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Trading Volume Activity Surrounding Earnings Releases: Evidence from Indonesia

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Abstract

The study investigates trading volume activities post-earnings announcement and their impact on abnormal returns. The objectives are to examine the changes in trading volume activities in response to earnings release and to measure the impact of the changes in trading volume activities on the cumulative average abnormal returns post-earning announcement. The study analyzes the trading volume response around the earnings announcement by comparing the ratio of trading volume activity (TVA) post-earnings announcements with the TVA during the estimation window. It reports an apparent increase in trading volume activity on day +2, indicating a slightly delayed reaction to the event's information. However, the findings indicate a significant relationship between cumulative abnormal returns and trading volume during the post-earning announcement abnormal return in a short period, following the semi-strong form of market efficiency. The study focuses on year-end announcements and does not evaluate interim announcements. The market response to interim data may vary and requires validation through an additional investigation. This implies that market traders should implement an effective trading strategy before the entire market reacts to the earnings announcement. Furthermore, the research findings underscore opportunities for policymakers to improve market infrastructure, hence augmenting the market's efficacy in conveying information pertaining to earnings releases.

Keywords: *Earnings announcement, efficient market hypothesis, market liquidity, trading volume activity.*

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INTRODUCTION

Efficient stock markets exhibit high liquidity levels, as shown by trading volume and trading value (Wright & Swindler, 2023; Ngene & Mungai, 2022). Investors are concerned about market liquidity (Angelo & Johnston, 2023; Kumari, 2019), as the acquisition of illiquid stocks results in

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increased costs and decreased selling prices. A liquid market enables the allocation of capital for long-term wealth investments and provides investors with convenient access to withdraw their assets as needed (Brandao-Marques et al., 2022; Hespeler, 2020).

Stock market liquidity plays a significant role in economic activities and upholding financial stability (Lee & Hooy, 2023; Holden et al., 2014). A decrease in liquidity within the stock market may lead to an increase in the cost of equity and encourage higher reliance on leverage due to rising prices. This condition poses a barrier to participation in equity activities as a result of the complex nature of stock trading. As a result, there is an increased probability that the valuations of equities may diverge from their underlying fundamental values. A liquid market enhances the fairness of trade chances for both purchasers and vendors. In contrast, markets with lower liquidity often exhibit information asymmetry (Quah et al., 2021) as certain participants possess privileged knowledge, allowing them to achieve abnormal returns.

Kim & Verracchia (1994), Chordia et al. (2001), and Mupondo (2022) have previously explored the concept of market liquidity through the analysis of trading volume. These studies emphasize the importance of trading volume in capturing the market's response before reaching price equilibrium. The advantage of using this indicator to look at returns after earnings reports is that it can show how the stock market reacted by measuring trading volumes or values, which makes it stand out from other variables. By using the Jamaica Stock Exchange, Wright & Swidler (2023) propose that the abnormal trading volume reflects the market's response to earnings announcements and stock pricing. The authors discovered that firms experience negative abnormal returns on the day of abnormal trading activity, which are mitigated by positive abnormal stock returns on the subsequent day. Additional research from Kornlert & Uachanachit (2022) on the Stock Exchange of Thailand shows the existence of an abnormal volume of stock trading prior to or following the release of financial statements.

Researchers have conducted several studies to assess the market liquidity of the Indonesian market, generally classifying it as having low liquidity (Andrianto & Mirza, 2016; Ikram & Nugroho, 2014). Another study by Rowter (2016) highlights market liquidity as the primary issue within the IDX market. In that context, this study considers Gârleanu's (2009) argument, which states that, depending on the level of market liquidity, the influence of trading volume on stock returns varies by market. This is an important consideration because there is a general perception that the Indonesian stock market is not as efficient as other markets (Novi & Pontoh, 2022; Julyana et al., 2022; Ginting et al., 2021). This scenario has increased the risk of anomalies occurring in the market. Consequently, thorough investigation is required to examine the correlation between trading volume activities and their impact on abnormal returns within the context of the Indonesian equities market during earnings announcements.

This study focuses on two specific areas of interest. **First,** the study examines if trading volume activity significantly escalates after an earnings announcement. **Secondly,** the study investigates whether trading volume activity significantly influences the abnormal returns that follow the earnings announcement. The study contributes to market stakeholders by providing empirical evidence regarding the Indonesian market's response to earnings announcements from the view of trading volume activity. The results will reveal whether the Indonesian market exhibits a

delayed response to earnings announcements. The study outcome is essential for market traders to execute an effective trading plan before the entire market reacts. This study's novelty lies in its ability to determine whether the size, earning per share, and debt-to-equity ratio of the firms influence the trading volume activity in response to the earnings announcement.

The study grounded its investigation on the market efficiency theory, which refers to how market prices reflect all available information (Vasileiou, 2022). The definition implies that new information instantaneously affects the stock price (Patra & Hiremath, 2022). The definition suggests that an efficient market incorporates all available information into its prices, making it impossible to outperform the market due to the absence of undervalued or overvalued stock prices.

Given that the market reacts to new information and reflects price adjustments, Gaio et al. (2022) explain that abnormal returns occur when a market operates in a less efficient form of market efficiency. Examining market efficiency using the perspective of abnormal returns provides a solid foundation for interpreting whether the market responds promptly and rationally to the financial details disclosed in the earnings announcement. Several researchers have explored the impact of earnings announcements on stock price movements. Sun & Wen (2023) propose that new fundamental information has a significant and positive correlation with future stock performance. Additional research by Hunt et al. (2022) demonstrates the importance of financial data in making investment and earnings prediction decisions. Other researchers validated the findings by reporting abnormal returns surrounding earnings announcements (Sehgal & Bijoy, 2015; Forner et al., 2009). Furthermore, Busse & Green (2002) demonstrate that in an efficient market, the stock price reacts within fifteen minutes of the news becoming public.

Conversely, the financial data relevant to the stock price valuation also generated controversy. Several studies have argued and proposed that financial statements that outline historical economic conditions are unable to predict a firm's future stock return (Mirali et al., 2018; Lev & Gu, 2016; Hirshleifer et al., 2011; Bollen et al., 2011). Additionally, some researchers reveal that financial statements may contain frauds (Davidson, 2022; Zhang et al., 2022; Demetriades & Owusu-Agyei, 2022), which might mislead investors' decisions. Thus, thorough financial statement research on stock prices is ongoing and requires special context.

This study investigates the semi-strong form of market efficiency in the Indonesia Equity Market (IDX), using earnings releases as public information and focusing on trading volume activity during the event. When examining earnings announcement returns, the benefit of utilizing the trading volume indicators over alternative criteria is their ability to capture the stock market's response in the form of trading amounts or values. Chordia et al. (2001) suggested that the initial impact of an earnings announcement may manifest as variations in trading volume and bid-ask spread, prior to the market reaching price equilibrium. Wright & Swidler (2023) reported that the unusual amount of trading volume reflects the market response to the earnings announcement when assessing the Jamaica Stock Exchange. The findings suggest that new information during the event alters market beliefs, prompting traders to execute trading transactions. Additionally, investors adjust their positions based on private prior information and respond differently to the

announcement, resulting in a positive volume. However, there is a dearth of academic research on the relationship between trading volume and earnings announcement events in the Indonesian equities market. Therefore, the study assesses the significant variation in the trading volume activity in the Indonesian equity market after the earnings announcement by testing the following hypothesis.

H1: There is a significant change in trading volume activity post-earnings announcement.

One of the most common anomalies in financial markets is the reaction of stock prices to earnings announcements. The behavior of stock prices in response to earnings announcements has perplexed researchers for decades. The study expands its analysis by evaluating the correlation between trading volume activity and abnormal returns following earnings announcements a few days after their release. This study examines Fink's (2021) assertion that anomalies can occur in financial markets in the form of post-earnings announcement drift. This concept posits that when firms provide further information regarding earnings surprises, stock prices may continue to trend in the same direction for a prolonged duration (Zhang & Gregoriou, 2020). These positive or negative post-earnings announcement drift scenarios may induce market volatility subsequent to the earnings announcement. Therefore, this study examines the relationship between cumulative abnormal returns and trading volume activity subsequent to the earnings announcement by testing the following hypothesis.

H2: There is a significant relationship between cumulative abnormal return and trading volume activity a few days after an earnings announcement.

RESEARCH METHOD

Data and Sample

The study focuses on the entire IDX market, releasing its financial records for the year ending December 31, 2018. During this time, Indonesia's economy was relatively stable, both prior to the COVID-19 pandemic and during the ten-year global financial crisis. The research measures the daily data for stock returns from day 0 to day 30 following the earnings release and compares it with the estimation window that runs from day 120 to day 30 prior to the earnings announcement. The study gathered the information from Indonesia's official stock exchange website, www.idx.co.id.

The Indonesia Stock Exchange (IDX) reported 634 listed businesses for the second quarter of 2019. However, the study was unable to include 13 firms from the dataset, including five that did not provide their earnings announcement, five delisted, two merged, and one suspended. Therefore, the sample size reduced from 634 to 621 businesses, or 98.26% of the total. Sample size is considered sufficient to provide a representative description of the market.

Measuring Trading Volume Activity

This study uses an indicator known as trade volume activity (TVA) to measure trading volume. It assesses the trading volume activity following an earnings announcement by comparing the number of stocks traded on the announcement date to the number of stocks outstanding on a comparable day. The study computes the trade volume activity using the following formula (Plerou et al., 2001).

$$TVA_{i,t} = \frac{Traded_{i,t}}{Outstanding_{i,t}} \quad \text{..... 1}$$

Where:

$TVA_{i,t}$ is the trading volume activity;

$Traded_{i,t}$ is the number of stocks traded at the announcement date;

$Oustanding_{i,t}$ is the number of stocks outstanding at the announcement date.

Measuring Cumulative Abnormal Returns

The study measures abnormal returns using the market model and daily data. It calculates the cumulative abnormal returns of stocks after identifying the abnormal return. The formula below computes the total abnormal returns (AR) and cumulative abnormal returns (CAR) for the firm's stock prices during the event period.

$$CAR_{i,t} = \sum_{t=1}^{n}(R_{i,t} - (\alpha_i + \beta_i R_{mt})) \quad \text{..... 2}$$

Where:

$CAR_{i,t}$ = cumulative abnormal return;

$R_{i,t}$ = Daily stock returns;

α_i = Intercept of firm and market returns in estimation window;

β_i = Slope of firm and market returns in estimation window;

R_{mt} = Daily market index returns;

Estimation Model and Significance Test of Hypothesis

This study aims to investigate the relationship between trading volume (Volume) and companies' cumulative earnings announcement returns (CARs). Our main technique for measurement is ordinary least squares analysis. The research employs control variables, namely earnings per share (EPS), total assets (Size), and debt-to-equity ratio (DER), which remain constant throughout the examination. The aforementioned variables serve as supplementary explanatory variables in the regression model, aiming to assess the extent to which the control factors influence the examination outcomes.

This investigation employs the following estimation model to assess the correlation between the independent variables and the observed dependent variable.

Model:

$$CAR_{i,t} = \beta_0 + \beta_1 Volume + \beta_2 EPS + \beta_3 Log(Size) + \beta_4 DER \quad \ldots\ldots 3$$

Where:
$CAR_{i,t}$ = Cumulative abnormal returns during post-earning announcement periods;
Volume = Changes in Trading Volume Activity (TVA) from Q_3 to Q_4 2018;
EPS = Earning per share reported in Q_4 2018;
Log (Size)= Natural log of total assets on Q_4 2018;
DER = Debt-to-equity ratio on Q_4 2018.

The study investigates the hypothesis and evaluates the significant relationship between variations in trading volume and cumulative abnormal returns using ordinary least squares regression. The study's acceptable errors are 10%, 5%, and 1%, associated with confidence levels of 90%, 95%, and 99%, respectively. The absolute t-values for each respective significance level are below 1.645, 1.96, and 2.58.

RESULTS AND DISCUSSION

Results

Descriptive Statistics

Table 1 displays the descriptive statistics of the bid-ask spread, trading volume activities (Volume), and cumulative abnormal returns (CAR) for samples of 621 firms listed on the IDX in the timeframes (-5, 0), (0, +5), (0, +10), (0, +15), and (0, +30). According to the table, following the news, CAR's means decreased from -0.08% in the window (-5, 0) to -0.28% (0, +5). However, the degree consistently decreased within the windows of (0, +10), (0, +15), and (0, +30), reaching -0.23%, -0.19%, and -0.13%, respectively. According to the pattern, the earnings release from the IDX market during this announcement period includes negative information that lowers market stock returns. It also notes that over longer window periods, the cumulative abnormal returns decline.

A similar table shows the average trading volume activity for the week following the earnings announcement, which rose from 1.31% one week prior to the announcement to 40.25% one week later. But in the windows (0, +10) and (0, +15) the volume continuously decreased to 33.30% and 26.14%, respectively, while in the window (0, +30), it slightly increased to 30.09%. Examining the maximum trading volume in the table, which rises from 3.76% in the window (0, -5) to 76.04% in the window (0, +5), reveals a more pronounced effect. This trend suggests that traders are prompted to execute a trade based on the information given during the earnings announcement. In other words, the announcement of earnings induces investors to respond to the

information presented during the event and adjust their positions based on private prior knowledge, resulting in positive trading volume activity.

Table 1: Descriptive Statistic of CAR, Volume, and Bid-Ask Spread

Description	Window				
	(-5, 0)	(0, +5)	(0, +10)	(0, +15)	(0, +30)
CAR					
Mean	-0.08%	-0.28%	-0.23%	-0.19%	-0.13%
Medium	0.00%	-0.04%	-0.04%	-0.02%	0.00%
Maximum	16.93%	7.66%	4.99%	3.73%	7.13%
Minimum	-28.99%	-25.21%	-14.17%	-12.09%	-12.37%
Std. Dev.	2.00%	2.19%	1.50%	1.21%	1.08%
Skewness	-4.62	-5.29	-4.16	-4.30	-3.71
Kurtosis	87.38	54.96	34.44	34.17	41.92
Observation	621	621	621	621	621
Volume					
Mean	1.31%	40.25%	33.30%	26.14%	30.09%
Median	-0.21%	-16.07%	-15.13%	-15.19%	-12.19%
Maximum	3.76%	76.04%	70.65%	49.59%	36.26%
Minimum	-1.35%	-1.85%	-1.63%	-1.64%	-1.69%
Std. Dev.	71.11%	359.03%	320.30%	237.27%	225.63%
Skewness	2.16	16.31	17.80	15.49	11.11
Kurtosis	8.17	325.38	378.92	306.86	151.73
Observation	621	621	621	621	621

Source: Data processed (2023)

Table 2 presents the descriptive statistics of earnings per share, size, and debt-to-equity ratio, which serve as the control variables, in addition to the above data. On average, the market earning per share is Rp 81.80, which suggests that the IDX market was positively performing during the year. The mean of the log(size) is 12.41, or Rp 2.570.395.782.769 in actual value, with the maximum and minimum values of the variable being 15.11 and 7.01, respectively, or 1.288.249.551.693.140 and 10.232.930 in actual value. The table also presents the debt-to-equity mean of 1.66, which indicates that the firms listed in IDX rely on debt financing to equity financing.

Trading Volume Activities Post-earnings Announcement

Table 3 presents the trade volume activity fluctuations during the transition from the third quarter to the fourth quarter of 2018. The table illustrates a decline in trading volume activity for approximately two-thirds of the listed companies in the IDX after the release of their financial results. However, the observed decrease is rather small, with an average decline of -29%, -29%, -

28%, and -27% within the time ranges (0, +5), (0, +10), (0, +15), and (0, +30), respectively. In contrast, it is noteworthy that although just one-third of the entire population of firms indicates increased trading activity, the average trading activity shows significant values, ranging from 138% to 181%. Trade volume activities provide evidence of an uneven distribution of these activities among market companies, with a strong concentration in a few firms.

Table 2: Descriptive Statistic of EPS, log(Size), and DER

Statistic	EPS	log(Size)	DER
Mean	0.86	12.41	1.66
Median	0.13	12.40	0.90
Maximum	40.49	15.11	34.06
Minimum	-22.83	7.01	-10.31
Std. Dev.	3.80	0.84	2.92
Skewness	4.61	-0.26	4.00
Kurtosis	47.85	5.57	34.91
Observation	621	621	621

Notes:
BTM= changes in book-to-market value from Q3 to Q4, 2018;
Cons = Largest share concentration;
Fam = Dummy variable of family ownership;
Gov = Dummy variable of government ownership;
EPS = Earning per share reported on Q4, 2018;
Size= Total assets on Q4, 2018;
DER = Debt to equity on Q4, 2018.
Source: Data processed (2023)

Table 3: Movement of Trading Volume Activity Post-Earning Announcement

Window	No of Firms	No of Firms (%)	Average TVA
(0, +5)			
Increase	205	33%	181%
Decrease	416	67%	-29%
(0, +10)			
Increase	206	33%	158%
Decrease	415	67%	-29%
(0, +15)			
Increase	200	32%	141%
Decrease	421	68%	-28%
(0, +30)			
Increase	217	35%	138%
Decrease	404	65%	-27%

Source: Data processed (2023)

The study in Figure 1 demonstrates the change in average trading volume activity (TVA) after the release of the earnings report, compared to the average TVA that remained unchanged by the report during the estimation window. The data reveals a significant increase in trading volume activity on day +2, indicating that the trading volume responds positively to the event-related information. Despite this, the reaction was short-lived, as it declined the following day and eventually returned to the mean over the specified estimation timeframe. The graphs illustrate that the market adheres to the semi-strong form of the market efficiency theory, as observed through trading volume activity. Therefore, the market promptly responds to new information presented during certain events within this type of market.

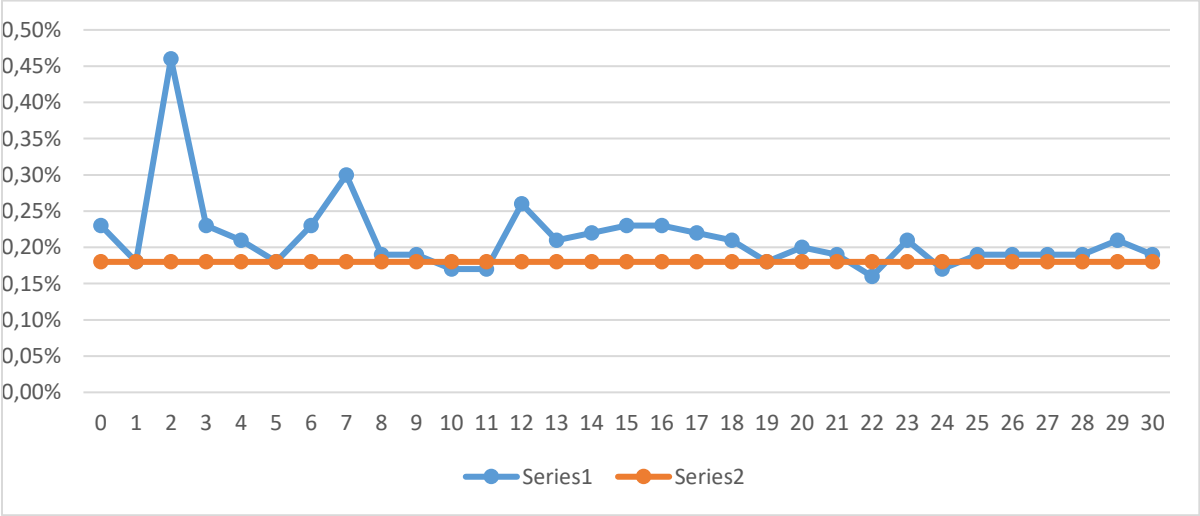

Figure 1: Trading Volume Activity Post-Earning Announcement
Source: Data processed (2023)

This study looks at the difference between the trading volume activity (TVA) after an earnings report and the TVA seen during the estimation window. The objective is to examine the trading volume response surrounding the earnings announcement. The observed event windows utilized are (0, +5), (0, +10), (0, +15), and (0, +30) for the purpose of this study. The estimation windows refer to the time intervals ranging from days -31 to -120. The research used the conventional t-statistic for the purpose of comparing the mean values. The results in Table 4 display the trading volume data, listed shares, and average trading volume activity on the announcement dates.

Table 4: Trading Volume during Activity Post-Earning Announcement

	Mean of TVA		
Day	**(0, +30)**	**(-120, -31)**	**Average Changes**
0	0.23%	0.18%	27%
1	0.18%	0.18%	0%
2	0.46%	0.18%	156%
3	0.23%	0.18%	28%
4	0.21%	0.18%	17%
5	0.18%	0.18%	-1%
6	0.23%	0.18%	26%
7	0.30%	0.18%	67%
8	0.19%	0.18%	6%
9	0.19%	0.18%	7%
10	0.17%	0.18%	-7%
11	0.17%	0.18%	-7%
12	0.26%	0.18%	45%
13	0.21%	0.18%	18%
14	0.22%	0.18%	20%
15	0.23%	0.18%	29%
16	0.23%	0.18%	28%
17	0.22%	0.18%	21%
18	0.21%	0.18%	16%
19	0.18%	0.18%	-1%
20	0.20%	0.18%	10%
21	0.19%	0.18%	3%
22	0.16%	0.18%	-11%
23	0.21%	0.18%	17%
24	0.17%	0.18%	-4%
25	0.19%	0.18%	7%
26	0.19%	0.18%	5%
27	0.19%	0.18%	4%
28	0.19%	0.18%	3%
29	0.21%	0.18%	15%
30	0.19%	0.18%	3%

Source: Data processed (2023)

Trading Volume and Abnormal Returns

Table 5 displays the regression analysis results for the relationship between cumulative abnormal returns and trading volume, considering windows (0, +5), (0, +10), (0, +15), and (0, +30). We conduct the analysis both with and without including a control variable. The table presents the coefficient values of 0.0627** and 0.0044*** during the initial and subsequent weeks following

the disclosure of earnings. These coefficients indicate a swift reaction in the trading value to the earnings announcement, regardless of whether the control variables of EPS, Log (Size), and DER are taken into account or not. The significance of the coefficient values of 0.0457** and 0.0462** persists until the second week. Nevertheless, the significance of the level becomes negligible when considering larger intervals such as (0, +15) and (0, +30). In these cases, the coefficients remain very similar, with values of 0.0138 and 0.0046 when the model includes control variables and 0.0139 and 0.0042 when the model excludes control variables. The results suggest that there was a notable response in the trading volume of the market following the publication of the news. However, traders observed this response only during the first two weeks after the earnings announcement. This conclusion implies that the presence of control factors does not determine the major trading-value activity pattern over extended periods.

Table 5: Cumulative Abnormal Returns and Trading Volume Activity

Window	CAR	Volume	EPS	Log (Size)	DER	F-Stat
(0, 5)	-0.31	0.06***				3.42***
	-5.51	0.06**	-0.01	2.07	0.01	2.58***
(0, 10)	-0.17	0.04**				3.12***
	-3.92	0.04**	-0.00	1.48	0.02	3.20***
(0, 15)	-0.11	0.01				3.08***
	-3.64	0.01	-0.00	1.39*	0.01	2.48***
(0, 30)	-0.03	0.00				6.63***
	-2.09	0.00	0.00	0.84	-0.00	4.63***

Notes:
Trading volume coefficient value without control variables;
Trading volume coefficient value with control variables.
* Significant at the 90% confidence level,
** Significant at the 95% confidence level,
*** Significant at the 99% confidence level,
Number of observations: 621.
Source: Data processed (2023)

Discussions

The EMH, originally proposed by Eugene Fama (1970), divides markets into three forms of efficiency: weak, semi-strong, and strong forms. In the weak form, stock prices reflect all information from historical price data. In semi-strong form, stock prices reflect all public information, including financial reports and company announcements. Meanwhile, in the strong form, share prices reflect all public and non-public information (internal information). The findings revealed by this study indicate that the Indonesian market is not at a semi-strong level, as

there is a delay in the market reaction to earnings announcements, contrary to the predictions of the semi-strong form of the EMH theory, where the market should immediately react to new information that is available publicly.

The analysis reveals that trading volume in the Indonesian equity market exhibited a significant response on day +2 post-announcement, contrasting with the findings of Busse & Green (2002), which suggest that stock prices react within fifteen minutes of news dissemination in an efficient market. This delay indicates that the Indonesian stock market does not operate under the semi-strong form of market efficiency, which posits that the market reacts instantaneously to new information presented during certain events (Patra & Hiremath, 2022). The condition indicates a temporal lag that enables investors to outperform the stock market by utilizing the mispricing associated with the delayed market reaction to earnings announcements.

In a semi-strong market, stock prices should react instantly to new information. However, this study shows that the Indonesian stock market takes time to digest information, indicating a temporal anomaly indicating that the market is inefficient. The implications of this delay, for example, is how it provides opportunities for investors to gain abnormal profits through arbitrage or trading strategies that utilize "post-earnings announcement drift" (PEAD), as explained by Fink (2021).

Notwithstanding the aforementioned delay anomaly, the results indicate a positive change of 156% in trading volume activity on day +2, suggesting that the Indonesian market responds to newly received information. The results diverge from the conditions recorded in the Jamaica Stock Exchange. Wright & Swidler (2023) noted a negative response in market trading volume activity following earnings announcements. However, the finding aligns with the author's conclusion that the market response is temporary, as the market adjusts its position the next day after the reaction.

The significant differences in how the Indonesian stock market responds to earnings announcements compared to stock markets in other countries are seen in Wright & Swidler's (2023) research on the Jamaica Stock Exchange. While the Indonesian stock market experienced an increase in trading volume of 156% on day +2 after the earnings announcement, the Jamaican stock market actually showed a decrease in trading activity after a similar announcement. These differences can be explained by several contextual factors that influence the efficiency of each market. One significant factor is market liquidity. The stock market in Indonesia, although growing rapidly, may have lower liquidity compared to more established markets, such as stock exchanges in developed countries. This lower liquidity can cause a delay in the reaction of the stock price to new information. On the other hand, high liquidity on the Jamaica Stock Exchange can facilitate faster price responses or even lead to immediate adjustments, resulting in different patterns of trading activity.

Additionally, differences in information accessibility may play a role. Stock markets in developing countries, such as Indonesia, often face challenges regarding information disclosure and the speed of data distribution to all market players. Delays in disseminating this information, whether due to technological constraints or differences in capital market regulations, can cause investors in Indonesia to take longer to process information after earnings announcements. In comparison, the Jamaica Stock Exchange may have a better information infrastructure and more

efficient mechanisms to ensure that relevant information is immediately accessible to investors, resulting in quicker and sharper market response. Based on capital market regulation, another factor influencing market response is how earnings announcements are treated legally and by stock exchange authorities.

In Indonesia, regulations may not yet strictly require rapid and transparent reporting, which may cause market reaction delays. In contrast, the Jamaican market may have a stricter regulatory framework regarding earnings announcements, which may explain why trading activity differs from that in Indonesia. Thus, these findings show that although efficient market theory can be applied globally, its application must consider local factors such as liquidity, access to information, and regulatory frameworks, which vary greatly in each country. A comparison between the Indonesian and Jamaica Stock Exchanges shows how these factors can influence market reactions to earnings announcements and further highlights that the Indonesian market has not yet fully achieved the semi-strong level of efficiency found in some other countries.

The study results demonstrate significant cumulative abnormal returns during the first and second weeks following the earnings announcement. This scenario corresponds with Gaio et al. (2022), who elucidate that abnormal returns occur when a market operates at a lower efficiency level. This is consistent with Fink's (2021) findings, which say that anomalies appear in financial markets as post-earnings announcement drift, and with Zhang & Gregoriou's (2020) suggestion that stock prices may continue trending in the same direction for a prolonged duration. This study demonstrates that IDX market returns recover to their levels in the third-week post-announcement, indicating market inefficiency. The study's findings demonstrated that trading volume activity substantially affected abnormal returns throughout the beginning periods of (0, +5) and (0, +10). The observation demonstrates an insignificant relationship in the next period of time.

This phenomenon provides further evidence that the Indonesian stock market is not completely efficient in the semi-strong form because abnormal returns should not occur if market information is instantly reflected in stock prices. Theoretically, liquidity theory and information asymmetry can explain the relationship between trading volume and abnormal returns. When new information, such as an earnings announcement, is announced to the market, investors who have earlier access or are quicker to process the information tend to adjust their portfolios immediately. This increases trading volume because informed investors first react to the new information (Naik & Reddy, 2021; Sari & Supratiwi, 2019). This increase in trading volume often indicates that investors are trying to capitalize on opportunities offered by new information that is not yet fully reflected in the stock price.

Abnormal returns are formed because stock prices have not fully adjusted to new information during earnings announcements. Investors who are more informed or quicker to respond may buy shares whose prices do not fully reflect better future prospects or sell shares if the announcement carries negative information. This activity increases trading volume and contributes to abnormal returns in the early days after the announcement. The abnormal returns observed during the first and second weeks after the announcement indicate that the stock price reaction in the Indonesian

market was gradual, not immediate. This can be connected to the research of Zhang & Gregoriou (2020), which suggests that stock prices may continue to move in the same direction for a longer period of time due to the phenomenon of "post-earnings announcement drift" (PEAD). PEAD is an anomaly often found in markets that are not completely efficient, where stock prices tend to react to earnings announcements even after the official announcement period is over because the new information is not immediately fully absorbed by the market. During periods (0, +5) and (0, +10), the increased trading volume may reflect the activity of investors trying to take advantage of short-term price discrepancies that occur due to delays in stock price adjustments to new information. In this period, larger institutional or individual investors, with better access to analytical information, may take a stronger position to profit from still distorted price movements.

However, what is interesting is the finding that the relationship between trading volume and abnormal returns becomes insignificant after this initial period. This suggests that after the first week or two, the market begins to fully adjust stock prices, reflecting the new information that market participants have absorbed. In the context of market efficiency theory, this indicates that although the Indonesian stock market does not react instantly to new information (as would be expected in a semi-strong market), it still has an adjustment mechanism that eventually restores stock prices to an equilibrium position that reflects the new information. This temporary effect of trading volume on abnormal returns is also in line with other research, which states that liquidity plays an important role in the speed of stock price reactions to information (Elizabeth et al., 2022; Naik & Reddy, 2021; Rinata & Suryaningrum, 2023). Markets with low liquidity often delay stock price reactions to important announcements, such as corporate earnings, because investors take longer to execute large transactions without unduly influencing market prices.

These findings provide practical insights for investors active in the Indonesian stock market. Strategies that rely on public information, such as earnings announcements, can produce abnormal returns if investors can identify and exploit delayed reaction patterns in the market. In periods (0, +5) and (0, +10), investors can use high trading volume as a signal to detect stock price movements that do not fully reflect the company's intrinsic value. However, because this relationship is only temporary, investors should be careful not to maintain their positions for too long, bearing in mind that the market will eventually adjust stock prices once the information is fully absorbed, leading to a weakening of the relationship between trading volume and abnormal returns in the next period.

The study examines several control variables, which include the debt-to-equity ratio, firm size, and earnings per share. Investigation results indicate that those variables do not alter the significance of the relationship between cumulative anomalous returns and trading value activity. As a result, the study does not necessitate the exclusion of specific features in the control variable, as the control variable's testing does not reveal any significant variance. These findings provide important insight into the fact that in the Indonesian stock market, these company fundamental factors may not always be the main determinant in the movement of abnormal returns after earnings announcements, especially when new information received by the market has a more dominant impact.

Theoretically, the debt-to-equity ratio reflects the company's capital structure, and companies with high DER are often seen as riskier because they have more debt than equity

(Odhiambo et al., 2022). This ratio influences market reactions to new information in the financial literature because companies with higher debt levels may be seen as more vulnerable to earnings uncertainty. However, the results of this study show that DER does not significantly influence the relationship between abnormal returns and trading volume. Research by Modigliani & Miller (1958) shows that capital structure (such as DER) should not affect firm value in an efficient market, assuming no bankruptcy costs. If the Indonesian stock market is in a relatively inefficient condition, this might explain why DER does not have a significant impact on abnormal returns. Investments are more likely to be influenced by new information, such as earnings announcements, rather than the company's relatively stable capital structure.

Company size is often used as a control variable because large companies tend to be more stable, liquid, and transparent than small ones. Studies by Banz (1981) and Bonfim et al. (2023) show that small companies often provide higher returns (small-firm effect) due to greater risk and lower liquidity. However, based on the result of this research, company size does not significantly influence the relationship between trading volume and abnormal returns. This can be explained by the assumption that in a less efficient market, as is the case in Indonesia, specific information about the company (such as company size) is less of a major concern in influencing investment decisions after earnings announcements. Investors are more likely to react to the earnings announcement itself rather than fundamental factors such as company size.

Earnings per share (EPS) is usually used to measure profitability per share and is often considered one of the main factors influencing stock returns, especially in more efficient markets. High EPS indicates greater earnings per share, which the market usually values positively (Fangohoi et al., 2023). However, in this study, EPS did not significantly influence the relationship between abnormal returns and trading volume. One potential explanation is that in markets that are not completely efficient, such as Indonesia, investors may not react immediately to EPS because overall earnings announcements dominate their perception of company performance. Research by Ball and Brown (1968) found that the market often anticipates earnings announcements before they are announced so that abnormal returns occur before the official announcement, making EPS less significant in explaining the market reaction after the announcement.

CONCLUSION

The study findings indicate an observable increase in trading volume activity on day +2, which suggests a delayed market reaction to the results announcement event. In addition, the study's findings show a strong relationship between trading volume and cumulative anomalous returns during the two weeks immediately following the earnings announcement. According to the observed drift and delay, the IDX market does not display characteristics that are consistent with the semi-strong form of market efficiency. These findings indicate that although the Indonesian

market responds to new information, there is a temporal lag which indicates that this market is not fully efficient in the semi-strong form. This challenges the efficient market hypothesis and shows that there is still room for arbitrage and market anomalies in emerging markets such as Indonesia.

The study contributes to market stakeholders by providing empirical evidence revealing that the Indonesian market exhibits a delayed response to earnings announcements. This study's novelty lies in its ability to show that the firms' size, earnings per share, and debt-to-equity ratio do not influence the trading volume activity in response to the earnings announcement. Delays in market reactions allow experienced investors to take advantage of market anomalies, but regulators may need to consider reforms to increase transparency and the speed of information dissemination in the Indonesian capital market. The study's findings are essential for market traders to implement an effective trading strategy before the entire market reacts to the earnings announcement. The research findings further highlight areas for policymakers to enhance the market infrastructure, thereby increasing the market's effectiveness in transmitting information related to earnings announcements.

This study has several limitations; first, this research only uses data from companies listed on the Indonesia Stock Exchange (BEI) in a certain period. This may limit the generalization of research results, especially in the context of stock markets in other developing countries with different characteristics. Future research could expand the scope of the sample to include companies from different sectors and sizes and expand into other emerging markets. Second, the research does not cover interim financial statement releases because it focuses on year-end releases. Therefore, researchers need to conduct additional research to confirm the market's reaction to interim data, which might deviate from these outcomes. Third, this research focuses on a certain time period after earnings announcements (for example, days 0 to +10) to observe trading volume and abnormal returns. However, the long-term impact of earnings announcements may not be apparent in this relatively short period. By extending the observation period, a more comprehensive analysis of long-term impacts can be carried out.

Abbreviation List

Indonesia Stock Exchange (IDX), cumulative abnormal return (CAR), debt to equity ratio (DER), and earnings per share (EPS).

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