thresholds matter most. This is consistent with evidence that different emotions carry different financial meaning and produce different reactions from investors (Huang et al., 2025). Trees therefore allow the analysis to detect clusters of observations where combinations of emotions generate unusually large negative or positive outcomes. These patterns reflect the behavioral mechanisms documented in studies of extreme sentiment and asymmetric return responses (Song et al., 2015).

3.5.6 Contribution of the Non-Linear Analysis

The regression tree analysis adds value by capturing non-linear patterns that cannot be identified through linear regressions. Prior research shows that extreme sentiment cases often drive a disproportionate share of abnormal returns (Song et al., 2015). Trees make it possible to isolate these cases and understand the emotion combinations behind them. This approach also aligns with evidence that emerging markets may be more sensitive to sentiment because of lower liquidity and stronger behavioral trading (Anusakumar et al., 2017). By combining linear models with regression trees, the empirical framework captures both average effects and interaction-driven extremes. This provides a more complete view of how multi-dimensional sentiment influences short-term stock returns in the Qatar Stock Exchange.

4. Empirical Results

4.1 Event-Day Results

Table 4 reports the event-day regression results, where abnormal returns on the news release date are regressed on eight sentiment dimensions extracted from firm-level headlines. This specification follows the standard event-study framework used to measure immediate market reactions to emotional content in financial news (Song et al., 2015; Seok et al., 2021).

The results show that only a subset of emotions has a statistically significant impact on abnormal returns on the event day. Anger has a negative and highly statistically significant coefficient of −1.473 percent, indicating a strong adverse market reaction to anger-related language. This magnitude is economically large for a single trading day and is consistent with evidence that anger conveys adverse firm-specific information that triggers immediate selling pressure (Song

et al., 2015). In the context of the Qatar Stock Exchange, such sharp reactions align with prior findings that markets with lower liquidity respond strongly to emotionally negative news (Ahmed, 2018).

Table 4. Event-Day Regression Results

	Dependent variable:
	Abnormal Daily Return (%)
anger	-1.473***
	(0.307)
anticipation	0.097*
	(0.050)
disgust	0.388
	(0.307)
fear	-0.409
	(0.288)
joy	-0.046
	(0.100)
sadness	1.210***
	(0.270)
surprise	0.319**
	(0.135)
trust	-0.053
	(0.045)
Constant	-0.059
	(0.045)
Observations	7,624
R^2	0.030
Adjusted R^2	0.029
Residual Std. Error	2.416 (df = 7615)
F Statistic	29.494*** (df = 8; 7615)
Note:	*p<0.1; **p<0.05; ***p<0.01, Standard errors are in parentheses

Anticipation exhibits a positive and statistically significant coefficient of 0.097 percent. Although the magnitude is modest, the positive sign suggests that expectation-related sentiment is associated with favorable immediate price reactions. This finding is consistent with studies showing that forward-looking or optimistic language can generate short-horizon abnormal returns when investors interpret such sentiment as a signal of positive future outcomes (Kim & Ryu, 2020).

Sadness also displays a positive and statistically significant effect, with a coefficient of 1.210 percent. While sadness is a negative emotion, prior research suggests that it may reflect reflective or empathetic content rather than imminent negative firm outcomes. As a result, sadness-related sentiment may not induce immediate selling pressure and can be associated with short-term mispricing or delayed adjustment (Anusakumar et al., 2017).

Surprise has a positive and statistically significant coefficient of 0.319 percent, indicating that unexpected or unusual news content is associated with higher abnormal returns on the event day. This result is consistent with evidence that surprise captures novelty and attention effects that can amplify immediate market reactions (Song et al., 2015).

The remaining sentiment dimensions, including disgust, fear, joy, and trust, do not exhibit statistically significant effects on event-day abnormal returns. The constant term is also not statistically significant, indicating no systematic abnormal return on the event day after controlling for sentiment. Overall, the event-day results provide clear evidence that emotional content in firm-specific news affects immediate stock price reactions, but that these effects are driven by specific emotions rather than by sentiment in general. This heterogeneity motivates the subsequent analysis of backward and forward abnormal returns to assess whether these effects

emerge before or persist after the event date. These findings motivate the analysis of forward and backward abnormal returns to examine whether sentiment effects persist or reverse after day 0.

4.2 Post-Event Dynamics

Table 5 presents the forward abnormal return regressions for days +1 through +5 following the news release. The analysis evaluates whether sentiment-related price effects persist beyond the event date, which would be consistent with delayed adjustment or behavioral trading. Prior studies suggest that in emerging markets, sentiment-driven reactions may continue after announcements due to information frictions and gradual diffusion (Anusakumar et al., 2017; Ahmed, 2018; Kim & Ryu, 2020).

The results indicate limited post-event persistence of sentiment effects. Anger is not statistically significant from day +1 through day +4, but becomes positive and statistically significant on day +5, with a coefficient of 0.500 percent. This suggests that anger-related sentiment does not generate immediate post-event drift, but may be associated with a delayed reaction several days after the announcement. Fear shows a negative and statistically significant effect only on day +5, with a coefficient of −0.540 percent, indicating a late adverse response rather than a sustained post-event pattern.

Trust displays the most consistent post-event association. The coefficient on trust is negative and statistically significant on day +1 at −0.147 percent, on day +2 at −0.084 percent, and on day +4 at −0.075 percent. These results suggest that trust-related language is associated with lower abnormal returns in the days following the announcement, although the effect is not monotonic across the full post-event window. Anticipation does not exhibit statistically significant

coefficients on any forward day, indicating that expectation-related sentiment does not persist after the event once the news becomes public.

Table 5: Forward Abnormal Return Regressions

	Dependent Variable: Abnormal Daily Return (%)				
	Day +1	Day +2	Day +3	Day +4	Day +5
anger	-0.042	-0.378	0.168	0.197	0.500*
	(0.314)	(0.277)	(0.265)	(0.262)	(0.264)
anticipation	0.061	0.026	-0.059	-0.053	0.023
	(0.051)	(0.045)	(0.043)	(0.043)	(0.043)
disgust	0.387	0.226	-0.314	-0.204	0.297
	(0.313)	(0.276)	(0.264)	(0.261)	(0.263)
fear	-0.063	0.058	-0.109	-0.018	-0.540**
	(0.294)	(0.260)	(0.248)	(0.245)	(0.248)
joy	0.020	-0.055	0.006	0.114	0.064
	(0.103)	(0.091)	(0.086)	(0.086)	(0.086)
sadness	-0.331	0.213	-0.242	-0.210	-0.086
	(0.276)	(0.244)	(0.232)	(0.230)	(0.232)
surprise	0.019	0.119	-0.059	-0.030	0.002
	(0.138)	(0.122)	(0.116)	(0.115)	(0.116)
trust	-0.147***	-0.084**	-0.032	-0.075**	-0.052
	(0.046)	(0.040)	(0.039)	(0.038)	(0.038)
Constant	-0.031	0.022	0.033	0.062	0.009
	(0.046)	(0.041)	(0.039)	(0.038)	(0.039)
Observations	7,624	7,624	7,624	7,624	7,624
R^2	0.002	0.003	0.001	0.001	0.001
Adjusted R^2	0.001	0.002	0.0004	0.0004	0.0002
Residual Std. Error (df = 7615)	2.466	2.178	2.078	2.056	2.075
F Statistic (df = 8; 7615)	1.929*	2.663***	1.364	1.346	1.148

Note: *p<0.1; **p<0.05; ***p<0.01, Standard errors are in parentheses

The remaining emotions, including disgust, joy, sadness, and surprise, do not show statistically significant effects on abnormal returns across the post-event horizon. In addition, the constant term is not statistically significant on any forward day, suggesting no systematic post-event drift after controlling for sentiment. Overall, the forward regressions provide weak evidence of persistent sentiment-driven price adjustment. Most emotional signals do not influence returns beyond the event date, and the significant effects that do appear are isolated to specific emotions and days, which is consistent with episodic rather than sustained post-event sentiment effects in emerging markets (Song et al., 2015; Anusakumar et al., 2017; Ahmed, 2020). These patterns support the need to analyze non-linear relationships and interaction effects, which is addressed in the next section using regression tree models.

4.3 Pre-Event Dynamics

Table 5 reports the backward abnormal return regressions for days −1 to −5 before the news release. The analysis examines whether sentiment-related price movements arise prior to the event date, which would be consistent with anticipatory trading, information leakage, or gradual information diffusion. Such pre-event effects have been documented in emerging markets where market frictions and uneven information flows are more pronounced (Anusakumar et al., 2017; Ahmed, 2018; Kim & Ryu, 2020).

The results show limited and uneven evidence of pre-event sentiment effects. Anger is statistically significant only on day −3, with a positive coefficient of 0.684 percent, and on day −4, with a negative coefficient of −0.498 percent. The absence of significance on the remaining days suggests that anger-related sentiment does not generate a stable pre-event return pattern. Anticipation displays positive and statistically significant coefficients on day −1 at 0.107 percent

and on day −3 at 0.100 percent, while remaining insignificant on other backward horizons. This pattern indicates that expectation-related language may be partially priced shortly before the announcement, but not consistently across the full pre-event window.

Table 6: Backward Abnormal Return Regressions (Day -1 to -5) all values in (%)

	Dependent Variable: Abnormal Daily Return (%)				
	Day -1	Day -2	Day -3	Day -4	Day -5
anger	0.169	-0.005	0.684***	-0.498*	-0.151
	(0.263)	(0.266)	(0.256)	(0.255)	(0.260)
anticipation	0.107**	0.036	0.100**	0.049	0.044
	(0.043)	(0.043)	(0.042)	(0.042)	(0.042)
disgust	0.056	0.016	0.326	-0.148	0.343
	(0.262)	(0.265)	(0.256)	(0.254)	(0.260)
fear	-0.204	-0.066	-0.809***	0.504**	0.201
	(0.247)	(0.250)	(0.240)	(0.239)	(0.244)
joy	-0.066	-0.126	0.004	-0.019	0.137
	(0.086)	(0.087)	(0.084)	(0.083)	(0.085)
sadness	0.219	-0.134	0.330	0.133	-0.104
	(0.231)	(0.234)	(0.225)	(0.224)	(0.229)
surprise	-0.076	0.131	-0.216*	-0.156	-0.130
	(0.115)	(0.117)	(0.112)	(0.112)	(0.114)
trust	-0.013	0.007	-0.054	0.014	-0.079**
	(0.038)	(0.039)	(0.037)	(0.037)	(0.038)
Constant	-0.067*	-0.064	-0.017	-0.022	0.027
	(0.039)	(0.039)	(0.038)	(0.037)	(0.038)
Observations	7,624	7,624	7,624	7,624	7,624
R^2	0.001	0.001	0.003	0.001	0.001
Adjusted R^2	0.00002	-0.0003	0.002	0.0001	0.0004
Residual Std. Error (df = 7615)	2.068	2.091	2.014	2.005	2.046
F Statistic (df = 8; 7615)	1.023	0.677	3.212***	1.082	1.390

Note: *p<0.1; **p<0.05; ***p<0.01, Standard errors are in parentheses

Fear is statistically significant only on day −3, with a negative coefficient of −0.809 percent, and on day −4, with a positive coefficient of 0.504 percent. These opposing signs across adjacent days suggest that fear-related sentiment does not produce a clear or persistent pre-event effect. Surprise is negatively associated with abnormal returns only on day −3, with a coefficient of −0.216 percent, while it remains insignificant on other days. Trust is statistically significant only on day −5, with a coefficient of −0.079 percent, indicating a small and isolated pre-event association. The remaining sentiment variables, including disgust, joy, and sadness, do not exhibit statistically significant effects on backward abnormal returns.

Overall, the backward regressions provide weak support for systematic pre-event drift. While some sentiment dimensions, such as anticipation and anger, show statistically significant coefficients on specific days, these effects are not consistent across the pre-event window. This suggests that most sentiment-related price adjustments occur at or after the news release rather than being fully incorporated beforehand, which is consistent with evidence from emerging markets where information diffusion is uneven and episodic (Anusakumar et al., 2017; Ahmed, 2020; Song et al., 2015).

4.5 Regression Tree Evidence Pre-Event Dynamics

Figure 1 to 5 presents regression tree models for abnormal returns from day −1 to day −5 prior to the news release. The regression trees are used to identify non-linear relationships and sentiment thresholds that are not captured by the linear backward regressions. This approach follows prior evidence that sentiment effects on returns may depend on intensity levels and interactions across emotions, particularly in emerging markets with heterogeneous information processing (Anusakumar et al., 2017; Huang et al., 2025).

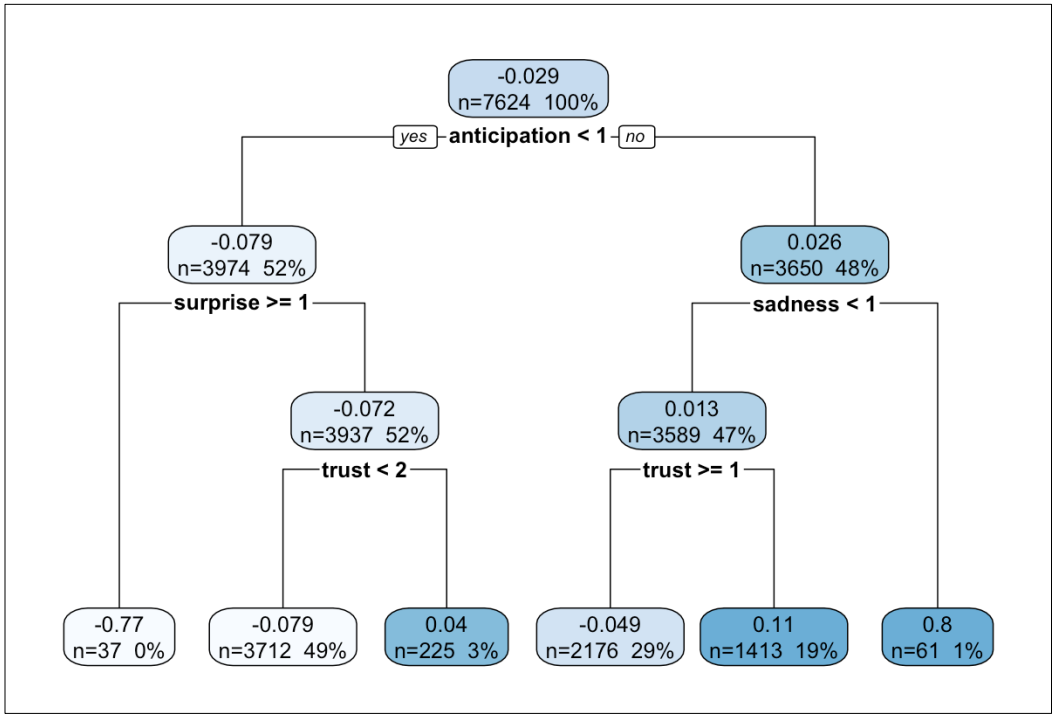

Figure 1: Abnormal daily return on the day before the announcement (%)

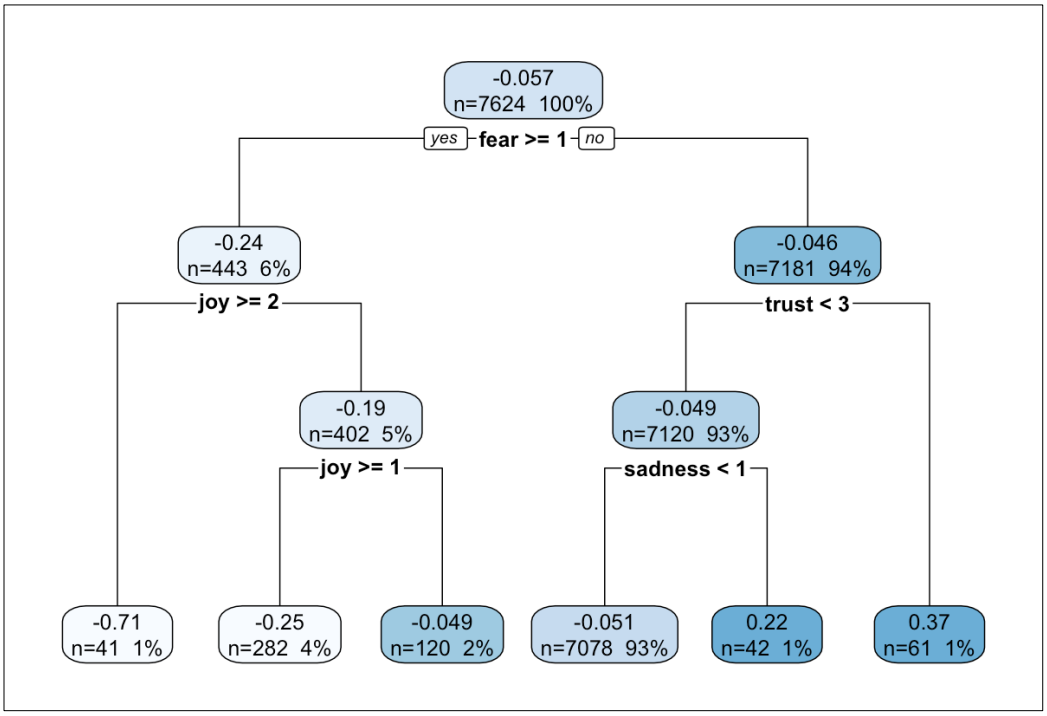

Figure 2: Abnormal daily return two days before the announcement (%)

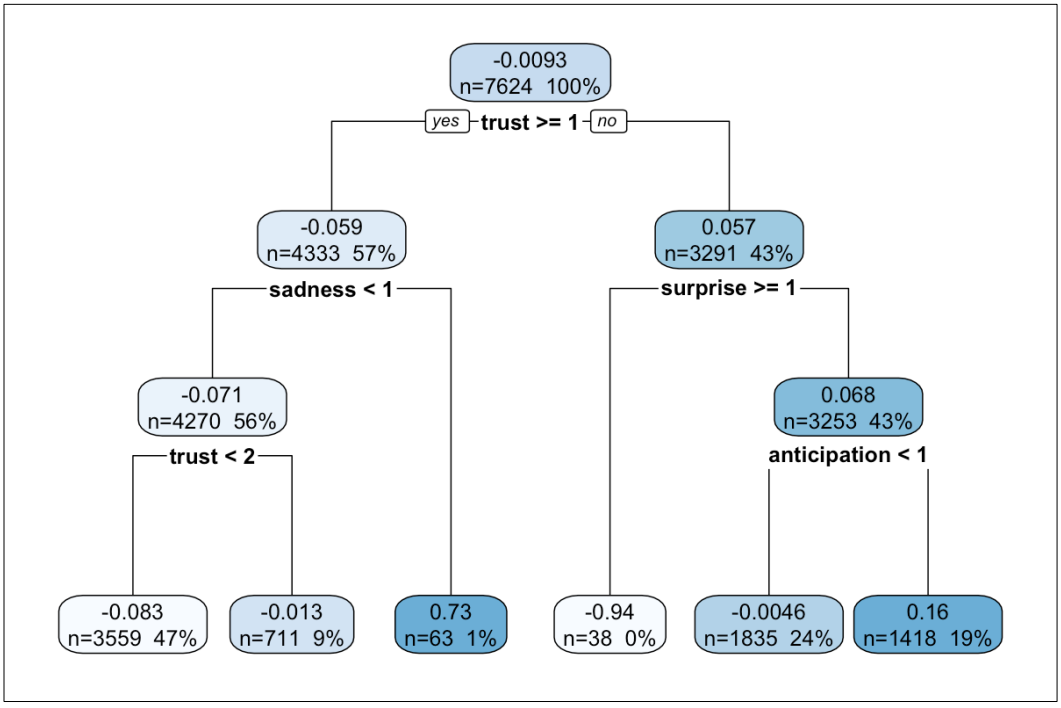

Figure 3: Abnormal daily return three days before the announcement (%)

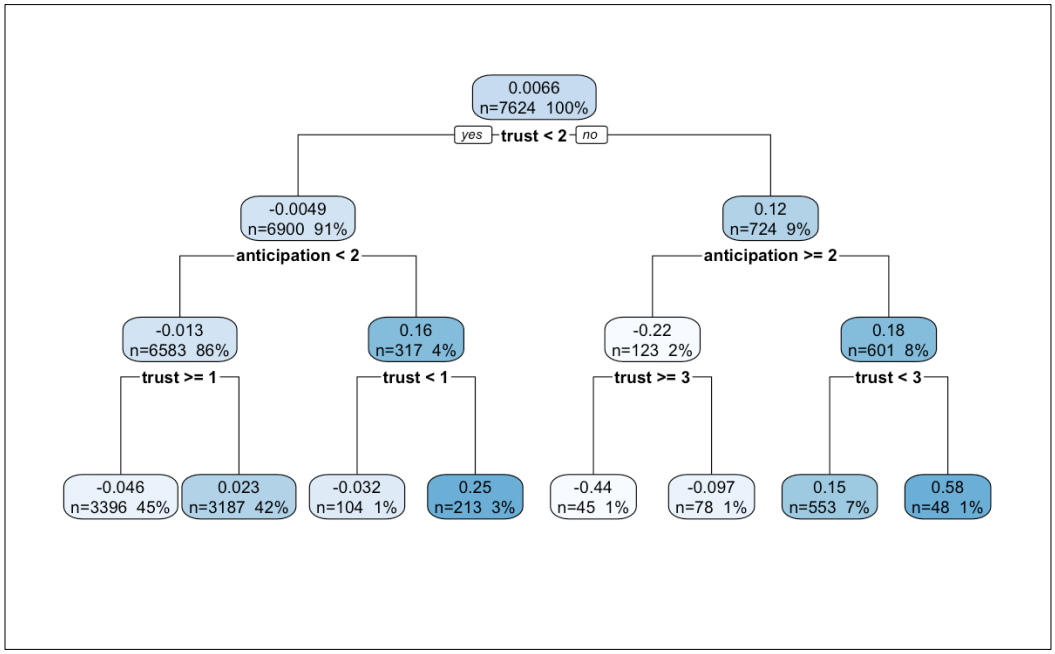

Figure 4: Abnormal daily return four days before the announcement (%)

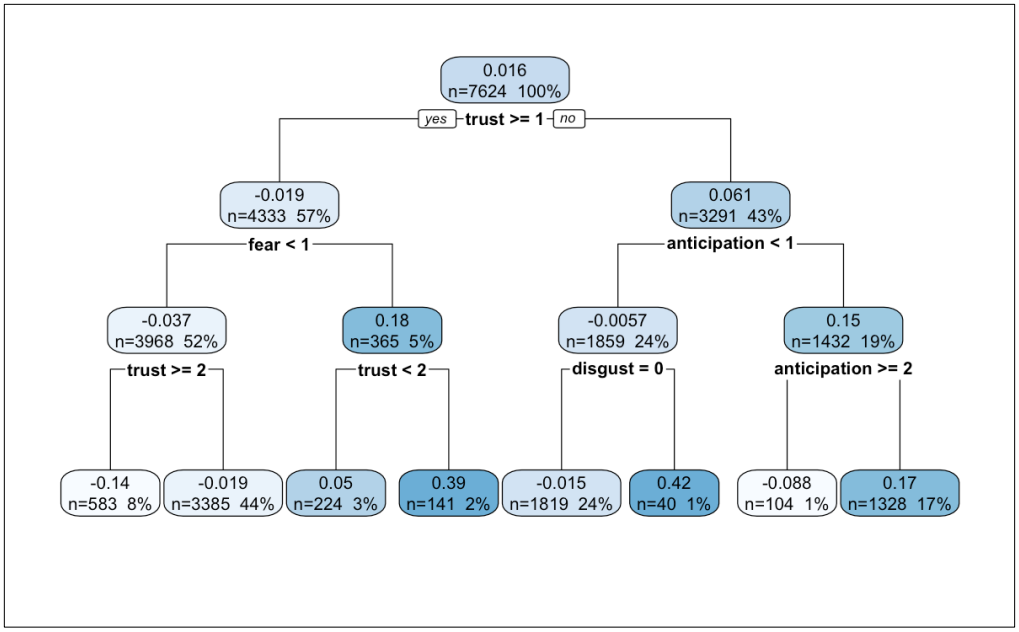

Figure 5: Abnormal daily return five days before the announcement (%)

Across the pre-event window, anticipation, trust, and fear consistently emerge as the most influential splitting variables. For day −1, the initial split is driven by anticipation at a threshold of 1. Observations with anticipation values below 1 exhibit an average abnormal return of −0.079 percent, while those with anticipation values of 1 or higher show a higher average abnormal return of 0.026 percent. Within the low-anticipation group, additional splits on surprise and trust identify small subgroups with more negative abnormal returns, including terminal nodes around −0.77 percent. In contrast, higher anticipation combined with higher trust is associated with positive abnormal returns, reaching up to 0.80 percent in small terminal nodes.

For day −2, fear appears as the dominant root split. Observations with fear values of 1 or higher have substantially lower abnormal returns, with terminal nodes reaching approximately −0.71 percent. When fear is below 1, trust and sadness further partition the data, producing a small subset of observations with positive abnormal returns of up to 0.37 percent. This structure indicates that fear-related sentiment is associated with negative pre-event returns, while the absence of fear combined with higher trust is linked to more favorable outcomes.

On day −3, trust is the primary splitting variable. Observations with trust values of 1 or higher exhibit lower average abnormal returns of −0.059 percent, whereas those with trust below 1 show higher average abnormal returns of 0.057 percent. Within the low-trust branch, surprise and anticipation generate further separation, producing terminal nodes with abnormal returns ranging from −0.94 percent to 0.16 percent. These splits suggest that trust interacts with surprise and anticipation to shape pre-event return dynamics.

For day −4, the root split is driven by trust at a threshold of 2. Observations with trust values below 2 display slightly negative abnormal returns of −0.0049 percent, while those with higher trust exhibit positive abnormal returns of 0.12 percent. Subsequent splits on anticipation and trust identify small subgroups with abnormal returns as high as 0.58 percent and as low as −0.44 percent. This pattern indicates that trust becomes increasingly important as the event date approaches.

The regression tree for day −5 shows a similar structure, with trust again acting as the primary split variable. Observations with trust values of 1 or higher exhibit lower abnormal returns of −0.019 percent, while those with lower trust show higher abnormal returns of 0.061 percent. Within these branches, fear, anticipation, and disgust further refine the splits, producing terminal nodes with abnormal returns ranging from approximately −0.14 percent to 0.42 percent. Although these terminal nodes represent a small share of the sample, they highlight localized pockets of sentiment-driven pre-event price movements.

Overall, the regression tree results indicate that pre-event abnormal returns are shaped by non-linear interactions among anticipation, fear, and trust. These effects are concentrated in relatively small subsets of observations and vary across days, which is consistent with the backward

regression results and supports the hypothesis that sentiment-driven price adjustment may begin before the news release through selective and non-linear channels (Song et al., 2015; Ahmed, 2018; Anusakumar et al., 2017).

4.6 Regression Tree Evidence Event and Post-Event Dynamics

Figure 6 to 11 presents regression tree models for abnormal returns on the event day and from day +1 through day +5. The purpose of this analysis is to identify non-linear effects and interaction patterns between sentiment dimensions that are not captured by the linear regressions. Prior research shows that sentiment-driven price reactions can be concentrated in specific regimes and may generate extreme outcomes even when average effects are moderate (Song et al., 2015; Huang et al., 2025).

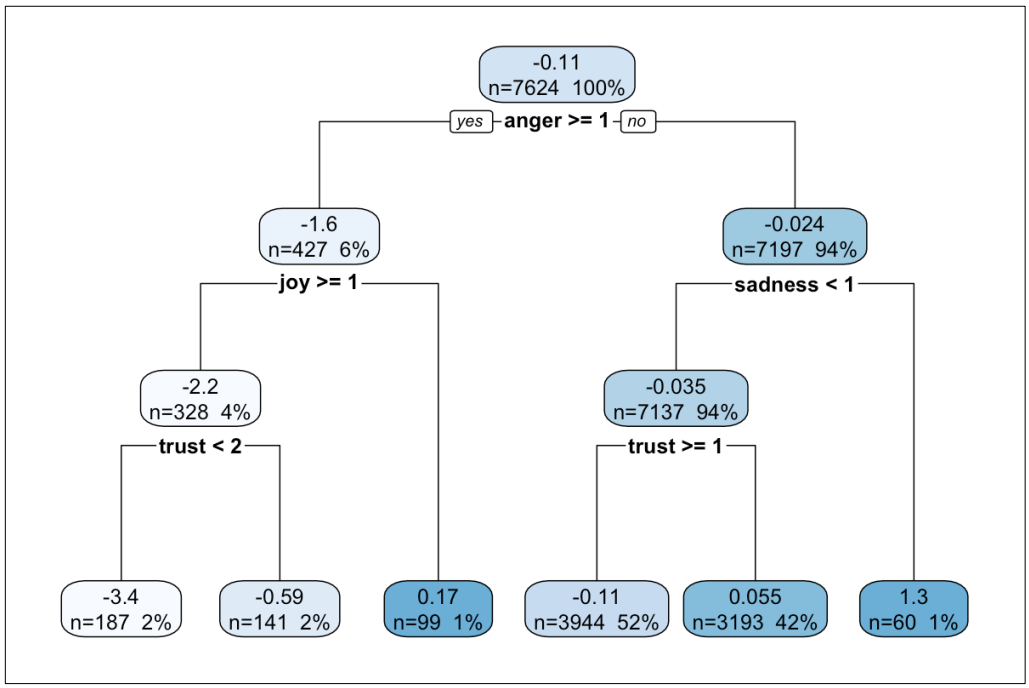

Figure 6: Abnormal daily return on the day of the announcement (%)

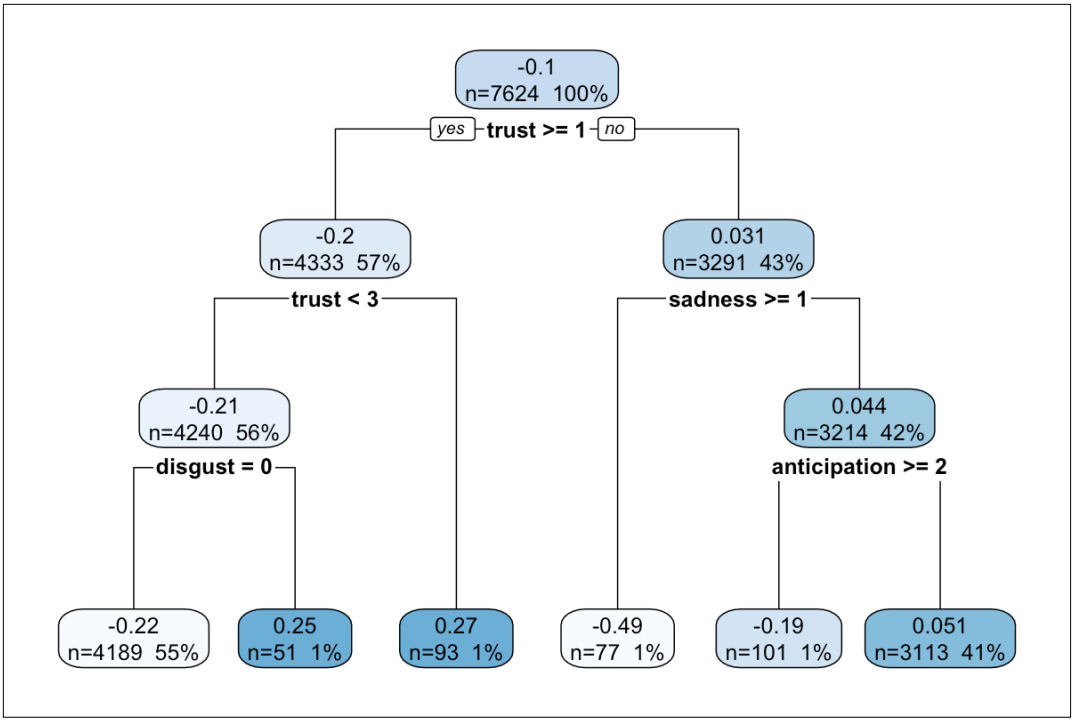

Figure 7: Abnormal daily return one day after the announcement (%)

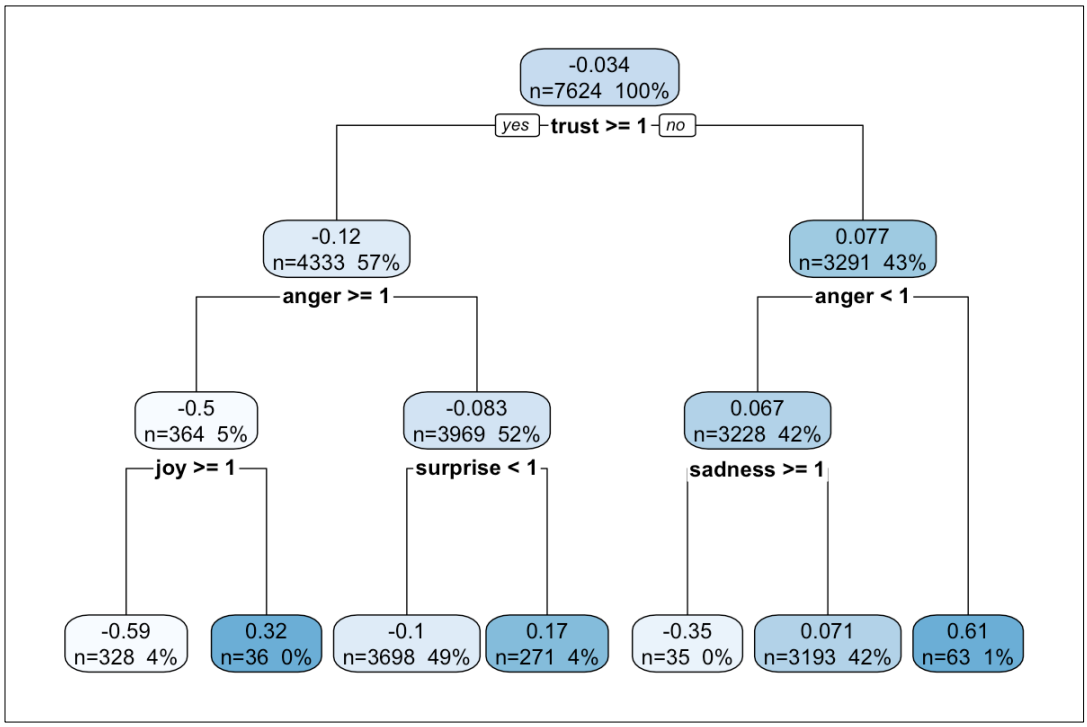

Figure 8: Abnormal daily return two days after the announcement (%)

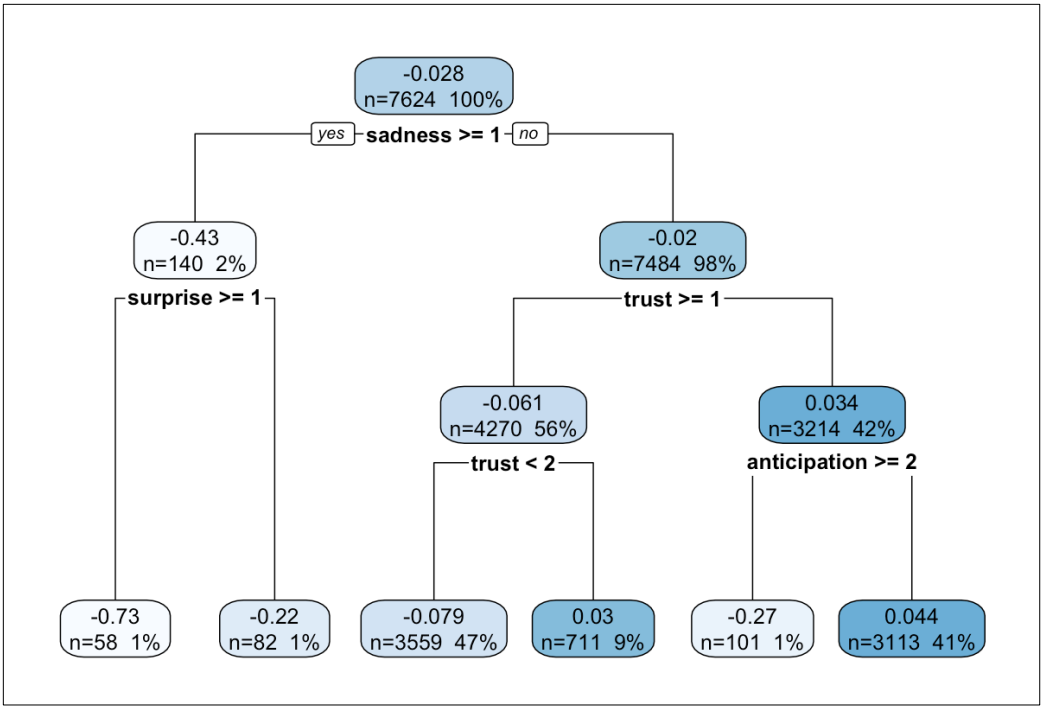

Figure 9: Abnormal daily return three days after the announcement (%)

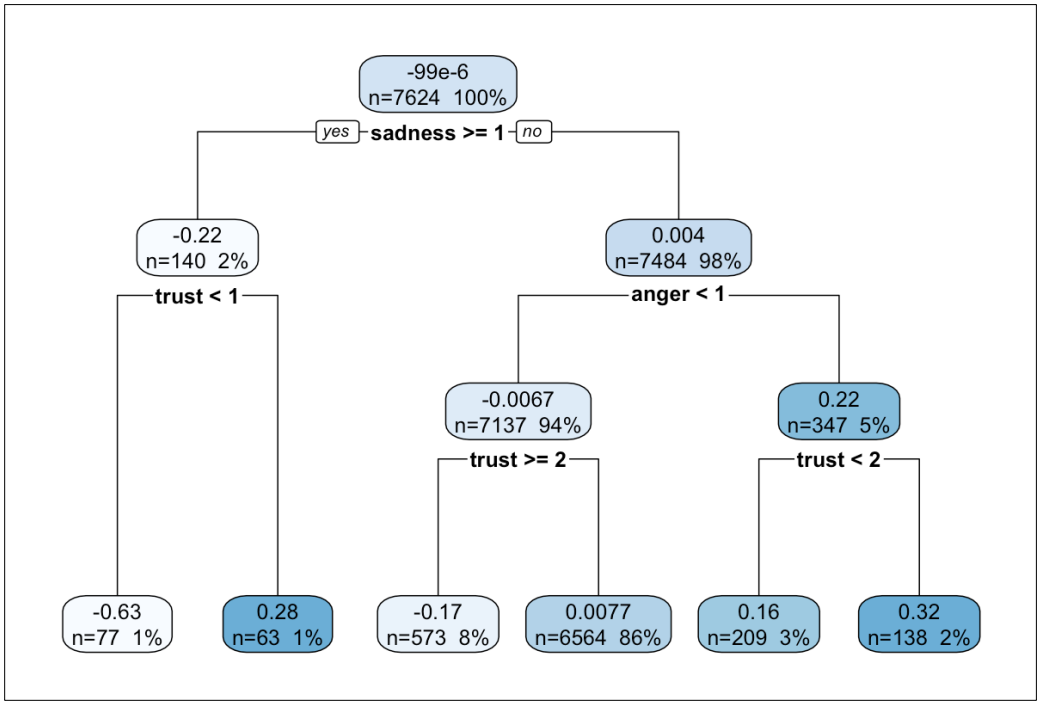

Figure 10: Abnormal daily return four days after the announcement (%)

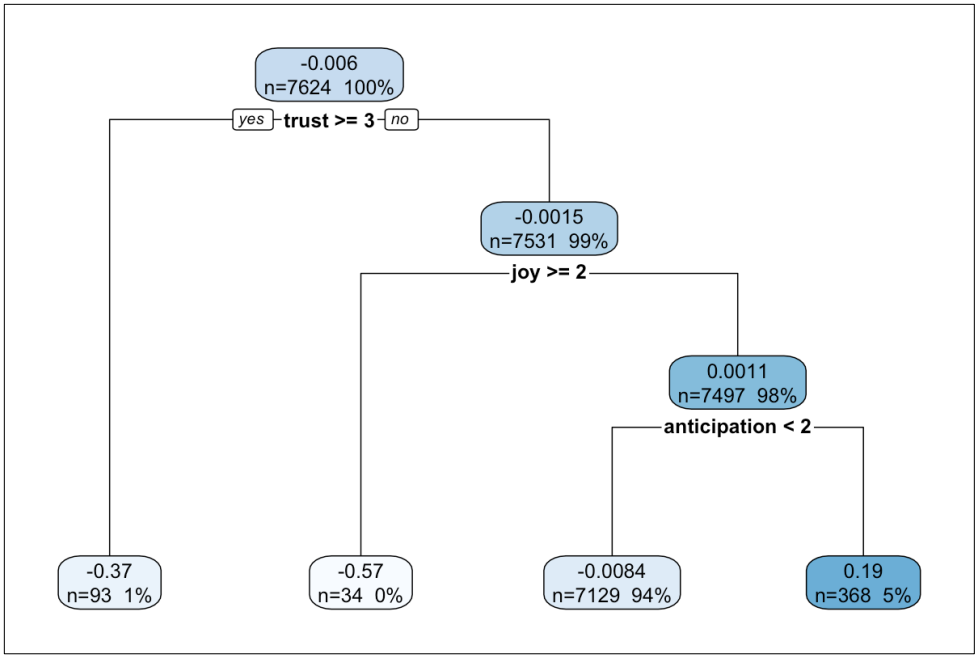

Figure 11: Abnormal daily return five days after the announcement (%)

On the event day, the first split in the regression tree is driven by anger at a threshold of 1. Observations with anger values of 1 or higher exhibit an average abnormal return of −1.6 percent, compared to −0.024 percent for observations without anger. Within the anger branch, further splits on joy and trust identify severe negative outcomes. When anger is combined with joy values of 1 or higher and trust below 2, abnormal returns reach −3.4 percent, while related branches show losses of −2.2 percent and −0.59 percent. In contrast, a small subgroup within the anger branch with higher trust shows a positive abnormal return of 0.17 percent. These patterns indicate that anger-driven reactions on the event day are highly non-linear and depend strongly on the interaction with other emotions.

For day +1 and day +2, trust emerges as the primary splitting variable. On day +1, observations with trust values of 1 or higher exhibit an average abnormal return of −0.20 percent, compared to 0.031 percent for observations with lower trust. Further splits show that combinations of low trust and absence of disgust generate positive abnormal returns of up to 0.27 percent, while other

branches remain negative. On day +2, observations with trust values of 1 or higher have an average abnormal return of −0.12 percent, whereas those with trust below 1 exhibit positive abnormal returns of 0.077 percent. Within the low-trust branch, the absence of anger is associated with higher returns of up to 0.61 percent, while the presence of anger leads to negative outcomes.

On day +3 and day +4, sadness becomes the dominant root split. For day +3, observations with sadness values of 1 or higher display an average abnormal return of −0.43 percent, compared to −0.02 percent for observations without sadness. Within the low-sadness branch, anticipation values of 2 or higher are associated with positive abnormal returns of 0.044 percent, while lower anticipation leads to negative outcomes. A similar pattern appears on day +4, where sadness values of 1 or higher are associated with abnormal returns of −0.22 percent. In contrast, when sadness is absent and anger is also below 1, abnormal returns become positive, reaching up to 0.32 percent in small subgroups.

On day +5, the first split shifts to trust at a threshold of 3. Observations with trust values of 3 or higher exhibit negative abnormal returns of −0.37 percent, while the remaining observations have near-zero average returns of −0.0015 percent. Within this larger group, anticipation becomes relevant. Observations with anticipation values of 2 or higher show positive abnormal returns of 0.19 percent, while lower anticipation is associated with slightly negative outcomes. This shift coincides with the linear regression results, where anger is no longer statistically significant on day +5 and other sentiment dimensions become more relevant.

Overall, the regression tree results reinforce and refine the linear regression findings. Anger drives strong negative abnormal returns on the event day through non-linear interactions with joy

and trust. In the days that follow, trust and sadness govern the direction of abnormal returns, while anticipation contributes to positive outcomes at later horizons. Most importantly, the trees show that extreme losses and gains arise from specific combinations of emotions, explaining why average regression coefficients understate tail behavior. These results support the hypothesis that post-event sentiment effects operate through selective and non-linear channels rather than through uniform average responses (Song et al., 2015; Anusakumar et al., 2017; Ahmed, 2018).

These insights motivate the discussion of how the empirical results can be translated into a trading strategy and how position sizing can be evaluated using the Kelly criterion.

4.7 Sentiment Analysis based on FinBERT Lexicon

Table 7 reports event-day abnormal return regressions using FinBERT sentiment classifications as a robustness check. Consistent with the main results based on multi-dimensional sentiment, sentiment polarity extracted using FinBERT is significantly related to event-day price reactions. Headlines classified as positive are associated with a large and statistically significant positive abnormal return of 0.700 percent, while neutral headlines are associated with a statistically significant negative abnormal return of −0.128 percent. In contrast, negative sentiment does not exhibit a statistically significant effect on the event day.

These findings align with the structure of firm-issued news in emerging markets, where explicitly negative language is relatively rare, while deviations from a neutral baseline carry stronger informational content. The strong positive coefficient on positive sentiment is consistent with evidence that clearly favorable language generates immediate price reactions when it departs from the typically cautious tone of corporate disclosures (Araci, 2019; Kim & Ryu,

2020). The negative coefficient on neutral sentiment suggests that neutrality itself may convey weak or disappointing information relative to investor expectations, which is consistent with studies showing that markets respond not only to sentiment polarity but also to the absence of positive signals (Song et al., 2015). Overall, the event-day FinBERT results confirm that sentiment matters for immediate price formation and that the core findings are not driven by the specific sentiment construction method.

Table 7. Event-Day Regression Results

	Dependent variable:
	Abnormal Return Close
Negative	0.134
	(0.241)
Neutral	-0.128***
	(0.028)
Positive	0.700***
	(0.246)
Observations	7,624
R^2	0.004
Adjusted R^2	0.003
Residual Std. Error	2.450 (df = 7621)
F Statistic	9.588*** (df = 3; 7621)
Note:	*p<0.1; **p<0.05; ***p<0.01, Standard errors are in parentheses

Table 8 presents forward abnormal return regressions from day +1 through day +5 using FinBERT sentiment classifications. The results indicate that post-event sentiment effects are limited and concentrated at specific horizons, which mirrors the patterns observed in the main multi-dimensional sentiment analysis. Positive sentiment exhibits a strong and statistically significant effect on day +1, with an abnormal return of 0.780 percent, and again on day +5, with an abnormal return of 0.684 percent. Neutral sentiment is associated with a statistically

significant negative abnormal return of −0.114 percent on day +1, but its effect becomes insignificant at longer horizons.

Table 8: Forward Abnormal Return Regressions (%)

	Dependent Variable: Abnormal Daily Return (%)				
	Day +1	Day +2	Day +3	Day +4	Day +5
Negative	-0.002	0.188	-0.195	-0.107	-0.596***
	(0.243)	(0.215)	(0.205)	(0.203)	(0.204)
Neutral	-0.114***	-0.039	-0.023	0.003	-0.007
	(0.029)	(0.025)	(0.024)	(0.024)	(0.024)
Positive	0.780***	0.116	-0.202	-0.104	0.684***
	(0.248)	(0.219)	(0.209)	(0.207)	(0.208)
Observations	7,624	7,624	7,624	7,624	7,624
R^2	0.003	0.0004	0.0004	0.0001	0.003
Adjusted R^2	0.003	0.0001	-0.00003	-0.0003	0.002
Residual Std. Error (df = 7621)	2.466	2.180	2.078	2.056	2.073
F Statistic (df = 3; 7621)	8.622***	1.135	0.911	0.181	6.458***
Note:					*p<0.1; **p<0.05; ***p<0.01, Standard errors are in parentheses

Negative sentiment shows no statistically significant impact on abnormal returns until day +5, where it is associated with a large negative abnormal return of −0.596 percent. This delayed effect suggests that adverse information classified as negative by FinBERT may take longer to be incorporated into prices, which is consistent with evidence of gradual adjustment and delayed reactions in emerging markets (Anusakumar et al., 2017; Ahmed, 2020). The overall pattern indicates that sentiment-driven post-event dynamics are episodic rather than persistent, with economically meaningful effects appearing only at selected horizons. These findings reinforce the main conclusion that sentiment effects are horizon-dependent and do not generate uniform post-event drift.

Table 9 reports backward abnormal return regressions for days −1 to −5 prior to the news release using FinBERT sentiment categories. The results provide limited evidence of systematic pre-event sentiment effects. Neutral sentiment is weakly significant only on day −2, with a negative abnormal return of −0.058 percent, while negative and positive sentiment classifications do not exhibit statistically significant effects across most pre-event horizons. The only marginally significant result appears for neutral sentiment, and its magnitude remains small.

Table 9: Backward Abnormal Return Regressions (%)

	Dependent Variable: Abnormal Daily Return (%)				
	Day -1	Day -2	Day -3	Day -4	Day -5
Negative	0.005	-0.209	-0.158	0.034	-0.120
	(0.204)	(0.206)	(0.199)	(0.198)	(0.202)
Neutral	-0.031	-0.058**	-0.007	0.005	0.018
	(0.024)	(0.024)	(0.023)	(0.023)	(0.024)
Positive	0.113	0.143	-0.035	0.061	0.007
	(0.208)	(0.210)	(0.203)	(0.202)	(0.206)
Observations	7,624	7,624	7,624	7,624	7,624
R^2	0.0003	0.001	0.0001	0.00002	0.0001
Adjusted R^2	-0.0001	0.001	-0.0003	-0.0004	-0.0003
Residual Std. Error (df = 7621)	2.069	2.091	2.016	2.005	2.046
F Statistic (df = 3; 7621)	0.663	2.376*	0.249	0.059	0.305
Note:					*p<0.1; **p<0.05; ***p<0.01, Standard errors are in parentheses

These findings suggest that sentiment captured by FinBERT does not strongly predict abnormal returns before the official news release. This is consistent with the main backward regression results and supports the interpretation that most sentiment-related price adjustment occurs at or after the announcement rather than beforehand. The absence of stable pre-event effects also reduces concerns about widespread information leakage or anticipatory trading based on

sentiment signals, which aligns with prior evidence that pre-event drift in emerging markets tends to be weak and irregular (Anusakumar et al., 2017; Ahmed, 2018; Song et al., 2015). Overall, the backward FinBERT results confirm that sentiment-driven price reactions are primarily event-centered rather than anticipatory.

Figures 12 to 16 presents regression tree models for backward abnormal returns from day −1 to day −5 using FinBERT sentiment classifications as a robustness check. The objective of this analysis is to examine whether the limited pre-event effects observed in the linear FinBERT regressions are driven by non-linear interactions or sentiment thresholds that are not captured by average regression coefficients. Consistent with the regression results in Table 8, the trees show weak and highly localized sentiment effects prior to the news release. Across all backward horizons, the first split is driven by one of the FinBERT sentiment indicators, but these splits isolate very small subsets of observations.

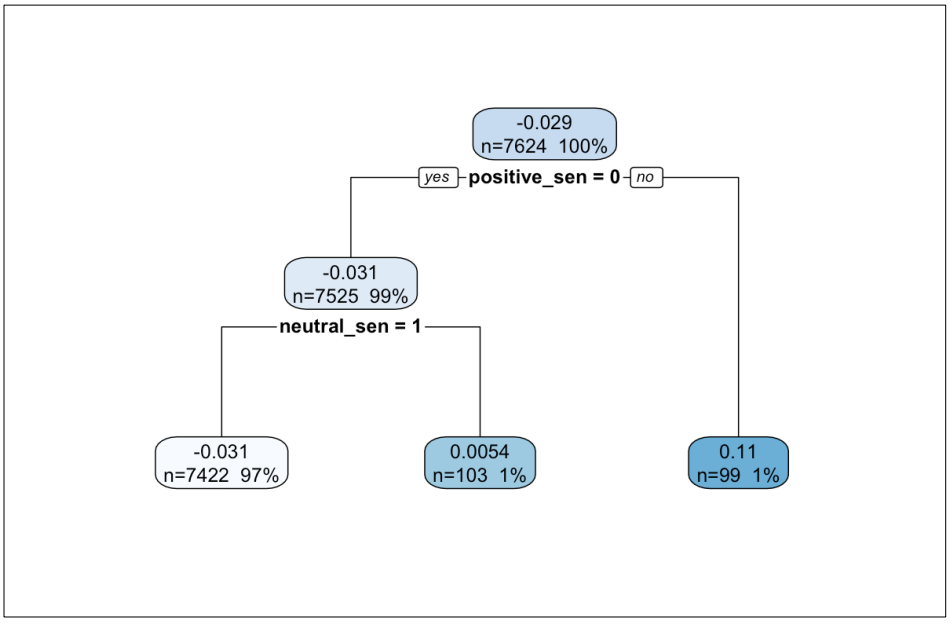

Figure 12: Abnormal daily return one day before the announcement (%)

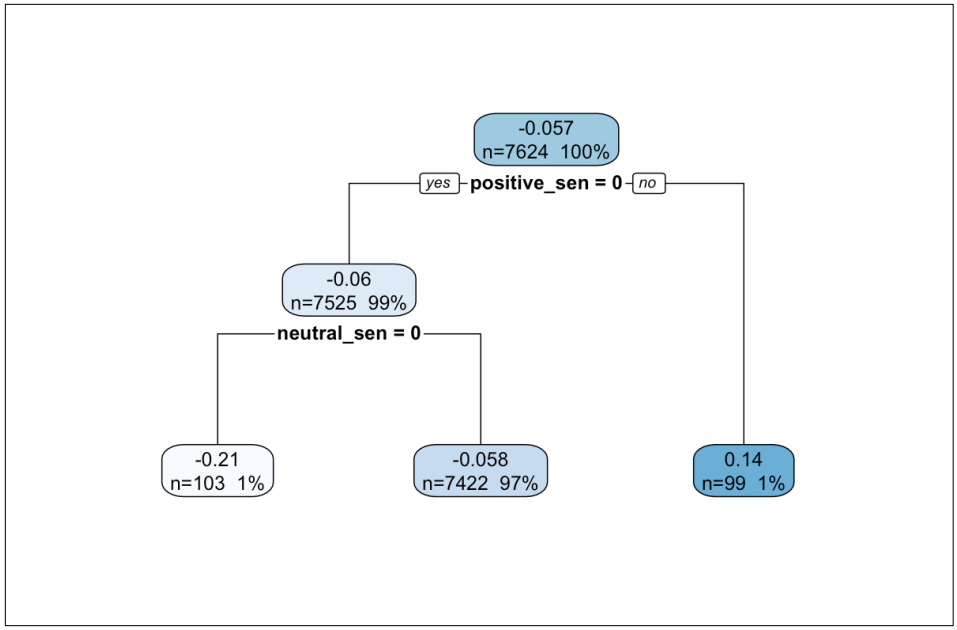

Figure 13: Abnormal daily return two days before the announcement (%)

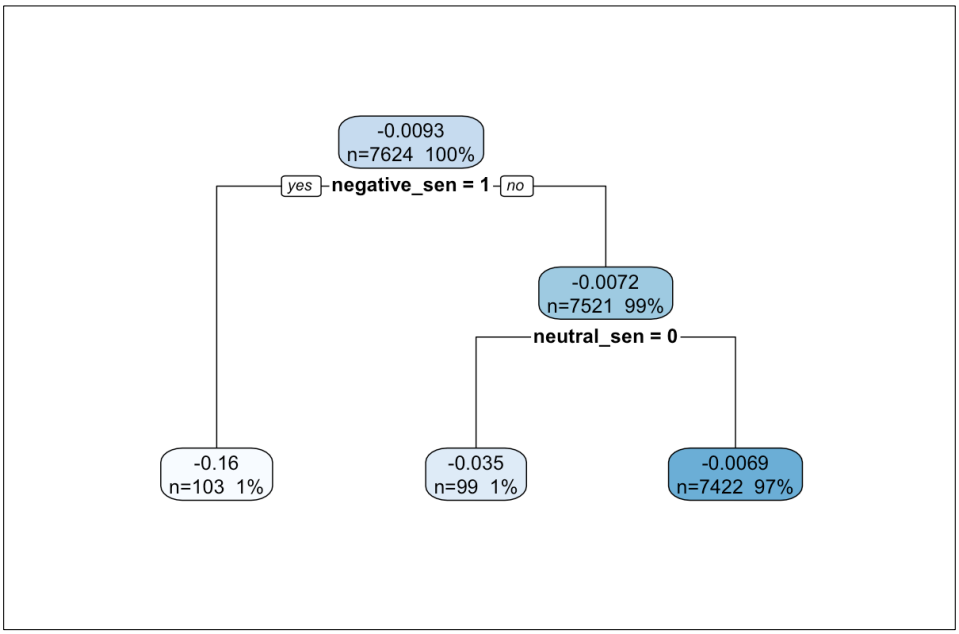

Figure 14: Abnormal daily return three days before the announcement (%)

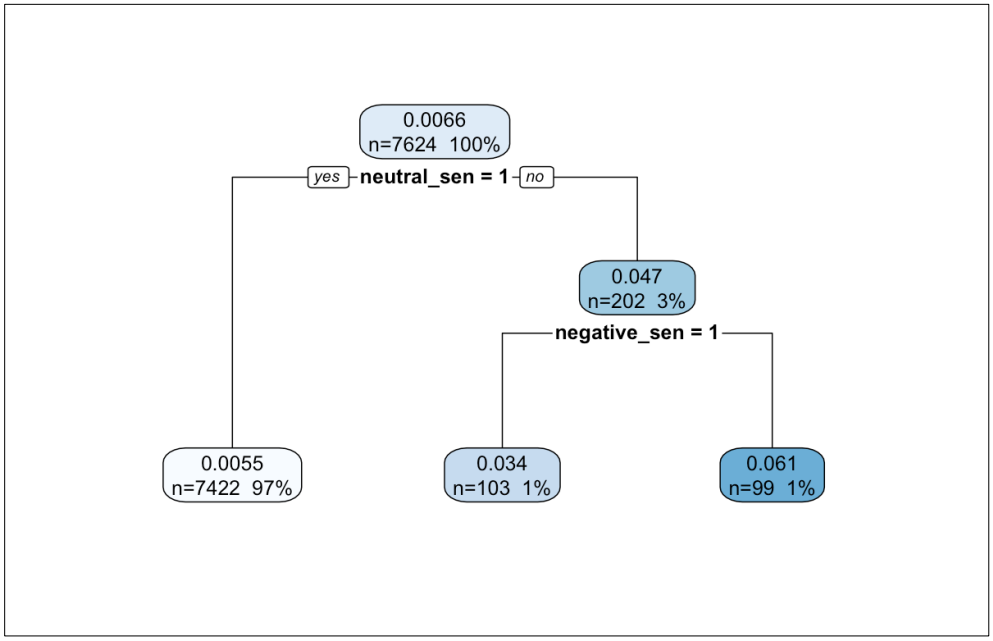

Figure 15: Abnormal daily return four days before the announcement (%)

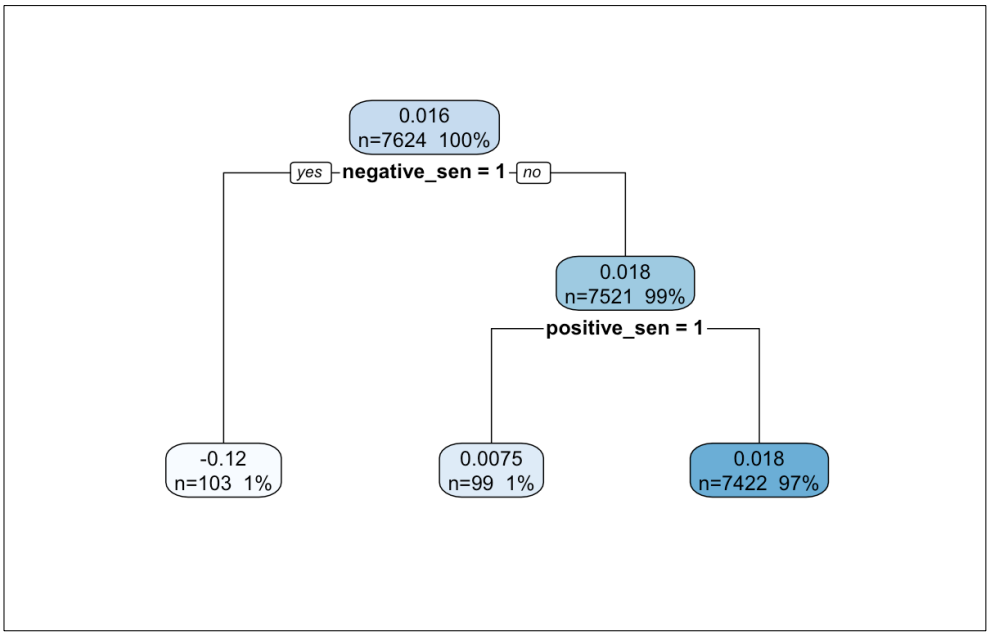

Figure 16: Abnormal daily return five days before the announcement (%)

For day −1 and day −2, the initial split is based on the absence of positive sentiment. Observations without positive sentiment represent almost the entire sample and exhibit small negative abnormal returns of approximately −0.029 percent and −0.057 percent, respectively. In contrast, the small subset of observations classified as positive, which represents about 1 percent of the sample, shows positive abnormal returns of 0.11 percent on day −1 and 0.14 percent on

day −2. These effects are economically small and confined to a narrow group, which explains why positive sentiment is not statistically significant in the corresponding backward regressions.

For day −3 and day −5, negative sentiment appears as the primary splitting variable. Observations classified as negative represent about 1 percent of the sample and are associated with abnormal returns of −0.16 percent on day −3 and −0.12 percent on day −5. The remaining observations, which are overwhelmingly neutral, display abnormal returns close to zero. This pattern indicates that pre-event negative sentiment may generate mild downward price pressure, but only in a very limited number of cases. The dominance of neutral sentiment in the sample constrains the ability of FinBERT sentiment to produce systematic pre-event effects.

On day −4, neutral sentiment becomes the root split. Observations classified as neutral, which account for approximately 97 percent of the sample, exhibit an abnormal return of 0.0055 percent. The small non-neutral group shows slightly higher abnormal returns, but these effects are again restricted to a very small fraction of observations. Across all backward horizons, the trees do not reveal large or persistent pre-event sentiment regimes. Instead, sentiment-driven effects appear sporadic, small in magnitude, and concentrated in rare sentiment realizations.

Overall, the regression trees in Figures 12 to 16 reinforce the backward regression findings using FinBERT sentiment. Pre-event abnormal returns are not systematically explained by sentiment polarity, and non-linear interactions do not uncover hidden anticipatory effects. This supports the interpretation that sentiment-driven price adjustment in the Qatar Stock Exchange occurs primarily at or after the news release rather than before it. The robustness results are consistent with prior evidence showing that pre-event sentiment effects in emerging markets are weak and

irregular, particularly when sentiment is measured using coarse polarity classifications rather than granular emotional dimensions (Song et al., 2015; Anusakumar et al., 2017; Ahmed, 2018).

Figures 17 to 22 presents the regression tree results for abnormal returns around the news release date using the FinBERT sentiment classification as a robustness check. The trees are estimated separately for the event day and for the backward windows from day −1 to day −5. This approach allows for a non-linear assessment of how coarse sentiment categories, negative, neutral, and positive, relate to abnormal returns and whether the patterns observed in the linear regressions persist under an alternative sentiment construction.

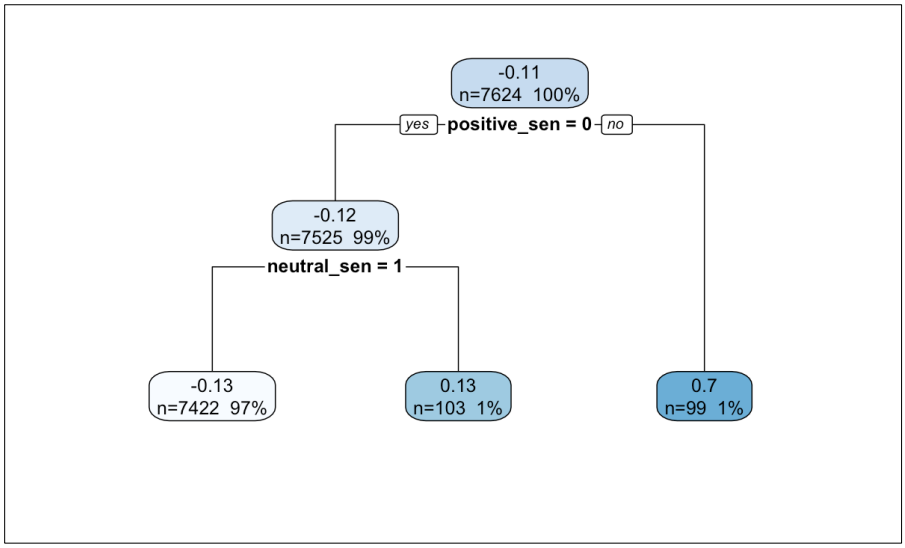

Figure 17: Abnormal daily return on the day of the announcement (%)

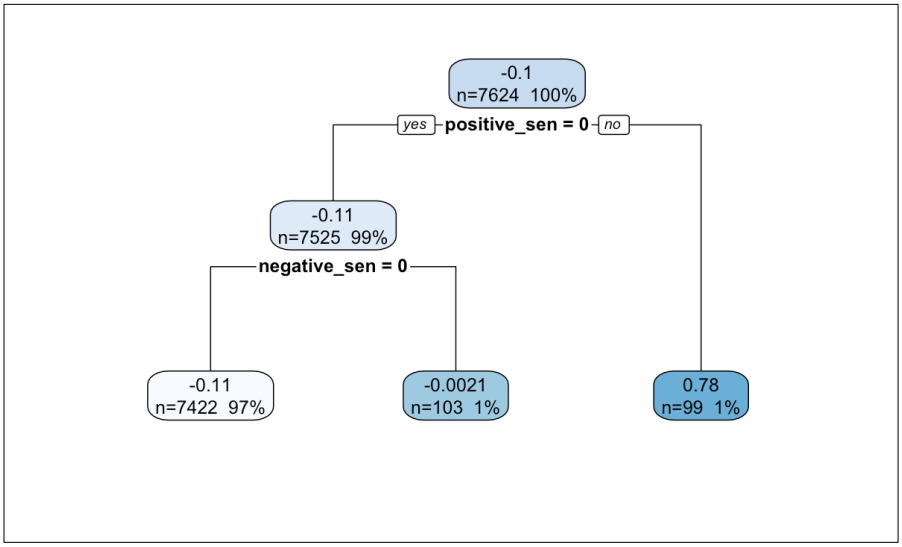

Figure 18: Abnormal daily return one day after the announcement (%)

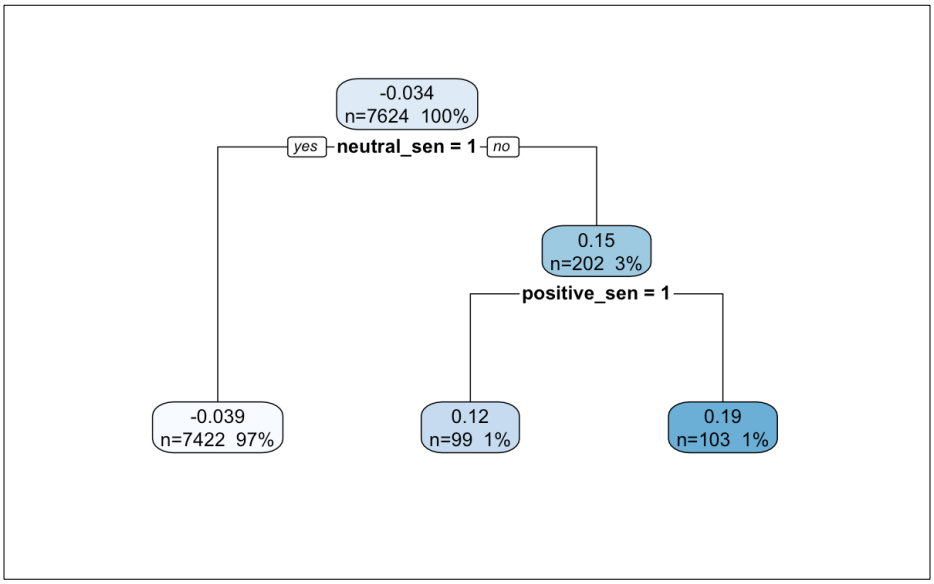

Figure 19: Abnormal daily return two days after the announcement (%)

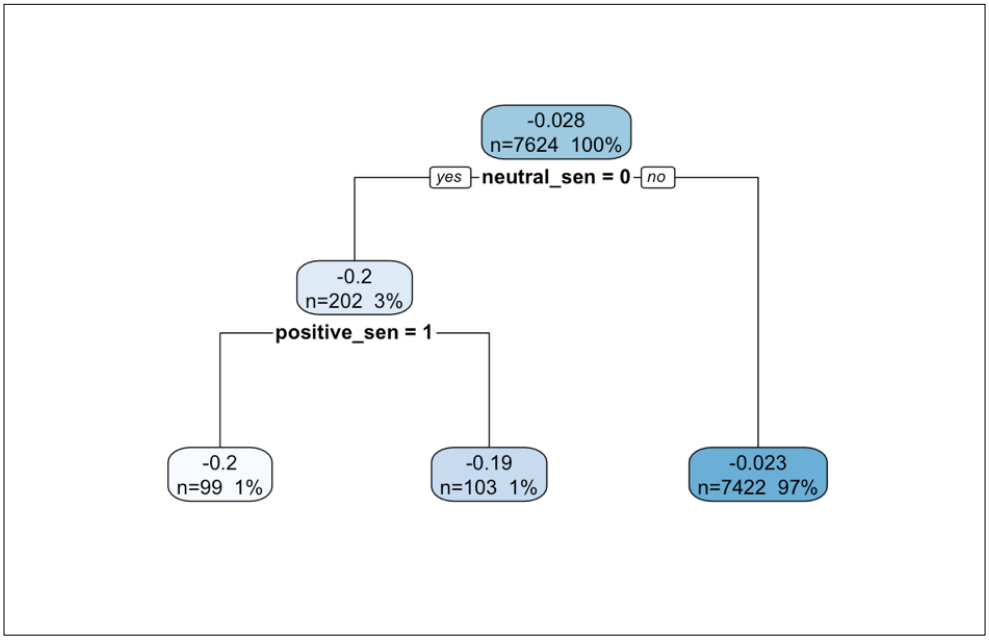

Figure 20: Abnormal daily return three days after the announcement (%)

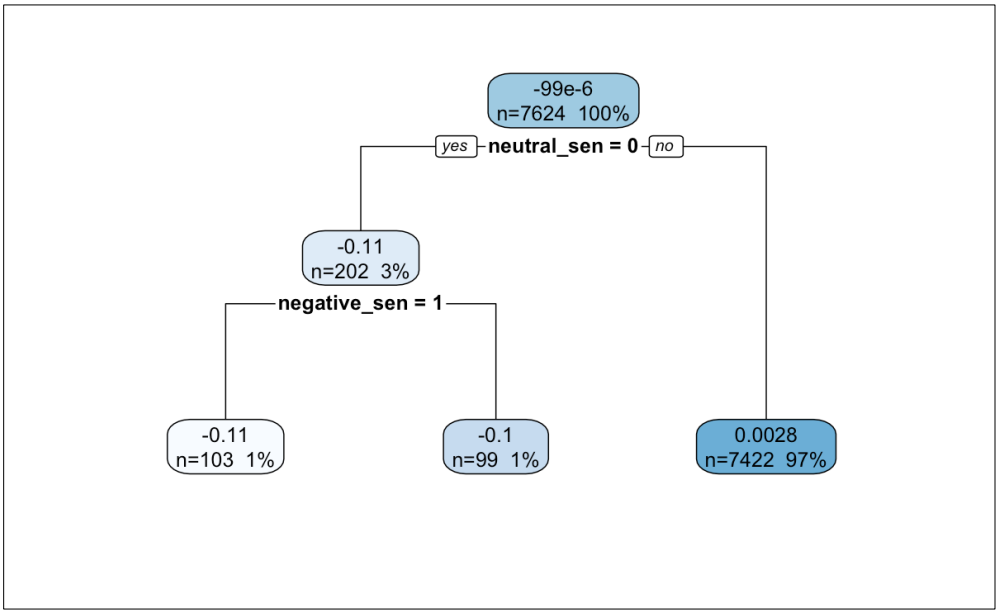

Figure 21: Abnormal daily return four days after the announcement (%)

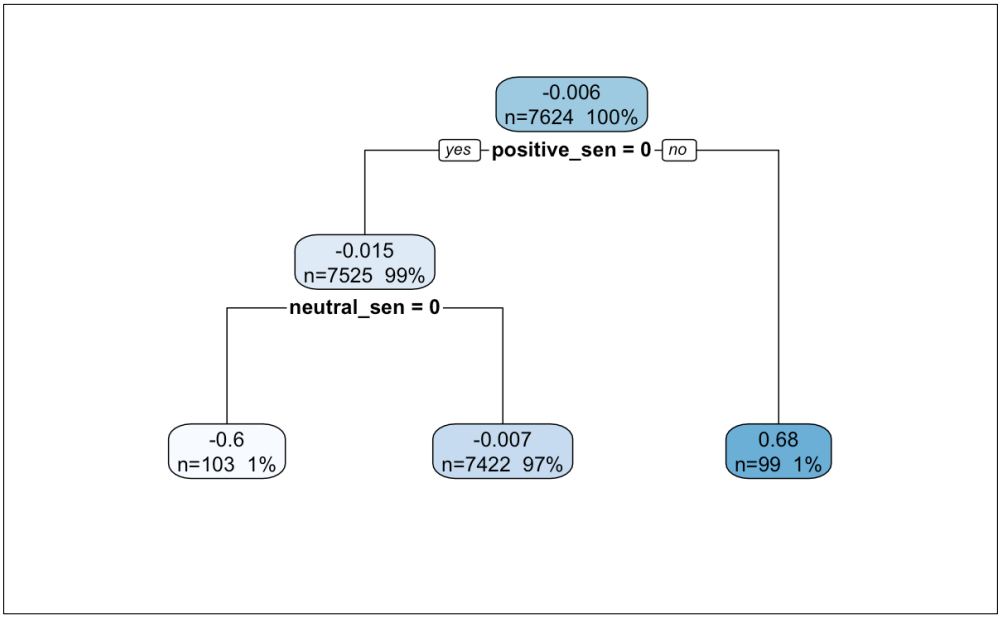

Figure 22: Abnormal daily return five days after the announcement (%)

On the event day, the regression tree identifies positive sentiment as the primary splitting variable. Observations classified as positive sentiment are associated with a substantially higher average abnormal return, approximately 0.70 percent, despite representing only about 1 percent of the sample. In contrast, observations without positive sentiment display negative abnormal returns, with the largest group, neutral sentiment, showing an average return of about −0.13 percent. This pattern is consistent with the event-day regression results, where positive sentiment is associated with statistically significant positive abnormal returns, while neutral sentiment carries a negative coefficient. The tree structure reinforces the interpretation that strongly positive news generates immediate price reactions, even though such observations are rare.

Across the pre-event window, the regression trees show limited evidence of systematic sentiment-driven price movements before the news release. In most backward horizons, neutral sentiment dominates the sample and is associated with abnormal returns close to zero. When splits occur, they are driven by small subsets of negative or positive sentiment observations, which account for roughly 1 percent of the data. These nodes occasionally display larger

absolute abnormal returns, but they do not form a consistent pattern across days. This finding aligns with the backward regressions, which show weak explanatory power and only isolated significant coefficients. Taken together, the tree results suggest that FinBERT sentiment does not indicate widespread information leakage or anticipatory trading prior to the announcement date.

Overall, Figures 12 to 16 supports the main empirical findings by showing that sentiment effects are concentrated on the event day and are primarily driven by clearly positive or negative news, while pre-event sentiment plays a limited role. The dominance of neutral sentiment in the pre-event period is consistent with the nature of firm disclosures in the Qatar Stock Exchange, which are often factual and restrained in tone, reducing the scope for early sentiment-based price reactions. These results are in line with prior studies documenting delayed or event-concentrated sentiment effects in emerging markets with higher information frictions (Ahmed, 2018; Anusakumar et al., 2017).

5. Sentiment Based Strategies

To better understand how emotion-based filtering alters return distributions, this discussion examines the statistical properties of each strategy. This comparison helps clarify which aspects of the return distribution drive economic relevance across emotions. Although the three strategies share the same trading rule which is buying stocks that meet certain criteria at the close of the day of the announcement and selling five days after the announcement at the close, their statistical properties differ in economically meaningful ways. It is assumed that the initial capital is 1 million Qatari Riyals. In addition, Kelly criterion is adopted to determine the stake size (Thorp, 2006).

The first strategy is when anger is not present in the sentiment, with an annualized 9.7% return. This strategy has a win probability of 45.57 percent, indicating that slightly fewer than half of the trades result in positive returns. However, the average gain among winning observations is 3.74 percent, which exceeds the average loss of 2.90 percent among losing observations. This gain loss asymmetry is the primary source of positive expected value for the strategy, rather than a high success rate.

Table 10. Summary Statistics for the Anger Equals Zero Strategy

Statistic	Capital (QAR)
Minimum	6.095×10^{4}
1st Quartile (Q1)	1.240×10^{7}
Median	9.151×10^{7}
Mean	4.882×10^{9}
3rd Quartile (Q3)	7.709×10^{8}
Maximum	1.616×10^{11}

The summary statistics for the anger equals zero strategy indicate a capital distribution with moderate variability and a clear gain and loss asymmetry. Capital outcomes range from a minimum of 6.095×10^{4} QAR to a maximum of 1.616×10^{11} QAR, with a median of 9.151×10^{7} QAR and a mean of 4.882×10^{9} QAR. The large gap between the mean and the median reflects right skewness, meaning that a small number of large positive outcomes increase the mean. This pattern implies that most observations generate more modest outcomes, while a limited subset drives the upper tail. The first quartile is 1.240×10^{7} QAR, which indicates that the lower end of the distribution remains positive and that extreme losses are relatively limited when anger is absent from the news sentiment. This pattern mirrors the regression and regression tree evidence, where anger consistently emerges as the strongest predictor of negative abnormal returns, in line with Hypotheses H1 and H2.

The second strategy is when trust is not present strategy shows the strongest statistical profile. The probability of a positive outcome increases to 46.73 percent, while the average gain among winners is 3.72 percent and the average loss among losers is 2.71 percent. Compared to the other strategies, this combination of a higher win rate and a smaller average loss produces a more favorable return distribution. This suggests that excluding trust related news events may remove cases where optimistic sentiment is already incorporated into prices, leaving a subset of events with better risk adjusted outcomes.

Table 11. Summary Statistics for the Trust Equals Zero Strategy

Statistic	Capital (QAR)
Minimum	5.843×10^{5}
1st Quartile (Q1)	7.114×10^{7}
Median	3.011×10^{10}
Mean	6.502×10^{12}
3rd Quartile (Q3)	2.589×10^{11}
Maximum	4.079×10^{14}

The strategy where trust is not present exhibits more pronounced dispersion than the anger strategy. Capital values range from a minimum of 5.843×10^{5} QAR to a maximum of 4.079×10^{14} QAR, with a median of 3.011×10^{10} QAR and a mean of 6.502×10^{12} QAR. The mean being far above the median indicates strong right skewness and the presence of extreme right tail outcomes. This suggests that excluding trust related news events isolates a subset where very large positive outcomes occur infrequently but dominate the overall distribution. The first quartile is 7.114×10^{7} QAR, which remains high relative to the minimum and supports the view that downside outcomes are smaller compared to the magnitude of potential gains within this filtered sample. This result is consistent with the event-day and post-event findings, where trust-related sentiment is associated with weaker abnormal return performance. This interpretation is

consistent with the event-day and post-event evidence, where trust-related sentiment is associated with weaker abnormal return performance once optimism is already reflected in prices.

The last strategy is when sadness is not present, this strategy has generated the highest returns of 11.1 percent. The win probability is 45.63 percent, with an average gain of 3.76 percent and an average loss of 2.92 percent. As with anger, the strategy's economic relevance comes from limiting exposure to emotionally negative states that are associated with persistent drawdowns rather than from improving the frequency of winning trades.

Table 12. Summary Statistics for the Sadness Equals Zero Strategy

Statistic	Capital (QAR)
Minimum	3.423×10^{4}
1st Quartile (Q1)	2.032×10^{7}
Median	2.181×10^{8}
Mean	2.581×10^{10}
3rd Quartile (Q3)	1.959×10^{9}
Maximum	9.611×10^{11}

The results for the sadness equals zero strategy fall between those of the anger and trust filtered strategies. Capital outcomes range from a minimum of 3.423×10^{4} QAR to a maximum of 9.611×10^{11} QAR, with a median of 2.181×10^{8} QAR and a mean of 2.581×10^{10} QAR. As with the other strategies, the mean exceeding the median indicates right skewness driven by a limited number of large positive outcomes. The first quartile is 2.032×10^{7} QAR, which indicates that the lower part of the distribution is still positive, while the upper tail remains substantial but less extreme than in the trust equals zero strategy. Relative to the anger equals zero strategy, both the median and mean are higher, suggesting stronger central tendency outcomes in the sadness

filtered sample. This outcome complements the regression tree evidence showing that sadness contributes to adverse post-event dynamics in specific regimes but does not generate uniform average effects across all observations.

Across all strategies, the similarity in average gains suggests that upside potential is relatively stable, while differences in losses and win probabilities drive variation in performance.

The choice of the day 0 to day +5 holding period follows directly from the horizon-dependent sentiment effects documented in Section 4. This holding window reflects the empirical observation that sentiment driven effects unfold gradually after news releases. Seok et al. (2021) document that sentiment shocks often produce incomplete short run correction, especially in markets where liquidity is limited and investor attention adjusts slowly. Beyond this horizon, the empirical results indicate that sentiment effects weaken and become less systematic, reducing their economic relevance.

By holding positions through day +5, the strategies capture delayed price adjustment while avoiding longer horizons where unrelated information is more likely to dominate returns. This design aligns with the view that sentiment predictability is horizon dependent and concentrated in the immediate post event period.

The Kelly criterion is used here as a comparative metric to assess economic magnitude across strategies, rather than as a prescriptive trading rule within the same empirical environment. To evaluate the economic magnitude of each strategy, the Kelly criterion is applied using the empirical win probabilities and average gains and losses (Thorp, 2006). The Kelly values are interpreted as measures of in sample edge rather than as recommendations for leverage.

Anger equals zero strategy

- p = 0.4557 and q = 0.5443, where p is the probability of a positive outcome and q is the probability of a negative outcome,
- g = 0.0374, the average gain among winning trades,
- l = 0.0290, the average loss among losing trades.

Using these values, the Kelly fraction is 1.1490. This relatively large value reflects that average gains exceed average losses. However, the modest win probability implies that returns remain volatile, and full Kelly sizing would expose investors to substantial drawdowns if the underlying edge is unstable.

Trust equals zero strategy

- p = 0.4673 and q = 0.5327,
- g = 0.0372,
- l = 0.0271.

The resulting Kelly fraction is 2.9143. This is substantially larger than for the other strategies and is driven by both a higher win probability and a stronger gain loss asymmetry. While this suggests a larger in sample edge, such a high Kelly value should be interpreted with caution. Small estimation errors in p, g, or l can lead to severe overbetting when the Kelly fraction is large.

Sadness equals zero strategy

- p = 0.4563 and q = 0.5437,

- $g = 0.0376$,
- $l = 0.0292$.

The Kelly fraction for this strategy is 1.1963. As with the anger filtered strategy, this value indicates positive expected value but also highlights sensitivity to parameter uncertainty.

Across all strategies, the Kelly results are best viewed as a consistent framework for comparing economic relevance rather than as guidance for practical position sizing. In applied settings, fractional Kelly approaches are typically used to mitigate estimation risk.

6. Discussion

This section interprets the empirical results and translates the documented sentiment–return relationships into economically meaningful implications. This study provides evidence that the emotion-specific sentiment effects documented in Section 4 have economically meaningful implications for short-horizon abnormal returns in the Qatar Stock Exchange when translated into simple trading rules. This approach is intended to illustrate the economic relevance of the empirical findings rather than to propose an implementable trading system. This design follows directly from the regression and regression tree results, which show that negative outcomes are concentrated in specific emotional regimes rather than being uniformly distributed across all news events. Across all three strategies, positions are initiated at the close of the announcement day and liquidated on day +5, mirroring the event window used in the empirical analysis. In particular, this choice reflects the concentration of statistically and economically meaningful effects between day 0 and day +5 observed in both the linear regressions and the non-linear tree models.

An important feature of the results is that economic relevance arises through distributional changes rather than through shifts in average returns alone such as changes in skewness, tail outcomes, and gain–loss asymmetry. The results indicate that short term price dynamics in the Qatar Stock Exchange are sensitive to emotional content in news headlines and that filtering out particular emotions alters both the probability of positive outcomes and the asymmetry between gains and losses. Accordingly, the economic relevance of the strategies arises primarily from downside risk reduction and tail behavior rather than from increases in mean returns.

The persistence observed in the forward abnormal return regressions and regression tree models aligns closely with prior findings in the sentiment literature. Song et al. (2015) show that sentiment induced mispricing can persist when investor attention and interpretation evolve slowly. This mechanism is particularly relevant in emerging markets, where information frictions and limited arbitrage capacity can delay price correction (Anusakumar et al., 2017). The consistency between these prior findings and the post-event patterns documented in Section 4 supports the interpretation that the observed effects reflect delayed price adjustment rather than transitory noise.

In the Qatar Stock Exchange, prior evidence points to asymmetric price and volume responses, suggesting that short run market dynamics can amplify sentiment effects (Ahmed, 2018). These characteristics increase the likelihood that emotionally charged news affects prices through short-term imbalances rather than immediate fundamental repricing. Within this environment, strategies that condition on emotional content can reduce exposure to extreme outcomes associated with negative or misleading sentiment signals. This market structure provides a

natural setting in which emotion-based filters can meaningfully alter the distribution of short-horizon abnormal returns.

The five day holding horizon is also consistent with evidence that sentiment predictability is strongest at short horizons and weakens as information is absorbed into prices (Kim & Ryu, 2020). This supports the design choice to evaluate returns through day +5 rather than relying solely on event day reactions.

Taken together, the evidence suggests that prices in the Qatar Stock Exchange do not fully incorporate the emotional content of firm-level news headlines on the announcement day at short horizons. Instead, adjustment appears gradual and emotion dependent. Filtering out anger and sadness reduces exposure to persistent negative returns, while filtering out trust appears to improve risk adjusted outcomes by avoiding events where optimistic sentiment may already be priced in.

These findings support behavioral models of price formation in which investor attention and emotional interpretation affect short run dynamics. They also align with prior evidence that sentiment effects can be amplified in markets characterized by asymmetric trading behavior and slower information diffusion (Ahmed, 2018; Anusakumar et al., 2017). These findings provide a coherent interpretation of the empirical results and motivate the broader conclusions regarding sentiment-driven price formation in emerging markets. These insights set the stage for the concluding discussion of the paper's contributions, limitations, and avenues for future research.

7. Conclusion

This paper examines how emotion-specific news sentiment influences short-term abnormal stock returns in the Qatar Stock Exchange. Using firm-level news headlines and daily stock price data, the study analyzes both immediate market reactions on the announcement day and short-horizon return dynamics following news releases. Rather than relying on aggregate sentiment measures, the analysis distinguishes between specific emotions, allowing for a more precise examination of how investors respond to different types of information.

The results show that sentiment matters, but its effects are not uniform across emotions. Consistent with Hypotheses H1 and H2, anger is associated with large and economically meaningful negative abnormal returns on the event day, with limited evidence of persistence in subsequent days. This pattern suggests strong initial selling pressure followed by partial correction, which is consistent with behavioral overreaction in markets characterized by lower liquidity and slower information diffusion (Ahmed, 2018; Anusakumar et al., 2017). In contrast, anticipation is linked to small positive abnormal returns on the event day, supporting Hypothesis H3, but these effects fade quickly and do not persist in the post-event window. Other emotions do not exhibit stable or economically meaningful average effects, highlighting the importance of emotion-specific analysis rather than aggregate sentiment measures.

The empirical findings contribute to the literature in several ways. First, the results provide clear evidence that different emotions convey different financial signals, even within short event windows. Second, the study offers new firm-level evidence from the Qatar Stock Exchange, an emerging market that has received limited attention in the sentiment literature. Third, the combined use of linear regressions and regression tree models shows that sentiment-driven price effects are concentrated in specific emotional regimes and interaction patterns, rather than being

evenly distributed across all news events. This finding helps explain why average regression coefficients alone may understate the economic relevance of sentiment.

The strategy-based analysis further illustrates the economic meaning of these results within the studied sample. Filtering news events based on emotional content alters the distribution of short-horizon returns, primarily by reducing exposure to adverse tail outcomes rather than by increasing average returns. This pattern is consistent with prior evidence that sentiment affects downside risk and return asymmetry more strongly than mean performance, particularly in emerging markets with information frictions (Song et al., 2015; Ahmed, 2020). The analysis is intended to demonstrate economic relevance rather than to propose implementable trading strategies.

Several limitations should be acknowledged. First, the strategy results are based on daily returns and do not account for transaction costs, bid ask spreads, or liquidity constraints, which may be important in an emerging market setting. Second, all strategies are constructed and evaluated in sample, which raises concerns about data snooping and overfitting. A more rigorous evaluation would require strict out-of-sample testing. Third, the sentiment measures are lexicon based and may not fully capture contextual nuance in financial language, which introduces potential measurement error.

Despite these limitations, the findings show that emotion-specific news sentiment is not only statistically significant but also economically meaningful within the analyzed sample. The results underscore the value of moving beyond aggregate sentiment measures and highlight the importance of emotional structure in understanding short-term price formation. Future research could extend this analysis by incorporating intraday data, applying out-of-sample validation, or using contextual language models to capture more nuanced sentiment signals. Together, these

extensions would further clarify the role of emotions in shaping short-horizon stock returns in emerging markets.

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