

Financial News Sentiment and Market Stability in Indonesia: A Comparative ASEAN Analysis (NLP)

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Abstract

The rapid expansion of digital financial information has increased the influence of news-driven narratives on capital market behavior in emerging ASEAN economies. This study examines how financial news sentiment affects stock returns and conditional volatility in Indonesia, Malaysia, and Singapore during 2015–2024. A daily sentiment index was constructed from Reuters, Bloomberg, Factiva, and LexisNexis articles using a hybrid Natural Language Processing (NLP) approach combining lexicon-based methods and FinBERT classification. The sentiment measures were integrated into panel regression, correlated random effects (CRE), Granger causality, and GARCH(1,1) models. The results show that sentiment significantly affects both returns and volatility across ASEAN markets. A one-standard-deviation decline in sentiment increases conditional volatility by approximately 10.3% in Indonesia ($p < 0.01$), with weaker effects observed in Malaysia and Singapore. The return estimations indicate that a one-unit increase in sentiment raises next-day returns by approximately 0.084 percentage points. Negative sentiment generates stronger volatility responses than positive sentiment, supporting behavioral asymmetry and loss-aversion interpretations. Cross-country findings further show that sentiment sensitivity is strongest in Indonesia and weakest in Singapore, suggesting that institutional development moderates the transmission of digital information into market outcomes. The study contributes by integrating FinBERT-based sentiment analysis with comparative ASEAN financial econometrics and demonstrates the growing importance of narrative-driven risk in emerging capital markets.

Keywords: financial news sentiment; market stability; Indonesia; ASEAN equity markets

JEL Classification: G14; G15; C58

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A. INTRODUCTION

Indonesia's capital market has experienced rapid digital and institutional transformation over the past decade, driven by expanding retail investor participation, mobile trading platforms, and deeper integration with regional and global financial systems (Harymawan et al., 2026). The growth of the Indonesia Stock Exchange (IDX) has been accompanied by a substantial increase in first-time retail investors, particularly following the acceleration of digital financial services during the post-pandemic period (Amalia et al., 2026; Wulandari et al., 2026). At the same time, financial authorities such as Otoritas Jasa Keuangan and Bank

Indonesia have intensified initiatives related to digital financial literacy, investor protection, and market transparency in order to strengthen financial resilience within an increasingly digitalized economy (Rahmatullah & Hakam, 2025). Despite these institutional developments, concerns persist regarding information asymmetry, speculative trading behavior, and the growing sensitivity of market participants to rapidly circulating financial narratives (Rahmatullah & Hakam, 2025). As digital participation expands, understanding how information flows influence market behavior becomes increasingly important not only for asset pricing, but also for financial stability and regulatory governance in

emerging markets (Januarsi & Taufik, 2025).

In this study, market stability refers primarily to the behavior of conditional volatility, return persistence, and the market's capacity to absorb information shocks without generating excessive price dislocation or destabilizing fluctuations (Sari et al., 2026). While financial markets have traditionally been modeled as informationally efficient systems, contemporary digital environments complicate this assumption (Ouassou & Tamasiga, 2026). Information now spreads through online financial media, algorithmically prioritized news aggregation systems, and platform-based investor ecosystems that intensify attention cycles and narrative repetition (Citera & De Pretis, 2026). Within ASEAN markets, these digitally amplified narratives may accelerate behavioral responses by increasing the speed, visibility, and persistence of emotionally charged information. Consequently, market dynamics increasingly reflect not only economic fundamentals, but also the interaction between digital information transmission, institutional credibility, and investor interpretation (Matsushita et al., 2026).

The conventional Efficient Market Hypothesis (EMH) posits that publicly available information is rapidly and rationally incorporated into asset prices. Under the semi-strong form of efficiency, publicly observable news should not systematically predict abnormal returns or persistent volatility (Sattar et al., 2026). However, growing evidence from behavioral finance and information economics suggests that financial markets frequently deviate from strict rationality. Investors may overreact, herd, or respond asymmetrically to negative information, particularly during periods of uncertainty and elevated narrative intensity (Sharma & Patra, 2025). These effects are often amplified in markets characterized by high retail participation, uneven financial literacy, and evolving institutional structures. From this perspective, market outcomes are shaped not solely by fundamentals, but also by how information is interpreted, circulated, and behaviorally internalized within digital financial ecosystems.

Against this backdrop, text-based sentiment analysis has emerged as an important empirical approach for measuring the tone, polarity, and emotional content embedded within financial narratives (Benedetti & Calderón, 2025). Unlike traditional macroeconomic indicators, sentiment indices derived from financial news capture qualitative dimensions of investor expectations such as optimism, pessimism, and uncertainty that may influence short-term market behavior (Lian, 2026). Recent advances in Natural Language Processing (NLP), including transformer-based financial language models, have further improved the ability to quantify contextual sentiment from structured news sources. As a result, sentiment analysis increasingly occupies an important position within empirical finance, particularly in studies examining volatility transmission, behavioral pricing dynamics, and information efficiency (Toksoz &

Isik, 2026).

Although the relationship between investor sentiment and market behavior has been extensively studied in developed economies such as the United States and China, evidence from ASEAN markets remains fragmented and methodologically uneven (Amalia et al., 2026). Existing regional studies are predominantly single-country focused, rely heavily on social-media proxies, or do not explicitly examine how institutional differences moderate sentiment transmission across markets (Arsal et al., 2026). This limitation is analytically significant because ASEAN economies display substantial variation in institutional maturity, regulatory structure, market depth, and investor composition. Indonesia, for example, is characterized by rapidly expanding retail participation and evolving disclosure systems, while Singapore represents a more institutionally mature and globally integrated financial center (Wahyuningrum et al., 2026). Malaysia occupies an intermediate position with relatively strong regulatory infrastructure but differing levels of retail market intensity. Consequently, a comparative ASEAN framework provides an opportunity to examine whether sentiment sensitivity reflects broader institutional conditions rather than merely differences in market size or liquidity (Costa et al., 2026).

This study addresses the following research question: to what extent does financial-news sentiment influence stock returns and conditional volatility in ASEAN capital markets, and how do these effects vary across different levels of institutional development? To answer this question, the study examines Indonesia, Malaysia, and Singapore using a comparative framework that integrates computational sentiment analysis with panel econometric and volatility modeling approaches. Specifically, the study evaluates whether sentiment extracted from structured financial news exhibits predictive relationships with stock returns and market volatility, and whether these relationships differ systematically across markets with varying degrees of institutional maturity.

This study contributes to the literature in three important ways. First, it constructs a structured financial-news sentiment index using domain-specific NLP techniques applied to ASEAN financial market reporting. Second, it integrates sentiment analysis with panel regression and GARCH-based volatility estimation to examine both return predictability and asymmetric volatility transmission. Third, and most importantly, it extends the political economy and Adaptive Market Hypothesis perspectives by demonstrating how institutional maturity moderates the transmission of digitally amplified financial narratives into market outcomes. In doing so, the study contributes to emerging debates on financial digitalization, behavioral finance, and market resilience within developing and emerging financial systems.

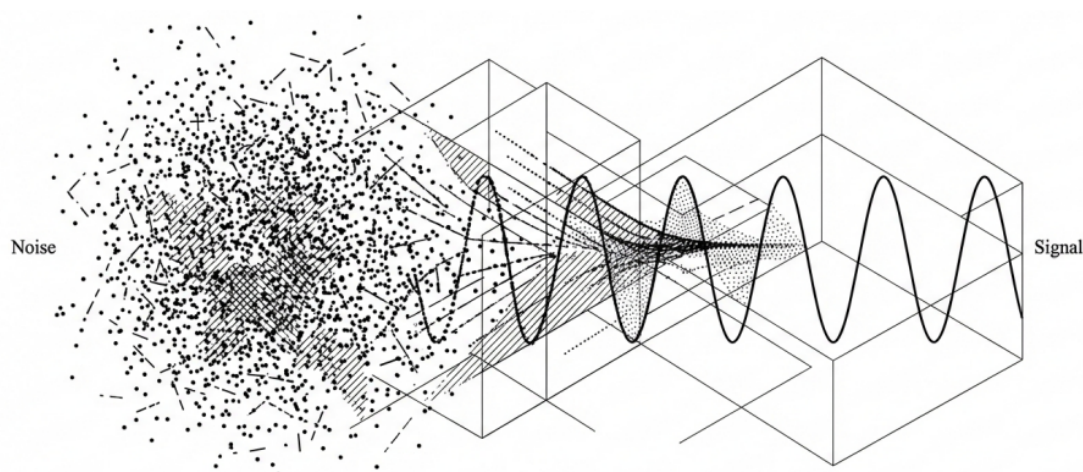


Figure 1. Conceptual Illustration of Information Filtering: From Noise to Market Signal. The left panel represents raw financial news characterized by informational noise and heterogeneous narrative components. The central filtering mechanism captures the sentiment extraction process using computational text analysis. The right panel illustrates the structured sentiment signal that influences asset returns and conditional volatility.

Source: Authors' estimation.

B. LITERATURE REVIEW

B.1 Market Efficiency, Behavioral Dynamics, and Adaptive Markets

The relationship between information and asset prices has long been dominated by the Efficient Market Hypothesis (EMH), which argues that publicly available information is rapidly incorporated into market prices, thereby limiting the possibility of systematically predicting abnormal returns (Utami et al., 2025). Under the semi-strong form of EMH, financial news should immediately be reflected in asset valuations, implying that sentiment extracted from publicly observable narratives should possess little or no predictive power. However, subsequent empirical research has repeatedly documented anomalies that are difficult to reconcile with strict informational efficiency, particularly during periods of heightened uncertainty and financial stress (Rahim et al., 2025).

Behavioral finance emerged partly in response to these limitations by emphasizing the role of cognitive bias, heuristic decision-making, and emotional responses in shaping investor behavior (Shiller, 2003). Rather than processing information fully rationally, investors may overreact to salient narratives, herd during periods of uncertainty, or disproportionately weight negative information relative to positive news. This asymmetry is closely linked to Prospect Theory and loss aversion, where losses generate stronger psychological responses than equivalent gains (Wahyuningrum et al., 2025). Consequently, pessimistic narratives often exert larger effects on volatility and risk perception than optimistic narratives of similar magnitude.

The Adaptive Market Hypothesis proposed by Andrew Lo provides an important theoretical bridge between EMH and behavioral finance by arguing that market efficiency is not static, but evolves according to institutional development, technological change, in-

vestor composition, and competitive adaptation (Lo, 2004). From this perspective, informational efficiency differs across markets and over time rather than existing as a universal condition. Markets characterized by deeper liquidity, stronger institutional participation, and more developed regulatory systems are expected to absorb information more efficiently than markets dominated by retail participation and informational asymmetry. This framework is particularly relevant in ASEAN, where financial systems display heterogeneous institutional maturity and varying capacities to process digitally transmitted information.

B.2 Investor Sentiment and Digital Information Transmission

The growing importance of digital communication technologies has intensified scholarly interest in investor sentiment as a driver of market behavior. Investor sentiment broadly refers to beliefs and expectations that are not fully justified by economic fundamentals but nonetheless influence trading decisions and market outcomes (Joaqui-Barandica et al., 2026). Recent studies show that sentiment can amplify short-term return reversals, intensify volatility clustering, and contribute to temporary mispricing, especially during periods of macroeconomic uncertainty or financial contagion.

Digital financial ecosystems further magnify these effects by accelerating the speed and repetition of information dissemination. Financial narratives are increasingly circulated through online news platforms, algorithmic recommendation systems, and mobile investment applications that prioritize emotionally salient content (Nave & Ruiz, 2025). In such environments, repeated exposure to similar narratives may strengthen investor attention cycles and reinforce collective reactions beyond underlying fundamentals. Empirical evidence following major global shocks, including post-

pandemic market turbulence and banking-sector instability, suggests that negative narratives tend to spread more rapidly and generate stronger volatility responses than positive information.

These dynamics are particularly important in emerging markets, where higher retail investor participation, uneven access to financial information, and relatively lower analyst coverage may increase sensitivity to narrative-driven trading behavior (Billah, 2025). In ASEAN markets, differences in institutional quality and market depth therefore become central to understanding how sentiment translates into returns and volatility. While developed financial systems may absorb information more efficiently through institutional arbitrage mechanisms, markets with evolving institutional structures may exhibit slower adjustment and stronger behavioral amplification.

B.3 Text-Based Sentiment Analysis in Financial Research

The integration of Natural Language Processing (NLP) into financial economics has significantly expanded the ability of researchers to quantify qualitative information embedded in financial narratives (Musamih et al., 2026). Early sentiment studies primarily relied on dictionary-based approaches that classified words into positive or negative categories. Seminal work by Tetlock (2007) demonstrated that media pessimism was associated with downward pressure on stock prices, while later refinements by Loughran and McDonald improved classification accuracy through finance-specific lexicons that reduced misinterpretation of technical financial terminology (Xu et al., 2026).

Although dictionary-based methods remain widely used because of their transparency and interpretability, they are limited in their ability to capture contextual meaning and semantic nuance. Words such as “liability,” “risk,” or “debt” may carry neutral meanings in financial reporting but are frequently classified as negative in generic sentiment dictionaries (Lengyel et al., 2026; Traverso et al., 2026). To address these limitations, recent research increasingly employs transformer-based architectures such as BERT and FinBERT, which incorporate contextual relationships between words and improve sentiment classification accuracy in financial texts (Arifin et al., 2026; Shalawati et al., 2026).

Despite these methodological advances, important limitations remain unresolved. Transformer-based models often require substantial computational resources, may suffer from interpretability concerns, and are still relatively underutilized in emerging-market finance research. In addition, many sentiment studies continue to rely on English-language datasets, which may not fully capture local linguistic nuance or retail-investor discourse in multilingual financial environments such as ASEAN. As a result, methodological improvements in sentiment extraction have not always

been matched by comparable advances in institutional and regional applicability.

B.4 Evidence from ASEAN and Emerging Markets

Empirical evidence from emerging markets generally indicates that sentiment effects are stronger where institutional efficiency and market depth remain relatively limited. Studies across Asia and Latin America frequently report that negative news generates larger volatility responses and stronger short-term return predictability than in more developed markets (Rahmawati et al., 2021). These findings support the argument that behavioral reactions are amplified when markets are characterized by higher retail participation, informational frictions, and evolving regulatory systems.

Within ASEAN, however, comparative evidence remains relatively limited. Existing regional studies are predominantly single-country analyses or rely heavily on social-media sentiment proxies, which often contain substantial informational noise and weak links to formal price discovery processes (Kesuma et al., 2022). While social-media sentiment may capture retail attention dynamics, it does not necessarily reflect the structured financial narratives most relevant to institutional and market-wide decision-making. Moreover, previous ASEAN studies rarely integrate institutional heterogeneity into the analytical framework, making it difficult to assess how differences in market maturity influence the transmission of sentiment into volatility and return dynamics.

This limitation is important because ASEAN markets differ substantially in terms of liquidity depth, investor composition, disclosure quality, and regulatory development. Singapore operates as a globally integrated financial center with relatively strong institutional dominance and mature market infrastructure, whereas Indonesia exhibits rapidly expanding retail participation and evolving informational governance (Tanaka & Suhartono, 2026). Malaysia occupies an intermediate position characterized by comparatively strong regulation but distinct market participation patterns. Without a comparative framework, it remains difficult to determine whether observed sentiment effects reflect universal behavioral mechanisms or country-specific institutional conditions.

B.5 Research Gap and Hypothesis Development

Although the relationship between investor sentiment and market behavior is well established in the broader literature, three major gaps remain insufficiently addressed. First, cross-country comparative studies using structured financial-news sentiment within ASEAN remain scarce. Existing studies are largely fragmented across individual markets and therefore provide limited insight into how institutional maturity moderates behavioral responses to digital information flows.

Second, prior research often separates methodological innovation in sentiment extraction from econometric modeling of market dynamics. Studies focusing on advanced NLP techniques frequently pay limited attention to volatility transmission and institutional heterogeneity, while econometric studies commonly rely on simplified sentiment proxies with weaker contextual accuracy. Consequently, the integration of transformer-based financial sentiment analysis with comparative panel-volatility frameworks remains underdeveloped in Southeast Asian contexts.

Third, relatively limited attention has been devoted to asymmetric volatility transmission and narrative persistence in emerging markets. While many studies confirm that sentiment predicts returns, fewer examine whether negative narratives generate disproportionately stronger and more persistent effects on conditional volatility across markets with different institutional structures.

Building on these gaps, this study develops five hypotheses. First, financial-news sentiment is expected to exhibit predictive relationships with stock returns, indicating deviations from strict semi-strong informational efficiency. Second, sentiment is expected to influence conditional market volatility, particularly during periods of elevated uncertainty. Third, negative sentiment is expected to exert stronger effects on volatility than positive sentiment, consistent with Prospect Theory and loss aversion mechanisms. Fourth, sentiment effects are expected to be stronger in less institutionally mature markets such as Indonesia than in more developed markets such as Singapore. Finally, sentiment effects are expected to display temporal persistence, reflecting delayed adjustment and narrative amplification within digital information environments.

C. METHODOLOGY

C.1 Research Design

This study employs a quantitative panel-data design to examine whether financial news sentiment influences stock returns and conditional volatility across ASEAN capital markets. The empirical framework integrates Natural Language Processing (NLP), panel econometrics, and volatility modeling to evaluate how digital information transmission interacts with market structure and institutional maturity. Indonesia, Malaysia, and Singapore are selected because they represent different stages of financial market development within ASEAN, allowing comparative assessment of sentiment sensitivity under heterogeneous institutional conditions.

The methodological structure is designed to test three interrelated dimensions. First, whether sentiment extracted from financial news possesses predictive power over stock returns. Second, whether sentiment contributes to volatility persistence and asymmetric market reactions. Third, whether these relationships differ across markets characterized by varying degrees of institutional depth and informational efficiency.

C.2 Data Sources and Sample Coverage

The study uses a balanced daily panel dataset covering the period from January 2015 to December 2024. The sample includes Indonesia, Malaysia, and Singapore, generating approximately 2,400 trading-day observations per country and nearly 7,200 total panel observations after synchronization and cleaning procedures.

Financial news data were collected from Reuters, Bloomberg, Factiva, and LexisNexis. These sources were selected because they provide professionally curated financial reporting with high relevance to investor decision-making and lower informational noise relative to social media platforms. Market data, including daily stock index prices, trading volume, and exchange rates, were obtained from Refinitiv Datastream and the World Federation of Exchanges. Monetary policy variables and macroeconomic indicators were retrieved from the International Monetary Fund (IMF), World Bank, and respective central bank publications, including Bank Indonesia and Otoritas Jasa Keuangan. Table 1 presents the data structure and source coverage.

All variables were aligned to trading days to ensure temporal consistency between sentiment measures and financial market responses.

C.3 Textual Data Processing and Sentiment Construction

Language Selection and Corpus Design. The sentiment corpus consists primarily of English-language financial news articles. English-language sources dominate cross-border institutional financial reporting within ASEAN and provide standardized coverage across the three sample countries. The use of English-language data also ensures comparability in NLP processing and minimizes translation inconsistencies across multilingual financial texts.

However, this approach may underrepresent localized retail sentiment expressed in Bahasa Indonesia or Malay-language media, particularly among domestic retail investors in Indonesia. Consequently, the sentiment index should be interpreted primarily as a measure of institutional and internationally mediated financial narratives rather than a complete representation of all retail investor perceptions. This limitation is acknowledged explicitly in the study's limitations section.

Text Preprocessing. News articles were cleaned and standardized before sentiment extraction. The preprocessing stage included duplicate removal, financial keyword filtering, tokenization, stop-word elimination, and lemmatization. Non-financial articles unrelated to macroeconomic conditions, equity markets, banking stability, or investor expectations were excluded to reduce classification noise. Named Entity Recognition (NER) procedures were additionally applied to identify country-specific financial references and market-related entities.

Table 1. Data Structure and Source Coverage

Variable Category	Data Source	Frequency	Purpose
Financial News	Reuters, Bloomberg, Factiva, Lexis-Nexis	Daily	Sentiment construction
Stock Market Data	Refinitiv Datastream, WFE	Daily	Returns and volatility
Exchange Rate	IMF, Central Banks	Daily	Macroeconomic control
Interest Rate	IMF, Central Banks	Daily/Monthly adjusted	Monetary control
Liquidity Measures	Exchange statistics	Daily	Market depth proxy

Source: Authors' compilation.

NLP Model and Sentiment Measurement. Sentiment scoring combines a finance-specific lexicon approach with transformer-based contextual analysis using FinBERT. The hybrid framework was selected because dictionary-only methods often misclassify technical financial terminology, while transformer-based architectures capture semantic context more effectively. For each article, sentiment polarity scores were generated and aggregated into a country-level daily sentiment index:

$$Sentiment_{i,t} = \frac{\sum_{j=1}^{N_t} Score_{j,t}}{N_t} \quad (1)$$

where $Score_{j,t}$ represents the sentiment score of article j at time t , and N_t denotes the total number of articles published on day t . All articles were weighted equally during daily aggregation. The study does not apply differential weighting based on media reach, audience size, or institutional influence. This decision avoids introducing subjective assumptions regarding the relative informational dominance of specific news providers and maintains comparability across countries. Positive sentiment values indicate optimistic narrative tone, whereas negative values reflect pessimistic or uncertainty-oriented narratives.

C.4 Variable Specification

The empirical analysis employs two dependent variables: stock returns and conditional volatility. Daily stock returns are calculated using logarithmic returns:

$$R_{i,t} = \ln\left(\frac{P_{i,t}}{P_{i,t-1}}\right) \quad (2)$$

where $P_{i,t}$ represents the closing stock index price for country i at time t . Conditional volatility is estimated through GARCH-family models to capture volatility clustering and time-varying market risk. The principal explanatory variable is the lagged sentiment index. To isolate sentiment effects from macroeconomic fundamentals, the models additionally include exchange rates, interest rates, lagged returns, and market liquidity controls. Table 2 summarizes the empirical variables.

Table 2. Empirical Variables

Variable	Definition	Measurement
Return ($R_{i,t}$)	Daily stock return	Log return
Volatility ($\sigma_{i,t}^2$)	Conditional variance	GARCH estimate
Sentiment	Financial news polarity	NLP sentiment index
Exchange Rate	Local currency/USD	Daily percentage change
Interest Rate	Monetary policy rate	Central bank rate
Liquidity	Trading activity proxy	Volume turnover

Source: Authors' compilation.

C.5 Panel Regression Model

To evaluate whether sentiment predicts stock returns, the study estimates the following panel regression model:

$$R_{i,t} = \alpha_i + \beta_1 Sentiment_{i,t-1} + \beta_2 X_{i,t} + \varepsilon_{i,t} \quad (3)$$

where $R_{i,t}$ denotes stock returns, $Sentiment_{i,t-1}$ represents lagged sentiment, $X_{i,t}$ is the vector of control variables, and α_i captures country-specific fixed effects. Lagged sentiment is used to reduce simultaneity bias and reflect the temporal sequence between information dissemination and market adjustment. The fixed-effects framework is preferred because it controls for unobserved country-specific heterogeneity associated with institutional structure, investor composition, and regulatory environments. Hausman specification testing is conducted to evaluate the suitability of fixed versus random effects estimators.

C.6 Correlated Random Effects (CRE) Robustness Model

To address potential endogeneity arising from correlation between regressors and unobserved panel-level characteristics, the study additionally estimates a Correlated Random Effects (CRE) model following the Mundlak specification. The CRE framework incorporates country-level means of time-varying regressors into the random-effects structure:

$$R_{i,t} = \alpha + \beta X_{i,t} + \theta \bar{X}_i + u_i + \varepsilon_{i,t} \quad (4)$$

where $\bar{X}_i$ represents the country-specific mean of explanatory variables across time. The CRE ap-

proach allows simultaneous estimation of within-country and between-country effects while mitigating omitted-variable bias associated with unobserved heterogeneity. This robustness procedure provides an additional check on the stability of the sentiment coefficients obtained from the baseline panel estimations.

C.7 Volatility Modeling

To examine whether sentiment contributes to conditional market volatility, the study estimates a GARCH(1,1) specification augmented with sentiment variables:

$$\sigma_{i,t}^2 = \omega + \alpha \varepsilon_{i,t-1}^2 + \beta \sigma_{i,t-1}^2 + \gamma \text{Sentiment}_{i,t-1} \quad (5)$$

where $\sigma_{i,t}^2$ denotes conditional variance, $\varepsilon_{i,t-1}^2$ represents lagged shock terms, $\sigma_{i,t-1}^2$ captures volatility persistence, and γ measures the contribution of sentiment to volatility dynamics. The GARCH(1,1) specification is selected because it provides parsimonious and empirically robust estimation of volatility clustering commonly observed in financial time series. Previous financial econometric studies consistently demonstrate that GARCH(1,1) captures persistence dynamics effectively while avoiding overparameterization associated with more complex specifications.

Although asymmetric models such as EGARCH and TGARCH are capable of modeling leverage effects, the present study adopts GARCH(1,1) as the baseline specification because the primary objective is to evaluate the direct contribution of sentiment to volatility persistence rather than isolate leverage asymmetry alone. Nevertheless, asymmetric volatility responses are further examined through sentiment decomposition and robustness analysis in subsequent estimations.

C.8 Granger Causality and Endogeneity Assessment

Because reverse causality may exist between investor sentiment and market outcomes, the study incorporates Granger causality testing to evaluate directional predictability between sentiment and stock returns. The bivariate specification is expressed as:

$$R_t = \sum_{k=1}^p \alpha_k R_{t-k} + \sum_{k=1}^p \beta_k \text{Sentiment}_{t-k} + \varepsilon_t \quad (6)$$

$$\text{Sentiment}_t = \sum_{k=1}^p \gamma_k \text{Sentiment}_{t-k} + \sum_{k=1}^p \delta_k R_{t-k} + u_t \quad (7)$$

The Granger framework does not establish structural causality; however, it provides evidence regarding whether past sentiment contains incremental predictive information for future market movements beyond lagged returns alone.

Event Study Framework. To examine the transmission of external financial shocks across ASEAN markets, the study additionally employs an event-study

methodology using the collapse of Silicon Valley Bank on 10 March 2023 as the focal event. The event-study framework is used to evaluate abnormal return behavior and volatility reactions surrounding major international financial disturbances. The analysis applies the standard Market Model to estimate abnormal returns relative to expected market performance. Expected returns are calculated as:

$$R_{i,t} = \alpha_i + \beta_i R_{m,t} + \varepsilon_{i,t} \quad (8)$$

where $R_{i,t}$ denotes the observed return for country i at time t , $R_{m,t}$ represents the benchmark market return, α_i and β_i are estimated market-model parameters, and $\varepsilon_{i,t}$ is the disturbance term. Abnormal returns are subsequently computed as:

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t}) \quad (9)$$

Cumulative abnormal returns (CAR) over the event window are calculated using:

$$CAR_{[t_1, t_2]} = \sum_{t=t_1}^{t_2} AR_{i,t} \quad (10)$$

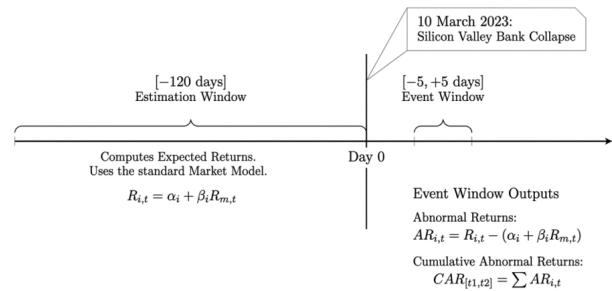


Figure 2. Shock Transmission: SVB Event Study.

Source: Authors' estimation.

The event window is defined as $[-5, +5]$ trading days surrounding the event date, while the estimation window consists of the 120 trading days preceding the event window. The relatively short event horizon minimizes contamination from unrelated macroeconomic developments and allows clearer identification of immediate market responses to the SVB shock. The Market Model is selected because it provides stable expected-return estimation and remains widely adopted in financial event-study literature for cross-market comparative analysis. In addition to abnormal returns, changes in conditional volatility surrounding the event are evaluated using the GARCH framework specified previously in Equation (5).

C.9 Diagnostic Procedures

Several diagnostic procedures are conducted to ensure model validity and econometric reliability. Stationarity is evaluated using Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests. Heteroskedasticity-consistent robust standard errors are employed in panel estimations to address variance instability. For volatility models, ARCH-LM diagnostics are used to confirm

the existence of conditional heteroskedasticity before GARCH estimation. Multicollinearity diagnostics are additionally examined through variance inflation factors (VIFs), while residual autocorrelation is assessed using Ljung–Box statistics. These procedures are implemented to ensure that the estimated relationships reflect stable statistical properties rather than spurious correlations or specification bias.

D. RESULTS AND DISCUSSION

D.1 Descriptive Statistics and Distributional Properties

Table 3 reports the descriptive statistics for the principal variables across Indonesia, Malaysia, and Singapore based on the dataset described in Section C.2. The results indicate substantial heterogeneity in market behavior across ASEAN financial systems.

Table 3. Descriptive Statistics

Variable	Indonesia	Malaysia	Singapore
Mean Return (%)	0.042	0.035	0.029
Std. Dev. Return	1.87	1.45	1.12
Mean Sentiment	0.012	0.018	0.025
Sentiment Std. Dev.	0.21	0.17	0.14
Skewness (Return)	−0.42	−0.31	−0.18
Kurtosis (Return)	4.78	4.12	3.95

Source: Authors' estimation.

Indonesia exhibits the highest return volatility, with a standard deviation of 1.87 compared with 1.45 in Malaysia and 1.12 in Singapore. Economically, this implies that Indonesian equity prices react more sharply to informational shocks and uncertainty episodes. The comparatively lower volatility in Singapore reflects deeper liquidity conditions and stronger institutional stabilization mechanisms.

All three markets display negative skewness, indicating that downside movements occur more frequently than extreme positive returns. More importantly, kurtosis values exceed the normal benchmark of three across all markets, confirming the presence of fat-tailed return distributions. Indonesia records the highest kurtosis value (4.78), suggesting a greater probability of extreme market events relative to Malaysia and Singapore.

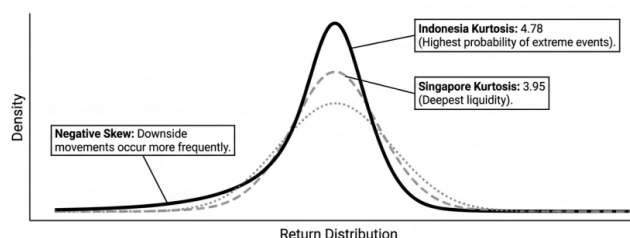


Figure 4. All three markets display excess kurtosis and negative skewness. This volatility clustering justifies conditional variance modeling over constant-variance linear estimation.

Source: Authors' estimation.

This finding is consistent with the behavioral inter-

pretation developed earlier, where digitally amplified negative narratives and retail-driven reactions may intensify tail-risk episodes during periods of uncertainty. The distributional properties shown in Table 3 also support the econometric specification introduced in Equation (5) of the methodology section. The existence of volatility clustering and excess kurtosis justifies the use of conditional variance modeling rather than constant-variance linear estimation.

D.2 Sentiment Dynamics and Persistence

Using the sentiment construction procedure specified in Equation (1), the empirical sentiment series reveals substantial persistence across all markets. The empirical sentiment series reveals significant first-order persistence across panel estimations.

The persistence effect is strongest in Singapore, where informational tone adjusts gradually over time, while Indonesia displays sharper sentiment reversals during periods of global financial stress. During major external shocks, negative sentiment spikes are more abrupt and persistent in Indonesia, suggesting stronger narrative amplification within retail-dominated trading environments.

These results imply that financial narratives do not dissipate immediately after publication. Instead, sentiment propagates through repeated exposure, media circulation, and investor attention cycles. The findings therefore provide evidence that information transmission in ASEAN markets operates dynamically rather than instantaneously.

D.3 Return Predictability Results

The baseline return regression defined in Equation (3) was estimated using fixed-effects panel estimation with robust standard errors. Table 4 presents the principal results.

Table 4. Panel Regression Results (Returns)

Variable	Coeff.	Std. Err.	t-Stat	p-value
Sentiment ($t - 1$)	0.084***	0.021	4.00	0.000
Lagged Return	0.113**	0.045	2.51	0.012
Exchange Rate	−0.032*	0.018	−1.78	0.075
Interest Rate	−0.056**	0.024	−2.33	0.020
R^2	0.27			

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' estimation.

The coefficient on lagged sentiment is positive and statistically significant at the 1% level. Economically, the coefficient implies that a one-unit increase in the standardized sentiment index is associated with an approximately 0.084 percentage-point increase in next-day stock returns, holding other variables constant. Although the magnitude is moderate, the effect remains meaningful given the daily frequency of the data and the cumulative nature of financial market adjustments.

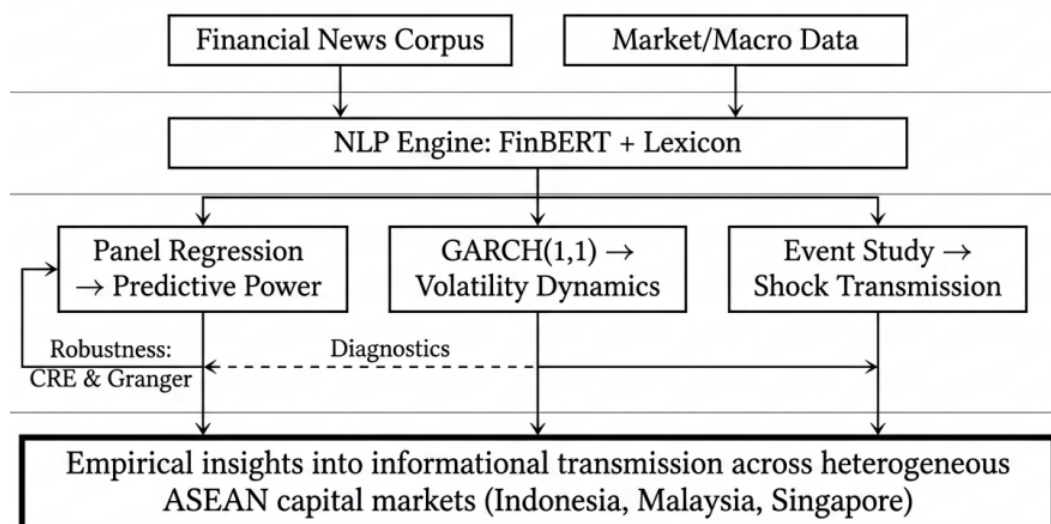


Figure 3. Macro System Synthesis.

Source: Authors' estimation.

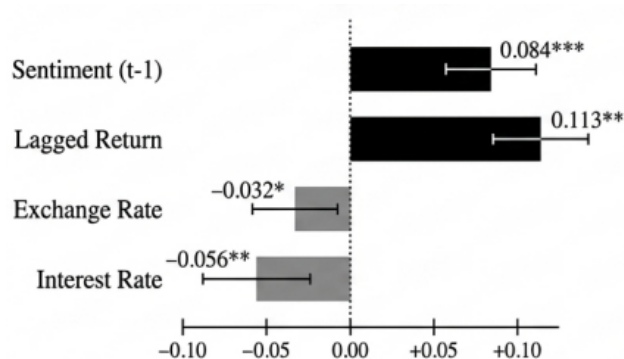


Figure 5. Narrative-based information is now an economically comparable explanatory factor alongside conventional fundamentals. Lagged return momentum (0.113**) indicates return adjustments are not fully instantaneous.

Source: Authors' estimation.

The control variables also exhibit important explanatory power. Exchange rate depreciation negatively affects market returns, reflecting the sensitivity of ASEAN capital markets to currency risk and external financing conditions. Similarly, higher interest rates reduce equity returns by increasing the cost of capital and lowering risk appetite. However, the magnitude of the sentiment coefficient remains economically comparable to traditional macro-financial drivers, suggesting that narrative-based information has become a relevant explanatory factor alongside conventional fundamentals.

The positive coefficient on lagged returns further indicates short-term momentum effects, implying that return adjustments are not fully instantaneous. Collectively, these findings provide evidence inconsistent with strict semi-strong market efficiency, although the results should be interpreted cautiously rather than as a definitive rejection of the Efficient Market Hypothesis.

D.4 Volatility Dynamics and Sentiment Transmission

Conditional volatility was estimated using the GARCH(1,1) specification introduced in Equation (5). The estimation results are reported in Table 5.

Table 5. GARCH(1,1) Estimation Results

Parameter	Coefficient	p-value
α (ARCH)	0.112***	0.000
β (GARCH)	0.845***	0.000
γ (Sentiment)	0.067**	0.018

** $p < 0.05$, *** $p < 0.01$.

Source: Authors' estimation.

The estimated persistence parameter ($\alpha + \beta \approx 0.957$) confirms substantial volatility clustering across the sample period. This indicates that shocks to market uncertainty dissipate slowly and continue to influence future volatility over multiple trading periods.

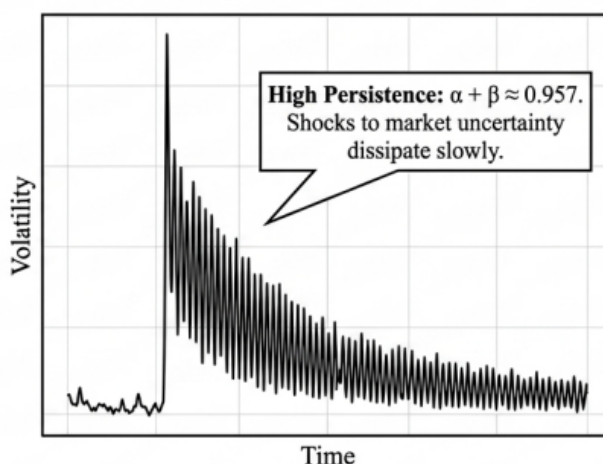


Figure 6. Worsening financial sentiment increases conditional variance beyond what historical price dynamics can explain. Narrative deterioration directly manufactures perceived market risk.

Source: Authors' estimation.

Most importantly, the sentiment coefficient remains positive and statistically significant. The result suggests that worsening financial sentiment increases conditional variance beyond what can be explained by historical price dynamics alone. Economically, this implies that narrative deterioration contributes directly to higher perceived market risk.

The asymmetric subsample analysis further shows that negative sentiment exerts a substantially stronger volatility effect than positive sentiment. During pessimistic news periods, the estimated volatility coefficient increases considerably relative to optimistic periods. This asymmetry is consistent with behavioral theories of loss aversion, where adverse information carries greater psychological weight than favorable news.

D.5 Cross-Country Heterogeneity

Country-specific estimations based on Equation (3) and Equation (5) reveal substantial variation in sentiment sensitivity across ASEAN markets.

Table 6. Cross-Country Estimation Results

Country	β_1 (Return)	γ (Volatility)
Indonesia	0.121***	0.103***
Malaysia	0.079**	0.061**
Singapore	0.043*	0.028*

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Source: Authors' estimation.

Indonesia consistently exhibits the strongest response to sentiment shocks, while Singapore records the weakest coefficients across both return and volatility estimations. Economically, this implies that identical changes in informational tone generate substantially larger pricing and risk responses in Indonesia than in Singapore.

The findings are consistent with the adaptive interpretation of market efficiency discussed earlier. Markets characterized by higher retail participation, lower liquidity depth, and evolving institutional structures appear more vulnerable to narrative-driven trading behavior. By contrast, Singapore's comparatively lower coefficients suggest faster information absorption and stronger arbitrage correction mechanisms. However, these differences should not be interpreted deterministically. The observed heterogeneity may also partially reflect variations in media coverage intensity, information quality, and differences in investor composition across countries.

D.6 Robustness and Endogeneity Assessment

Several robustness procedures were conducted to evaluate the stability of the baseline estimations. Alternative sentiment specifications, lag structures, and crisis-period exclusions produced coefficient estimates consistent with the main findings.

The correlated random effects (CRE) specification described in the methodology section produced results similar to the fixed-effects estimation, indicating that the principal relationship between sentiment and mar-

ket outcomes remains stable after controlling for unobserved panel-level heterogeneity.

To further address reverse causality concerns, Granger causality testing was implemented between sentiment and returns. The results indicate that lagged sentiment significantly predicts future returns, whereas reverse predictive effects from returns to sentiment are comparatively weaker. Although this does not fully eliminate endogeneity concerns, it strengthens the interpretation that sentiment contains incremental informational content rather than merely reflecting contemporaneous price movements.

Diagnostic testing also supports model adequacy. Variance Inflation Factors remain below conventional thresholds, indicating no serious multicollinearity issues, while ARCH-LM diagnostics confirm the appropriateness of conditional volatility estimation.

D.7 Dynamic Response Analysis

The impulse response estimations based on the dynamic specification indicate that return responses to sentiment shocks peak rapidly and dissipate within a short horizon. Volatility responses, however, remain persistent for longer periods.

The results show that the strongest return adjustment occurs approximately one trading day after the initial sentiment shock, while volatility effects remain statistically observable for up to five trading days. This suggests that prices adjust more quickly than perceived market risk.

Cross-country differences remain visible in the dynamic analysis. Singapore exhibits the fastest decay rate, whereas Indonesia shows more persistent volatility transmission. This pattern reinforces the interpretation that institutional maturity moderates the persistence of behavioral effects in financial markets.

D.8 Event Study: Silicon Valley Bank Shock

To examine external shock transmission, the study applies the event-study framework defined in Section C using the collapse of Silicon Valley Bank (SVB) on 10 March 2023 as the event date. Abnormal returns were estimated using the Market Model specified in Equation (8).

The Market Model was selected because the short event window of $[-5, +5]$ trading days reduces the incremental benefit of more complex multifactor models. In addition, the model remains widely used in financial event-study literature due to its transparency, stability, and suitability for cross-country comparative estimation.

The Indonesian market recorded a cumulative abnormal return ($CAR_{[-5,+5]}$) of -2.8% , accompanied by an approximately 37% increase in conditional volatility relative to baseline conditions. Singapore experienced a smaller cumulative abnormal decline of -1.1% and a more limited volatility increase of roughly 12%.

These findings suggest heterogeneous shock absorption capacity across ASEAN financial systems. In-

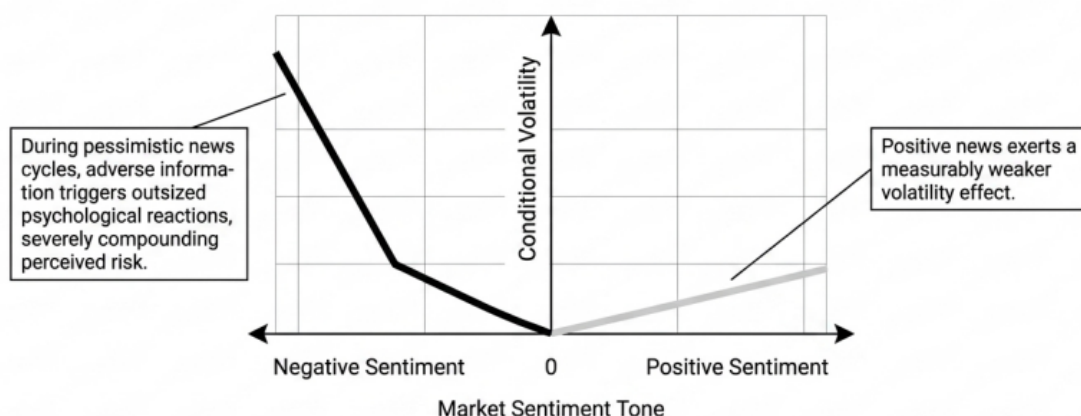


Figure 7. The asymmetric volatility response is consistent with behavioral theories of loss aversion. Adverse information carries mathematically greater weight than favorable news during market stress periods.

Source: Authors' estimation.

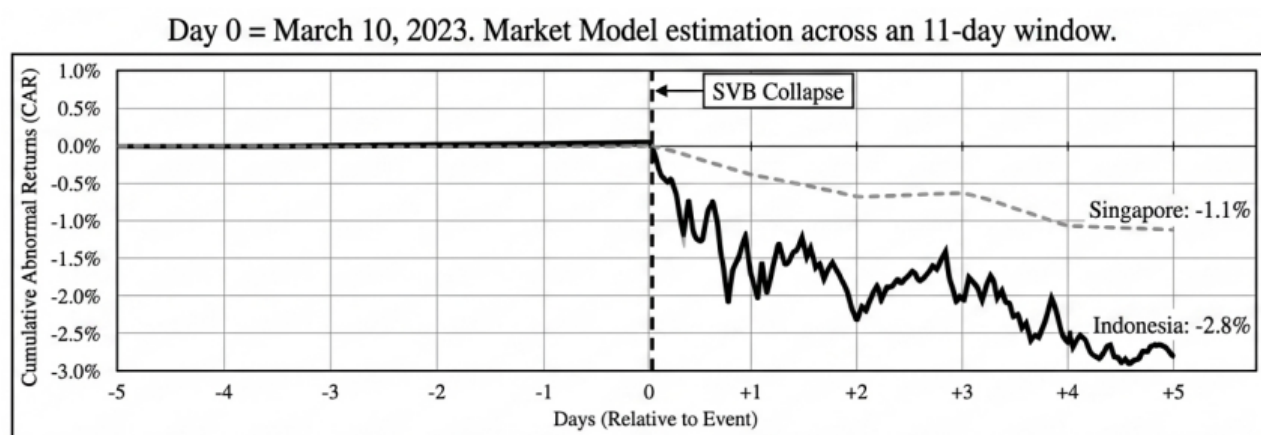


Figure 8. Event Study: The SVB Contagion Shock.

Source: Authors' estimation.

Indonesia's larger CAR magnitude and stronger volatility reaction imply greater sensitivity to global narrative contagion and external uncertainty transmission. Singapore's comparatively smaller response may indicate stronger institutional stabilization mechanisms and deeper liquidity conditions.

D.9 Discussion

Overall, the empirical findings consistently indicate that financial news sentiment contributes to both return predictability and volatility dynamics across ASEAN markets. The results suggest that digital information flows influence market behavior not only through fundamentals, but also through behavioral interpretation and narrative transmission mechanisms.

The evidence further indicates that sentiment effects are economically and institutionally heterogeneous. Indonesia displays substantially stronger sensitivity to informational tone than Singapore, implying that institutional maturity moderates the relationship between sentiment and market outcomes (Chung et al., 2026; Daeli & Wedari, 2025).

Importantly, the volatility response remains more persistent than the return response across specifications. This suggests that sentiment primarily influences perceived uncertainty and risk transmission

rather than permanently altering long-run valuation levels.

Taken together, the findings are broadly consistent with adaptive and behavioral interpretations of market dynamics. Rather than implying that markets are entirely inefficient, the results indicate that informational adjustment appears gradual, context-dependent, and conditioned by institutional structure within ASEAN financial systems.

E. CONCLUSION

This study investigated whether text-based financial news sentiment influences stock returns and volatility across Indonesia, Malaysia, and Singapore within the context of increasingly digitalized ASEAN financial markets. Using the econometric framework specified in the methodology section, the findings consistently show that sentiment contains measurable explanatory power for both return dynamics and conditional volatility, particularly in markets characterized by stronger retail participation and evolving institutional structures.

The results indicate that sentiment effects are not uniform across ASEAN markets. Indonesia exhibits the strongest responsiveness to financial narratives, followed by Malaysia and Singapore. This pattern suggests that institutional maturity, liquidity depth, and

investor composition moderate how information is incorporated into prices and risk expectations. The volatility estimations further demonstrate that negative sentiment exerts a substantially larger effect than positive sentiment, implying that adverse narratives amplify uncertainty more strongly than optimistic information improves confidence. Rather than suggesting a complete failure of market efficiency, the evidence indicates that informational adjustment appears gradual and behaviorally conditioned within emerging financial systems.

These findings carry important implications for financial governance and regulatory monitoring in Indonesia. As digital participation in capital markets expands, narrative-driven volatility may increasingly affect market stability through rapid information diffusion and behavioral amplification. In this context, regulatory institutions such as the Indonesia Stock Exchange and the Financial Services Authority could benefit from integrating Regulatory Technology (RegTech) systems capable of monitoring real-time sentiment transmission, abnormal narrative concentration, and cross-platform contagion signals. AI-assisted surveillance dashboards, anomaly detection systems, and automated sentiment risk indicators may help regulators identify periods of excessive speculative pressure before volatility escalates into broader systemic stress.

The study also contributes to the broader discussion surrounding Indonesia's long-term financial modernization agenda. The results suggest that strengthening market resilience requires not only deeper liquidity and greater participation, but also improvements in information governance, financial literacy, and digital risk monitoring. In this sense, the findings align with the objectives of Golden Indonesia 2045, particularly the emphasis on financial sector resilience, technological adaptation, and sustainable digital economic development.

Several limitations should nevertheless be acknowledged. The sentiment measures rely primarily on structured financial news sources and predominantly English-language textual data, which may underrepresent localized retail sentiment expressed in Bahasa Indonesia or other regional languages. Although robustness procedures and causality testing were implemented, the possibility of residual endogeneity between sentiment and market outcomes cannot be entirely eliminated. In addition, the analysis focuses on three ASEAN markets and daily-frequency observations, meaning that intraday dynamics and broader regional spillovers remain outside the scope of the present framework.

Future research could therefore extend the analysis by incorporating multilingual datasets, higher-frequency trading information, and broader ASEAN coverage. Further methodological development may also explore Large Language Models (LLMs) beyond transformer architectures such as BERT or FinBERT

to capture deeper semantic shifts, contextual ambiguity, and evolving narrative structures in financial discourse. Such extensions would provide a more refined understanding of how digital information ecosystems interact with institutional development and market stability across emerging economies.

DECLARATIONS

Author contributions. Z.U.R.Z.: conceptualization, methodology, software, formal analysis, data curation, writing — original draft, and project administration. M.S.: conceptualization, validation, investigation, and writing — review and editing. M.P.A.F.A.: data curation, investigation, and visualization. M.A.: investigation, resources, and visualization. M.N.: validation, writing — review and editing, and supervision. All authors have read and approved the published version of the manuscript.

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Conflicts of interest. The authors declare no conflict of interest. No party other than the authors had any role in the design of the study; in the collection, analysis, or interpretation of data; in the writing of the manuscript; or in the decision to publish the results.

Use of artificial intelligence. The authors declare that generative artificial intelligence tools were not used to generate the substantive content, analysis, or conclusions of this manuscript. The FinBERT model employed in Section C is a domain-specific classification model applied as a research instrument for sentiment measurement, and is reported transparently as part of the study methodology. Where AI-assisted language tools were used, they were limited to grammar and readability checking, and the authors reviewed and take full responsibility for the entire content of the published article.

Data availability. The market data analysed in this study were obtained from publicly accessible exchange records for Indonesia, Malaysia, and Singapore. The news corpus was retrieved from Reuters, Bloomberg, Factiva, and LexisNexis under institutional subscription and cannot be redistributed by the authors due to licensing restrictions. The replication code is available from the corresponding author on reasonable request.

Ethics approval. Not applicable. This study did not involve human participants or animal subjects.

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