“Is there a relationship between investor attention co-movement and stock return co-movement? Evidence from Indonesia”

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IS THERE A RELATIONSHIP BETWEEN INVESTOR ATTENTION CO-MOVEMENT AND STOCK RETURN CO-MOVEMENT? EVIDENCE FROM INDONESIA

Abstract

The rapid growth of retail investors and digital information access has increased the relevance of investor attention in shaping stock market dynamics, particularly in the Indonesian stock market. This study examines whether investor attention co-movement is associated with stock return co-movement. Using data of 418 stocks listed on the Indonesian Stock Exchange over the period 2020–2023 and covering 1,672 firm-year observations, this study employs a regression-based approach to construct measures of attention co-movement and return co-movement, controlling for firm characteristics and market-related factors. The results show that attention co-movement derived from internet search activity has a positive and statistically significant association with stock return co-movement, with a coefficient of 0.1147 ($p < 0.01$). In contrast, attention co-movement based on media coverage is not statistically significant. Furthermore, attention co-movement does not predict next-period return co-movement, as the coefficients are statistically insignificant across specifications. These findings indicate that investor attention co-movement links to stock return co-movement only contemporaneously through digital search activity, while media-based attention represents a weaker information channel. Overall, the results highlight the role of retail-driven digital attention in relation to stock return synchronization in an emerging market context.

Keywords attention co-movement, retail investor, stock return, synchronization, emerging markets

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INTRODUCTION

The COVID-19 pandemic marked a turning point in financial markets, accelerating digitalization and significantly increasing retail investor participation. Globally, the pandemic encouraged greater reliance on digital platforms and online financial information among retail investors (Talwar et al., 2021). In Indonesia, mobility restrictions and the growing use of online investment platforms coincided with a sharp rise in retail investor participation. Otoritas Jasa Keuangan (OJK, 2023a) reports substantial growth in the number of capital market investors during this period. At the same time, the Indonesian stock market demonstrated considerable resilience, with sustained growth in market activity and market capitalization despite heightened global uncertainty (OJK, 2023b). This combination of rapid retail investor growth and market resilience highlights the increasing importance of understanding how investor behavior shapes market dynamics.

As retail investors become more prominent market participants, the information environment of stock markets also changes. Digital

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platforms and online information channels allow investors to access and process similar information simultaneously, increasing the likelihood of coordinated trading behavior (Da et al., 2011; Barber & Odean, 2008). When investors collectively respond to common information signals, trading decisions may become synchronized, potentially generating stock return co-movement beyond firm-specific fundamentals.

Previous empirical studies examine the relationship between investor attention co-movement and stock return co-movement. Drake et al. (2017) conducted the study on the US stock market, a developed country. Then, Su and Wang (2021) conduct a study on the A-Share China stock market, which represents one of the largest stock markets in the world (Peng et al., 2024). This study fills the gap by capturing a different contextual framework than that of research conducted by Drake et al. (2017) and Su and Wang (2021), namely the emerging stock market.

Indonesia provides an appropriate setting to examine this mechanism because the country has experienced rapid growth in stock market capitalization and retail investor participation alongside increasing market digitalization. In 2023, Indonesia's stock market experienced the largest growth in market capitalization among the ASEAN countries (OJK, 2023a). Furthermore, retail investors increased by 56% in 2020 compared to the previous year and continued to grow, reaching 12.1 million investors by 2023, with 5.3 million active stock market participants, representing an 18.4% increase from 2022 (KSEI, 2023). The rapid expansion of the retail investor base (Koesrindartoto et al., 2020; Usman et al., 2024) underscores the relevance of examining collective investor behavior in the Indonesian stock market. Besides, Koesrindartoto et al. (2020) highlight that the trading activities of Indonesian retail investors cannot be ignored, as the authors find that individual investors past actions have a strong relationship with later actions. Therefore, whether investor attention co-movement is associated with stock return co-movement in such an environment remains an open empirical question, particularly in explaining cross-stock return synchronization.

1. LITERATURE REVIEW

Classical and behavioral finance theories offer contrasting perspectives on investor behavior. Traditional finance theory posits that asset prices reflect all available information and that investment decisions are driven by risk and return considerations (Markowitz, 1952; Fama, 1970, 1995). This framework assumes that investors are fully rational and able to process all relevant information. In contrast, the concept of bounded rationality suggests that investors face cognitive limitations and cannot fully process the vast amount of information available in financial markets (Simon, 1955, 1972). As a result, investors selectively allocate their attention to a subset of available information, particularly to salient signals (Kahneman, 1973). The limited attention framework further emphasizes that investors do not process all available disclosures equally, leading to systematic biases in information processing and market outcomes (Hirshleifer & Teoh, 2003).

Within this context, investor attention has emerged as an important behavioral factor influencing financial markets. When investors focus on attention-grabbing information, their trading decisions may be driven by attention rather than fundamentals, leading to excess demand for certain stocks (Barber & Odean, 2008). Investor attention has been measured using various proxies, including news coverage and internet search behavior. Empirical evidence suggests that these measures are associated with stock returns, volatility, and trading activity (Tetlock, 2007; Chen, 2017; Han et al., 2018; Akarsu & Süer, 2022). In particular, internet search activity has been shown to capture real-time investor attention and predict stock market behavior (Da et al., 2011), while market-wide attention measures are also linked to trading activity and return dynamics (Yuan, 2015). With the increasing availability of digital data, internet search activity has become a widely used proxy for investor attention and information demand (Preis et al., 2013; Affuso & Lahtinen, 2019). Digital information generated through online news and

media sources provides complementary measures of investor attention and information dissemination across financial markets (Shen & Wang, 2023; Yuan, 2015). Social media sentiment has also been used to capture market expectations and collective investor behavior (Gu & Kurov, 2020; Duz Tan & Tas, 2021; Bollen et al., 2011).

Da et al. (2011) argue that Google search volume provides a direct measure of investor attention because internet users actively seek information they consider relevant. Unlike passive exposure to information, search activity reflects investors' intentional efforts to acquire and process information, making Google Search a useful proxy for attention. The authors further distinguish search-based measures from news-based measures, suggesting that search activity captures investors' active demand for information, whereas news coverage primarily reflects the supply of information available to the market. Consequently, while media coverage may increase information availability, it does not necessarily imply that investors actively engage with that information. In contrast, search activity provides a more direct indication of investors' information-seeking behavior.

Recent evidence from the COVID-19 crisis further highlights the importance of investor attention in extreme market conditions. Using Google search volume as a proxy, Smales (2021) shows that increased investor attention during the pandemic is associated with lower stock returns and higher market volatility, reflecting faster information diffusion and heightened uncertainty. This suggests that investor attention plays a critical role in shaping market dynamics during periods of systemic shocks.

Beyond firm-level attention, recent literature suggests that attention can co-move across stocks. Stock return co-movement refers to the tendency of stock returns to move together across firms (Morck et al., 2000; Barberis et al., 2005). Previous studies suggest that common factors, including macroeconomic shocks, firm characteristics, and information diffusion, may contribute to this synchronization of stock returns (Li et al., 2019). Extending this idea, attention co-movement reflects the extent to which investor attention to a firm is driven by attention to its industry and the broader market (Drake et al., 2017; Su & Wang, 2021). This phenomenon arises because investors are exposed to similar information environments and may respond collectively to shared signals.

Several mechanisms explain how attention co-movement may translate into return co-movement. First, attention is not purely individual but can be shaped through social interaction and information sharing, leading to correlated beliefs and trading behavior (Han & Hirshleifer, 2015). Second, investors tend to categorize stocks and allocate attention within categories, which can generate correlated responses to common signals (Barberis et al., 2005; Peng & Xiong, 2006). Third, information diffusion across related stocks may cause investors to respond similarly to macroeconomic or industry-level news (Li et al., 2019). These mechanisms imply that synchronized attention can act as a behavioral channel that is linked to return co-movement.

Empirical evidence on the relationship between investor attention co-movement and stock return co-movement remains limited. Drake et al. (2017) and Su and Wang (2021) document a positive association using internet search activity and media-based indicators. Related studies show that other digital measures, including Twitter sentiment and activity, are also associated with stock returns and trading activity (Affuso & Lahtinen, 2019; Duz Tan & Tas, 2021). In the Indonesian context, the stock market has witnessed rapid growth in retail investor participation (Koesrindartoto et al., 2020; Usman et al., 2024), while prior evidence suggests that investor attention is associated with stock returns (Kenneth & Husodo, 2021).

Overall, the literature suggests that investor attention is an important factor in explaining stock market dynamics, yet the extent to which synchronized attention drives stock return comovement remains inconclusive, particularly in emerging markets characterized by rapid retail investor growth and increasing reliance on digital information.

This study therefore aims to examine the association between investor attention co-movement and stock return co-movement in the Indonesian stock market. Based on the theoretical mechanisms and empirical evidence discussed above, the following hypothesis is proposed:

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H1: Investor attention co-movement is positively associated with stock return co-movement.

Additionally, prior studies have examined whether investor attention has predictive implications for stock return co-movement. Drake et al. (2017) and Su and Wang (2021) investigate this issue using lead-lag regression models and reveal a positive association between attention co-movement and subsequent stock return co-movement. Their findings suggest that investor attention co-movement may predict synchronized stock returns, indicating that investor attention contains information relevant to future return co-movement. Based on prior empirical studies, we propose the hypothesis as follows:

H2: Investor attention co-movement has a predictive effect on stock return co-movement.

2. METHODOLOGY

This study employs firm-level data for all companies listed on the Indonesian Stock Exchange (IDX) over the period from March 2020 to December 2023. The sample period begins in March 2020 to capture the post-outbreak phase of the COVID-19 pandemic, during which mobility restrictions and increased reliance on digital platforms significantly affected investor behavior and attention allocation. The initial sample includes all listed firms. Firms are excluded if they have fewer than 26 weekly stock return observations within a given year, a negative book-to-market ratio, or incomplete data for the control variables. After applying these criteria, the final sample consists of 418 firms and 1,672 firm-year observations.

Weekly stock price data, market index data, and industry classifications are obtained from Refinitiv and Capital IQ. Firm-level accounting and ownership data are collected from firms' annual reports. To mitigate the influence of extreme values while preserving valid observations, return on assets (ROA) and the book-to-market ratio (BM) are winsorized at the 1st and 99th percentiles. The industry classification follows the IDX sectoral classification, which groups firms into ten sectors: energy, basic materials, industrials, consumer non-cyclicals, consumer cyclicals, health care, financials, property and real estate, technology, infrastructure, and transportation and logistics.

This study measures stock return co-movement following Drake et al. (2017) and Su and Wang (2021), based on the extent to which a firm's stock return is explained by industry-wide and market-wide returns. For each firm i in year t, the following regression is estimated using weekly data:

$$\begin{aligned} \mathrm{Re}t_{i,w,t} &= \alpha_0 + \alpha_1 \mathrm{Re}t\_Ind_{i,w,t} \\ &+ \alpha_2 \mathrm{Re}t\_Mkt_{i,w,t} + \varepsilon_{i,w}, \end{aligned} \tag{1}$$

where $Ret_{i,w,t}$ is the weekly return of stock i during week w in year t; $Ret\_Ind_{i,w,t}$ is the equally-weighted average return of stock i's peer firms in the same industry where stock i is classified into (excluding stock i) during week w in year t, and $Ret\_Mkt_{i,w,t}$ the equally-weighted average return of the market where stock i is listed during the same period (excluding stock i). The coefficient of determination (R^2) obtained from this regression is transformed into a firm-year measure of return co-movement as follows:

$$Comovement\_Ret_{i,t} = \log\left[\frac{R^2}{\left(1-R^2\right)}\right]. \tag{2}$$

Higher value of $Comovement\_Ret_{i,t}$ indicates a stronger degree of co-movement between the firm's return and common industry and market factors.

In addition to stock return co-movement, this study measures investor attention co-movement, using two proxies: internet search activity and media coverage. Internet search attention is proxied using Google Trends (GTREND) data. Weekly Google Trends data from 2020 to 2023 were collected through Phyton using the *pytrends* library. The queries were executed with fixed parameters, including language set to English (United States) (h1 = "en-US"), unrestricted category (cat = 0), geographic scope Indonesia (geo = "ID"), and time zone parameter set to 420. To ensure consistent and reproducible data collection, query delays and retry controls were implemented. Stock tickers were obtained from the official Indonesia Stock Exchange (IDX) registry. To mitigate keyword am-

biguity, as some tickers resemble common words, all Google Trends queries used the format "saham + <ticker>", where saham denotes equity-related searches ("saham" is Indonesian for "stock"). The Google Trends Index for each listed firms was retrieved individually using the same query parameters and time period. The Google Trends Index for each listed firm was retrieved individually using the same query parameters and time period. All queries were executed automatically in a single run of a Python script to ensure consistency across observations.

Moreover, media attention is proxied by news coverage obtained from the Global Database of Events, Language, and Tone (GDELT), which systematically records worldwide media coverage. This dataset has been widely used in prior studies, including Barroso del Toro et al. (2022), Voukelatou et al. (2020), and Alamro et al. (2019). Media attention was measured using GDELT Version 2 data from the Global Analysis of Language and Tone (GKG/GAL) table accessed via Google BigQuery. We identified Indonesian-language news articles whose titles or descriptions contained the keyword "saham + <ticker>". After removing missing values and duplicate records, stock-level media attention was constructed by aggregating weekly article counts for each ticker. These two measures provide complementary perspectives: search activity reflects direct investor interest, while media coverage captures information dissemination.

Following Drake et al. (2017) and Su and Wang (2021), investor attention co-movement is measured by estimating whether firm-level attention is explained by industry-wide and market-wide attention. For each firm i in week w and year t, the following regression is estimated:

$$\begin{aligned} Attn_{i,w,t} &= \alpha_0 + \alpha_1 Attn\_Ind_{i,w,t} \\ &+ \alpha_2 Attn\_Mkt_{i,w,t} + \varepsilon_{i,w,t}, \end{aligned} \quad (3)$$

where $Attn_{i,w,t}$ represents the attention measure of firm i using either GTREND or GDELT; $Attn\_Ind_{i,w,t}$ is the equally weighted average attention of peer firms in the same industry, excluding firm i; and $Attn\_Mkt_{i,w,t}$ is the equally weighted average attention of all firms in the market, excluding firm i. The resulting R^2 is transformed into a firm-year measure of attention co-movement:

$$Comovement\_Attn_{i,t} = \log\left[\frac{R^2}{\left(1-R^2\right)}\right]. \quad (4)$$

In the empirical analysis, this variable is operationalized as $Comovement\_GTREND_{i,t}$ when using internet search data and as $Comovement\_GDELT_{i,t}$ when using media coverage.

Furthermore, this study conducts empirical analysis in three steps. First, the determinants of investor attention co-movement are examined by regressing attention co-movement on firm characteristics and market-related variables:

$$\begin{aligned} Comovement\_Attn_{i,t} &= \alpha_0 + \beta_1 MktVal_{i,t} \\ &+ \beta_2 Size_{i,t} + \beta_3 ROA_{i,t} + \beta_4 BM_{i,t} \\ &+ \beta_5 Turnover_{i,t} + \beta_6 \mathrm{Re}t_{i,t} + \beta_7 Inst_{i,t} \\ &+ \beta_8 Comovement\_ROA_{i,t} \\ &+ \beta_9 Attention_{i,t} + \varepsilon_{i,t}, \end{aligned} \quad (5)$$

where $MktVal_{i,t}$ is market capitalization; $Size_{i,t}$ is the firm size measured by the natural logarithm of total assets; $ROA_{i,t}$ is return on assets; $BM_{i,t}$ is book to market ratio; $Turnover_{i,t}$ is trading turnover ratio; $Ret_{i,t}$ is firm-specific risk-adjusted return; $Inst_{i,t}$ is institutional ownership; $Comovement\_ROA_{i,t}$ is co-movement ROA; $Attention_{i,t}$ represents the level of investor attention (denoted as either GTREND or GDELT). The description of each variable is presented in the Appendix. Each model specifications incorporates both year and firm effects to control for macroeconomic variations and unobserved firm-specific characteristics that remain constant over time. Furthermore, statistical significance is evaluated using firm -clustered standard errors.

Second, Hypothesis 1 is tested by estimating the following model:

$$\begin{aligned} Comovement\_Ret_{i,t} &= \alpha_0 \\ &+ \beta_{i,t} Comovement\_Attn_{i,t} \\ &+ \sum \beta_{j,it} Var_{j,i,t} + \varepsilon_{i,t}, \end{aligned} \quad (6)$$

where $Comovement\_Ret_{i,t}$ is the return co-movement of firm i in year t, and $Comovement\_Attn_{i,t}$ is the co-movement of investor attention of firm i in

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year *t*. Similar to the previous equation, we utilize the same control variables ($Var_{j,i,t}$).

Third, to examine the predictive content of investor attention co-movement (Hypothesis 2), the following model is estimated:

$$Comovement\_Ret_{i,t+1} = \alpha_0 + \beta_{i,t} Comovement\_Attn_{i,t} + \sum \beta_{j,i,t} Var_{j,i,t} + \varepsilon_{i,t}. \quad (7)$$

3. RESULTS

This section presents empirical results and evaluates the proposed hypothesis on the relationship between investor attention co-movement and stock return co-movement.

We begin by examining the distribution of the key variables. *Comovement_Ret* captures the extent to which stock returns are explained by common industry and market factors, while *Comovement_Attn* is proxied using internet search activity (GTREND) and media coverage (GDELT). As reported in Table 1, the mean value of *Comovement_Ret* is −0.633, with a standard deviation of 0.530. For attention co-movement, the mean values are −0.643 (GTREND) and −0.876 (GDELT), with standard deviations of 0.613 and 0.533, respectively. These values indicate that both return co-movement and attention co-movement vary across firms, reflecting differences in the extent to which common factors drive returns and investor attention.

Table 2 reports the correlation coefficients among the co-movement variables. *Comovement_Ret* is positively correlated with *Comovement_GTREND* (0.296, significant at the 1% level), while the correlation between *Comovement_Ret* and *Comovement_GDELT* is 0.0052 and not statistically significant. The correlation between *Comovement_GTREND* and *Comovement_GDELT* is 0.1118 (significant at the 1% level), The correlations show a positive association between stock return co-movement and investor attention co-movement, particularly when attention is measured using GTREND.

Table 3 and Table 4 present the descriptive statistics and correlation matrix for the control variables. The results show substantial variation in

Table 1. Descriptive statistics of co-movement variables

Category	Variable	Mean	Std dev	Median	Min	Max
Comovement_Ret	Weekly Return	−0.633	0.530	−0.658	−2.557	0.954
Comovement_Attn	GTREND	−0.643	0.613	−0.658	−2.530	1.412
	GDELT	−0.876	0.533	−0.927	−2.371	1.376

Table 2. Correlations of co-movement variables

Category	Comovement_Ret	Comovement_GTREND	Comovement_GDELT
Comovement_Ret	1.0000		
Comovement_GTREND	0.2960***	1.0000	
Comovement_GDELT	0.0052	0.1118***	1.0000

Note: *** indicate statistical significance at 1%.

Table 3. Descriptive statistics of control variables

Category	Mean	Std Dev	Median	Min	Max
MktVal	12.373	0.836	12.364	10.169	15.064
Size	9.686	0.804	9.660	7.623	12.316
ROA	0.048	0.068	0.034	−0.030	0.339
BM	0.013	0.011	0.010	0.002	0.058
Turnover	0.720	2.221	0.069	0.000	43.856
Ret	0.105	0.587	−0.001	−1.751	5.062
Inst	4.650	8.800	0.6	0.000	99.35
GTREND	11.773	12.376	6.509	0.115	66.698
GDELT	1.511	6.830	0.230	0.019	189.865

Table 4. Correlation coefficients of control variables

Variable	MktVal	Size	ROA	BM	Turnover	Ret	Inst	GTREND	GDELT
MktVal	1.000								
Size	0.750***	1.000							
ROA	0.312***	0.102***	1.000						
BM	–0.370***	–0.063**	–0.216***	1.000					
Turnover	0.224***	0.220***	–0.028	–0.047*	1.000				
Ret	0.037	–0.047**	0.160***	–0.057**	0.082***	1.000			
Inst	0.122***	0.112***	0.008	–0.054**	0.064***	–0.056**	1.000		
GTREND	0.516***	0.419***	0.170***	–0.176***	0.317***	0.024	0.148***	1.000	
GDELT	0.081***	0.019	0.109***	–0.088***	0.015	0.015	–0.010	0.087***	1.000

Note: *** and ** indicate statistical significance at 1% and 5% , respectively.

firm characteristics such as size, profitability, trading activity, and institutional ownership. The correlation matrix does not show strong associations among the control variables, indicating that multicollinearity is unlikely to be a concern in the regression analysis.

We next examine the determinants of investor attention co-movement in Table 5, with *Comovement_GTREND* as the dependent variable in column (1) and *Comovement_GDELT* in column (2). Firm size is negatively associated with attention co-movement, while co-movement in profitability is positively related to attention co-movement. Other control variables exhibit mixed relationships across model specifications. When attention co-movement is measured using *GTREND*, firm size is negatively associated with attention co-movement, while market value and book-to-market ratio show positive relationships. This indicates that firms with smaller size tend to experience stronger synchronization in search-based attention. In contrast, when attention is measured using *GDELT*, firm size and profitability

Table 5. Estimation results of determinants of investor attention co-movement

Variable	Comovement_GTREND	Comovement_GDELT
MktVal	0.1865*	0.0937
	(0.111)	(0.075)
Size	–0.7218**	0.4133**
	(0.320)	(0.188)
ROA	–0.7154*	0.8036**
	(0.419)	(0.366)
BM	6.2494**	–0.9882
	(3.10)	(2.952)
Turnover	–0.0060	0.0092
	(0.011)	(0.006)
Ret	–0.0643***	–0.0870***
	(0.023)	(0.022)
Inst	–0.0059	–0.0100***
	(0.008)	(0.003)
Comovement_ROA	0.0041	0.0340
	(0.034)	(0.030)
GTREND	0.0209***	
	(0.002)	
GDELT		0.003
		(0.002)
FE – Year	Yes	Yes
FE – Firm	Yes	Yes
R^2	0.1385	0.0400

Note: ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively. Numbers in parentheses represent standard errors.

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are positively associated with attention co-movement, while institutional ownership shows a negative relationship. These results suggest that different attention proxies capture distinct channels of information flow and investor behavior.

Hypothesis 1 is tested in Table 6, which reports the relationship between investor attention co-movement and stock return co-movement. Column (1) includes attention co-movement measured by internet searches (*Comovement_GTREND*), while column (2) includes attention co-movement measured by news coverage (*Comovement_GDELT*). The results show that attention co-movement based on internet search activity (*Comovement_GTREND*) has a positive and statistically significant association with return co-movement, with a coefficient of 0.1147 ($p < 0.01$). This indicates that an increase in attention synchronization across stocks is associated with a higher degree of return co-movement. In economic terms, when investors focus on similar information simultaneously, their trading behavior becomes more aligned, leading to more synchronized price movements across stocks. In contrast, attention co-movement measured using media coverage (*Comovement_GDELT*) does not exhibit a statistically significant relationship with return co-movement. This suggests that media-based attention may not directly translate into synchronized trading behavior to the same extent as search-based attention.

Table 6. Estimation result of the relationship between investor attention co-movement and stock return co-movement

Variable	Comovement_Ret	
	(1)	(2)
Comovement_GTREND	0.1147***	
	(0.030)	
Comovement_GDELT		−0.0225
		(0.029)
MktVal	−0.1175	−0.0024
	(0.090)	(0.081)
Size	−0.3062*	−0.3656**
	(0.173)	(0.160)
ROA	−0.8623**	−0.7721**
	(0.3771)	(0.336)
BM	7.668**	2.4058
	(2.98)	(2.754)
Turnover	−0.0214**	−0.0032
	(0.008)	(0.008)
Ret	−0.0364	−0.0374
	(0.022)	(0.022)
Inst	0.0049	0.0079**
	(0.004)	(0.003)
Comovement_ROA	0.0410	0.0057
	(0.030)	(0.028)
GTREND	0.0091***	
	(0.002)	
GDELT		0.0023
		(0.002)
FE - Year	Yes	Yes
FE - Firm	Yes	Yes
R^2	0.0958	0.0247

Note: ***, and **, * indicate statistical significance at 1%, 5%, and 10%, respectively. Numbers in parentheses represent standard errors.

Table 7. Estimation result of the relationship between investor attention co-movement and stock return co-movement

Variable	*Comovement_Ret* (*t*+1)	
	(1)	(2)
Comovement_GTREND	0.00127	
	(0.028)	
Comovement_GDELT		−0.0413
		(0.026)
MktVal	0.0904	0.0659
	(0.083)	(0.073)
Size	−0.2072	−0.0941
	(0.160)	(0.146)
ROA	−0.1064	0.2097
	(0.348)	(0.306)
BM	1.7148	−0.7682
	(2.761)	(2.511)
Turnover	0.0059	0.114
	(0.008)	(0.008)
Ret	0.0029	0.0091
	(0.022)	(0.020)
Inst	−0.0069*	−0.0026
	(0.004)	(0.003)
Comovement_ROA	0.0704**	0.0792**
	(0.0279)	* (0.025)
GTREND	0.0037**	
	(0.001)	
GDELT		−0.0037
		(0.002)
FE - Year	Yes	Yes
FE - Firm	Yes	Yes
R^2	0.0272	0.0206

Note: ***, and **, * indicate statistical significance at 1%, 5%, and 10%, respectively. Numbers in parentheses represent standard errors.

Finally, Table 7 tests Hypothesis 2, which presents the predictive regression results; where next-period stock return co-movement is regressed on current investor attention co-movement. The results show that investor attention co-movement, whether measured using *GTREND* or *GDELT*, does not have statistically significant explanatory power for return co-movement at $t + 1$. The result indicates that attention co-movement does not have predictive power for future return synchronization. Instead, the effect of attention co-movement appears to be contemporaneous, reflecting immediate responses from investors to available information rather than persistent effects over time. Among the control variables, *Comovement_ROA* is positive and statistically significant in both specifications. Besides, *Inst* and *GTREND* intensity are statistically significant only in the specification that includes *Comovement_GTREND* as the attention co-movement proxy.

The empirical results provide partial support for the proposed hypothesis. Investor attention co-movement has a positive and statistically significant association with stock return co-movement when measured using internet search activity (*GTREND*), supporting *H1*. However, when attention is measured using media coverage (*GDELT*), the relationship is not statistically significant. Therefore, *H1* is supported only for search-based

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attention and not for media-based attention. Moreover, the result does not find a statistically significant predictive effect of investor attention co-movement on stock return co-movement, which does not support *H2*.

4. DISCUSSIONS

The findings reveal that the determinants of investor attention co-movement differ depending on the proxy used to capture attention. When attention co-movement is measured using internet search activity, firm characteristics such as market value (MktVal) and book-to-market ratio (BM) are positively associated with attention co-movement, whereas firm size (Size) and risk-adjusted return (Ret) are negatively related. In contrast, when attention is measured using media coverage, firm size and profitability (ROA) are positively associated with attention co-movement, while risk-adjusted return and institutional ownership (Inst) are negatively related.

These differences suggest that internet search activity and media coverage capture distinct attention channels and reflect different mechanisms of information diffusion. Internet search behavior likely reflects more immediate and decentralized investor responses, particularly from retail investors, whereas media coverage tends to represent more structured and curated information flows. This interpretation is consistent with prior studies emphasizing that different attention proxies capture different dimensions of information processing and investor behavior (An & Su, 2023). Compared to prior studies, our results are broadly consistent with Su and Wang (2021), particularly in the role of firm characteristics such as market value and returns in shaping attention co-movement. However, the proxy-dependent nature of the results highlights an important distinction: the determinants of attention co-movement vary depending on whether attention is captured through search activity or media coverage. In the Indonesian context, this suggests that investor attention is related not only by firm fundamentals but also by the channel through which information is accessed.

The main finding of this study shows that investor attention co-movement is positively associated with stock return co-movement when attention is measured using internet search activity, while no significant relationship is observed when using media-based attention. This result is consistent with Ayala et al. (2024), who document a positive relationship between search-based investor attention and stock market behavior. It also aligns with the broader literature on attention-driven trading, which suggests that investors tend to trade on salient and easily accessible information (Barber & Odean, 2008).

However, our findings differ from Drake et al. (2017), who document stronger effects for media-based attention co-movement. This divergence may reflect differences in market structure and investor composition. In the Indonesian stock market, where retail investors dominate in number (Koesrindartoto et al., 2020) and have grown substantially in recent year (Usman et al., 2024), internet search activity is likely a more direct proxy for investor attention than traditional media coverage. Retail investors tend to rely more heavily on digital platforms and real-time information sources, which may explain why search-based attention exhibits a stronger relationship with return co-movement in this setting.

From a theoretical perspective, these findings can be interpreted through the perspective of bounded rationality and limited attention (Simon, 1955, 1972; Barber & Odean, 2008). When investors face constraints in processing information, they tend to focus on widely searched or salient stocks, leading to synchronized attention across firms. This synchronization can translate into correlated trading behavior, thereby increasing stock return co-movement. The significant role of search-based attention suggests that digital information environments may amplify this mechanism by facilitating faster and more coordinated investor responses.

This mechanism can be further understood by considering the interaction between retail investor dominance and digital information environments in emerging markets. In settings where retail participation is high, investors are more likely to rely on easily accessible and widely shared information rather than conducting in-depth fundamental analysis (Barber & Odean, 2008; Simon,

1955, 1972). Digital platforms such as search engines provide a common gateway through which investors access information simultaneously, increasing the likelihood that attention becomes synchronized across firms and sectors (Da et al., 2011; Yuan, 2015). As a result, investors may react to similar signals at roughly the same time, leading to clustered trading behavior and contemporaneous co-movement in stock returns. This effect is likely to be amplified during periods of heightened uncertainty, such as the COVID-19 pandemic, when investors actively seek information and respond more intensively to market-wide signals. Consequently, attention co-movement in such environments reflects not only information diffusion but also collective behavioral responses shaped by shared information channels and limited processing capacity (Kahneman, 1973; Simon, 1955, 1972), particularly in markets characterized by strong retail investor participation (Koesrindartoto et al., 2020; Usman et al., 2024).

In contrast, the absence of predictive power of attention co-movement indicates that its–relationship is primarily contemporaneous rather than persistent over subsequent periods. This finding suggests that attention co-movement reflects immediate information processing and rapid price adjustment, rather than forward-looking expectations. In this sense, investor attention may accelerate the incorporation of information into prices, reducing the persistence of its association over time. Studies by Drake et al. (2017) and Su and Wang (2021) find a predictive relationship between investor attention co-movement and return co-movement in a more developed market setting.

An additional finding highlights that co-movement in firm fundamentals plays a more important role in explaining future return co-movement than attention synchronization. This finding highlights a distinction between behavioral and fundamental drivers of co-movement: while attention co-movement is associated with short-term synchronization in returns, fundamental co-movement appears to play a more persistent role in shaping future return dynamics.

The overall findings provide a nuanced view of attention-driven co-movement in the Indonesian stock market. Search-based attention co-movement is positively associated with contemporaneous return co-movement, supporting the role of attention-driven trading under limited information-processing capacity (Barber & Odean, 2008; Simon, 1955, 1972). However, the absence of predictive effects indicates that attention co-movement does not constitute a persistent channel for forecasting future co-movement. Instead, it reflects short-lived synchronization in investor behavior, particularly in a retail-driven and digitally connected market environment.

These results also point to several directions for future research. First, future studies could examine heterogeneity across sectors and market conditions, as the strength of attention-driven co-movement may vary depending on industry characteristics or periods of market stress. Second, incorporating higher-frequency data could provide further insights into the short-term dynamics of attention and return co-movement.

CONCLUSIONS

This study examines whether investor attention co-movement associated with stock return co-movement in the Indonesian stock market. Using firm-level data over the period 2020–2023, this study constructs measures of attention co-movement and return co-movement based on internet search activity and media coverage.

The results show that investor attention co-movement derived from internet search activity is positively associated with stock return co-movement. In contrast, attention co-movement based on media coverage is not statistically significant. In addition, investor attention co-movement does not predict next-period return co-movement, indicating that its relationship is limited to contemporaneous market dynamics. These findings demonstrate differences in the association between search-based activity and media with return dynamics in the emerging stock market context.

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These findings suggest that synchronized investor attention, particularly through digital search activity, is linked to short-term synchronization in stock returns rather than persistent co-movement over time. The results highlight the importance of digital information channels in shaping market behavior in a retail-driven emerging market. They also indicate that attention-based co-movement reflects immediate responses to available information rather than forward-looking expectations. From a practical perspective, the findings imply that increased digital engagement among retail investors may be related to short-term market synchronization, underscoring the need for improved investor awareness and risk communication in digital investment environments.

AUTHOR CONTRIBUTIONS

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APPENDIX A

Table A1. Description of variables

Variable	Description	Reference
Firm-week variable		
Return	The difference of logarithm of weekly closing price for firm *i* in week *w*	
Return_Ind	The equally weighted log returns for industry *j* which is classified into week *w* (excluding firm *i*)	
Return_Mkt	The equally weighted log returns for all sample firms in week *w* (excluding firm *i*)	
Attention	The aggregated volume of investor attention for firm *i* in week *w*, including Gtrend and Gdelt	
Attention_Ind	The equally weighted attention indices for industry j which firm *i* is classified into in week *w* (excluding for *i*)	
Attention_Mkt	The equally weighted attention indices for all sample firms in week *w* (excluding firm *i*)	
Firm-year variable		
Market Value	Total amount of outstanding shares multiplied by share price at the end of fiscal year *t*	Su and Wang (2021), Drake et al. (2017)
Size	The average of total assets at the end of fiscal year *t* and preceding fiscal year *t-1* for firm *i*	
ROA	Net income scaled by average assets for firm *i* in year *t*	
BM	The book value of equity divided by the market value of equity for firm *i* in year *t*	
Turnover	The total volume traded divided by the number of float shares for firm *i* in year *t*	
Ret	The average of firm-specific risk-adjusted returns calculated using the market model for firm *i* in year *t*	
Inst	The quarterly average of the percentage of outstanding shares owned by institutional investors for firm *i* in year *t*	
Comovement_ROA	The logarithmic transformation of the adjusted R2 obtained from the regression of firm *i*'s Return on Assets (ROA) on an equally weighted ROA of peer firms in the same industry throughout the last 12 quarters	
GTREND	The value of Google Search Volume Index (SVI) identified by "saham" and "ticker symbols" for firm *i* in year *t*	
GDELT	Total number of news articles about firm i sourced from gdelt for firm *i* in year *t*	

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