



Examining the Information Efficiency of Indonesia Equity Market: Evidence from Earnings Announcements

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ABSTRACT

The main objective of this study is to examine the semi-strong form of market efficiency in the Indonesia Equity Market on publicly available information. The study uses a market model to analyze the significance of abnormal returns before and after earnings releases. It analyzes the cumulative average abnormal returns of the daily trades before and after the earnings release. The study reveals that there are no significant abnormal returns during the pre-announcement periods, suggesting that there is no significant leakage of information before the disclosures. An analysis of the post-announcement documents reveals a delay in the market response, indicating that the market is inefficient in rapidly and accurately transmitting the information from earnings releases to investors. It also observes significant abnormal returns within the initial week of the release periods and a post-earnings announcement drift of up to 30 days. The findings indicate that the market does not possess the attributes of a semi-strong form of market efficiency. The results imply that the market's financial reporting processes have the potential for digital technology improvement to enhance transparency, accountability, and information efficiency within the market.

Keywords: Earnings Announcement, Market Efficiency, Information Leakage, Post-Earnings Announcement Drift, IDX Market

JEL Classifications: G14, G15, G28, G32

1. INTRODUCTION

The efficient market hypothesis (EMH), first introduced by Fama et al. (1969), offers valuable empirical observations regarding the response of stock prices to new information. The core assumption behind this statement is that the prices of securities, at any particular time, effectively encompass and represent all available information (Wright and Swindler, 2023; Bänziger et al., 2023; Bhattacharjee and De, 2022). The prompt inclusion of new information has a substantial effect on current stock prices and serves as an indicator of the level of information efficiency in a market. Nevertheless, Martin and Nagel (2022) observed that the efficiency of information in a market could be associated with using big data and a substantial number of predictor factors. Hence, the technology infrastructure plays a crucial role in determining how information is distributed from the market to investors and how investors gather and incorporate it into their decision-making process.

Despite extensive analysis and research on market efficiency across various markets and contexts spanning several decades, this topic elicits strong opinions, primarily due to divergent interpretations of its definition and the fundamental belief that it significantly influences an investor's approach to investment strategies (Zhurakhovska, 2023; Chen and Liu, 2023; Lee and Choi, 2023). Despite significant support, some studies have identified anomalies and conflicting results when assessing the efficiency of a particular market in various market conditions. Rangapriya and Lokhand (2023) proposed that several elements influence market efficiency in a certain market and underlined that certain characteristics must correctly reflect the entire market dynamics. A study conducted by Chang et al. (2023) found that the efficiency level of a particular market did not significantly differ between periods of financial crisis and non-financial crisis. Nevertheless, they detected distinct abnormal return patterns during these two examination times. According to Du et al. (2024), the effectiveness

of a particular market depends on the infrastructure accessible to the public for data access. These premises indicate that additional research is required to evaluate the market efficiency in various markets and circumstances. Therefore, this inquiry aims to enhance comprehension of market dynamics across many contexts and environments.

This study examines the timeliness of information from the perspective of market efficiency in the Indonesia Equity Market (IDX) by analyzing earnings releases as publicly available information. According to Woo et al. (2020), a fragmented body of evidence indicates that stock prices occasionally deviate from the principles of market efficiency, as demonstrated in their comprehensive study on market efficiency. This inquiry aims to clarify the discrepancies, inconsistencies, and contradictions in many earnings announcements and abnormal returns studies. It highlights the importance of further inspection and examination in this area. Therefore, carrying out a focused investigation into the market's return patterns related to earnings releases in the Indonesian equities market is crucial. The study is significant for Indonesian market policymakers to evaluate current technology and consider potential digital technology improvement to enhance policy transparency, accountability, and efficiency, considering the market's continuous endeavours to strengthen its capital market position among investors.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Several studies have investigated the semi-strong form of market efficiency in different marketplaces. This study primarily focuses on how the market reacts to the information during the earnings announcement, particularly about abnormal returns. The semi-strong market efficiency theory posits that markets promptly respond to publicly available information (Alam et al., 2020). Wael (2004) found that the Paris market showed abnormal reactions within 15 min of the release of annual earnings reports, leading informed traders to make abnormal returns. However, various empirical studies demonstrate different outcomes and abnormalities. Hawaldar (2016) conducted assessments of the Indian market and determined that it lacks efficiency in the semi-strong form. Gupta and Sardana (2018) found that the market demonstrates efficiency in both weak and semi-strong forms. Julyana et al. (2022) studied the behaviour of the IDX market and concluded that the market exhibits inefficiency. The observed disparities in results suggest that the conclusions of market efficiency studies can differ according to the market context and research methodology.

The study conducted by Beltratti et al. (2016) explores the occurrence of information asymmetry before earnings announcements, particularly in the form of information leakages. Various factors, including private information, signals, or other indicators, may influence the returns before earnings disclosure. When the market receives the earnings indication signal before the announcement date, when the disclosure becomes public, it does not provide any significant unexpected information to the

investors. Therefore, the earnings report does not significantly impact the stock market returns on the preceding day of the event. Hence, abnormal returns before the releases may indicate the information leakage prior.

This study examines the abnormal returns before the release of financial statements. The need to examine this issue arises from the potential consequences of information asymmetry problems before the disclosure of earnings releases, which could lead to an irrational market reaction to market movements. Heitz et al. (2020) have presented evidence confirming the presence of many variations in stock price variance before earnings announcements, which may indicate information leakage. Chae (2005) analyzed trade volume patterns before scheduled and unscheduled announcements in another investigation. The results indicated a substantial decrease of more than 15% in the trading volume before the scheduled announcements. Thus, this study analyzes the significance of cumulative average abnormal returns before earnings release by formulating the following hypothesis.

H_1 : The cumulative average abnormal return during the pre-earnings announcement period differs from zero.

Furthermore, as previously explained, the main objective of this study is to examine the efficiency of the Indonesia Equity Market (IDX) under the semi-strong form. It accomplishes the objective by examining the market's reaction following the release of earnings information. This investigation examines the degree to which the market promptly and logically responds to the financial information revealed in earnings releases, leading to abnormal returns. A market is semi-strong efficient when stock prices quickly and accurately reflect all newly revealed information available to the public. Therefore, the study continues by analyzing the occurrence of abnormal returns following the release of earnings reports.

Since 1968, Ball and Brown have provided empirical evidence that supports the notion of market efficiency theory, suggesting that cumulative abnormal returns have the potential to persist in an upward trend for positive earnings surprises and a downward trend for negative earnings surprises for a duration of up to three months after the announcement. The duration of the anomaly takes some time in an inefficient market due to the investors's necessity to capitalize on the mispricing chances and mitigate the occurrence of market drift. Driskill et al. (2020) state that a market could delay its reactions to earnings releases. This delay arises because investors may need additional time to analyze the information and formulate their investment strategy (Singh et al., 2023). Truong (2011) examined this phenomenon within the Chinese stock market and indicated a post-earnings announcement drift in the Chinese stock market between 1994 and 2009. Specifically, the study reported substantial positive (negative) earnings surprises indicated in noteworthy positive (negative) abnormal returns for up to 1 year following the earnings announcements. Considering these studies' outcomes, the study aims to evaluate the presence of abnormal returns in the post-earning announcement periods by testing the following hypothesis.

H_2 : The cumulative average abnormal return during post-earnings announcement differs significantly from zero.

3. DATA AND METHODOLOGY

The primary objective of this research is to examine the earnings announcement for the year ended December 31, 2018, with a scheduled release date of March 31, 2019. After a decade since the onset of the global financial crisis, Indonesia's economic situation has reached a level of stability that warrants an examination of the behaviour of its financial market. Publicly traded companies must submit their reports electronically via the IDX website, making the information accessible to the general public. However, this study considers the recorded submission dates as the official announcement dates, regardless of whether they occur before or after the necessary date. The study examines the abnormal return preceding the earnings announcement, specifically within 30 days before the announcement, as Garfinkel and Sokobin (2006) explored. Additionally, it investigates the post-earning announcement drift within 30 days following the release of information, as discussed by Ye and Schuller (2021), Liang (2003), and Fink (2021). The study compares the data to the estimation window that spans up to day 120 before the event (Gupta and Goldar, 2005).

The significance of event studies lies in the fact that a specific event can lead to an abnormal stock performance. The study used the market model, wherein the expected return is determined by adding the risk-free rate to the value of beta and the expected difference between the market and risk-free returns (Al-Binali, 2023; Danquah et al., 2023). The process commences by computing the daily returns of the firms' stock prices utilizing the subsequent formula (Singh et al., 2020).

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

Where:

- $R_{i,t}$ = The daily return;
- $P_{i,t}$ = closing price at day t ;
- $P_{i,t-1}$ = closing price at day $t - 1$.

The step continues by calculating the firms' abnormal returns. The equations below show the measurement of abnormal returns using the market model.

$$AR_{i,t} = R_{i,t} - (\alpha_i + \beta_i R_{m,t}) \quad (2)$$

Where,

- $AR_{i,t}$ = abnormal return;
- $R_{i,t}$ = Daily stock returns;
- $R_{m,t}$ = Daily market index returns;
- α_i = Intercept of firm and market returns in estimation window;
- β_i = Slope of firm and market returns in estimation window.

After calculating the abnormal return, the study continues calculating the cumulative abnormal returns of the stocks. Cumulative abnormal return (CAR) is the sum of abnormal return (AR) in the event period for the firm stock prices in a certain period using the following formula:

$$CAR_{i,t} = \sum_{t=1}^n AR_{i,t} \quad (3)$$

Where:

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

The step continues the process by calculating the average abnormal returns in the observed periods. It estimates the average abnormal return (AAR_t) of the cross-sectional data for a specific event day, t , using the following formula.

$$AAR_t = \frac{1}{N} \sum_{i=1}^m AR_{i,t} \quad (4)$$

Where:

- AAR_t = average abnormal return;
- $AR_{i,t}$ = abnormal return;

The study proceeds by calculating the cumulative average abnormal returns of the market ($CAAR_m$) surrounding the observed periods calculated based on the following formula.

$$CAAR_m = \sum_{t=1}^n AAR_t \quad (5)$$

Where:

- $CAAR_m$ = cumulative average abnormal return;
- AAR_t = average abnormal return;
- N = periods.

The study uses the following t-test formula used by Zhang and Zhuang (2020) to decide the significance level cumulative average abnormal returns (CAAR) in time series data.

$$t_{CAAR} = \frac{CAAR_m}{\hat{\sigma}(CAR_{it})/\sqrt{N}} \quad (6)$$

Where:

- t_{CAAR} = t-value of time series CAAR
- $CAAR_m$ = cumulative average residual of abnormal returns;
- $\hat{\sigma}(CAR_{it})$ = standard deviation of CAAR the estimation window;

N is the number of observed days.

The study uses the following t-test for testing the significance of the cross-sectional data.

$$t_{Cross} = \frac{CAR_{i,t}}{\hat{\sigma}(CAR_{it})} \quad (7)$$

Where:

- t_{cross} = t-value of cross sectional CAR
- CAR_m = cumulative abnormal returns;
- $\hat{\sigma}(CAR_{it})$ = standard deviation of CAR the estimation window;

4. FINDINGS AND DISCUSSION

4.1. Earning Announcement Abnormal Return in the IDX Market

Table 1 presents the summary statistics of the sample's cumulative abnormal return (CAR), including 621 firms listed in the IDX. The

periods examined are from -5 to 0, from 0 to + 5, from 0 to + 10, from 0 to + 15, and from 0 to + 30. Based on the table reports, the average values of CAR declined from -0.08% in the window (-5, 0) to -0.28% in the window (0, + 5) following the earnings announcements. However, the value consistently decreased to -0.23%, -0.19%, and -0.13% across the windows of (0, + 10), (0, + 15), and (0, + 30), respectively. The observed pattern indicates that the earnings release of the IDX market during this particular period conveys negative information, resulting in a decline in stock returns within the market. Furthermore, the analysis suggests a decrease in overall abnormal returns when analyzing longer intervals.

The study continues by presenting Table 2, which exhibits the distribution of cumulative abnormal returns (CARs) based on their significance level throughout several event windows after earnings releases. The data reveals that throughout the day (0, + 5), 29 firms (approximately 5% of the sample) exhibited noteworthy cumulative abnormal returns. The values in the bigger window show an upward trend, with increases of 8%, 12%, and 41% corresponding to the intervals (0, + 10), (0, + 15), and (0, + 30), respectively. In contrast, a majority of firms, precisely 95% (or 592 firms), 92% (or 569 firms), 88% (or 547 firms), and 59% (or 366 firms), exhibited insignificant abnormal returns within the time windows of (0, + 5), (0, + 10), (0, + 15), and (0, + 30), respectively. The finding suggests that, from a cross-sectional perspective, stock prices in the market require additional time to incorporate the information conveyed during these announcements.

4.2. Daily Analysis of Abnormal Returns

The study then examines the daily average abnormal returns (AARs) across different event periods. The objective is to assess

the timely presentation of abnormal financial gains associated with the earnings disclosure. Table 3 displays the average abnormal returns (AARs) for 30 days before and after the earnings announcement. This table provides crucial data regarding the market's reactions, illustrated in Figure 1. Both presentations reveal that there was a notable response from the market on the 2nd day following the release, and the cumulative average abnormal returns demonstrated a gradual increase up until the 13th day from the announcement dates, with a negative Cumulative Average Abnormal Return (CAAR) of 0.52% and a $t = 2.74$. The negative trends persisted until days + 3 and + 4 but were rectified on day + 5, resulting in positive abnormal returns of 0.07%. On day + 10, there was a notable adverse abnormal return (AAR) of -0.39%. However, this negative AAR was swiftly rectified on day + 11, as seen by a subsequent positive AAR of 0.05%.

4.3. Pre-Earning Announcement Abnormal Return

After conducting the AAR analysis, this study examines the cumulative average abnormal returns (CAARs) pre-earnings announcement. A cumulative average abnormal return (CAAR) aggregates daily abnormal returns (ARRs) over a certain period. While the concept of Average Abnormal Returns (ARR) primarily examines the daily abnormal returns in the market, the idea of cumulative average abnormal returns (CAAR) focuses on evaluating the overall impact of an event on the entire market. This examination aims to examine the significance of cumulative average abnormal returns before earnings announcements in the Indonesian equities market to assess the presence of information leaks before such announcements. It investigates the level of cumulative average abnormal returns (CAARs) inside specific time

Table 1: Descriptive statistic of cumulative abnormal return (CAR)

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
Standard deviation (%)	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

Table 2: Distribution of CAR post-earning announcements

Significance	Window (0, +5)		Window (0, +10)		Window (0, +15)		Window (0, +30)	
	Firms	in (%)	Firms	in (%)	Firms	in (%)	Firms	in (%)
Not Sig.	592	95	569	92	547	88	366	59
Significant								
Sig*	9	1	14	3	16	3	37	6
Sig**	10	2	18	3	29	5	65	10
Sig***	10	2	20	3	29	5	153	25
Sub Total	29	5	52	8	74	12	255	41
Total	621	100	621	100	621	100	621	100

CAR=Cumulative abnormal returns, *Significant at the 90% confidence level, **Significant at the 95% confidence level, ***Significant at the 99% confidence level, Each group consists of 621 firms

Figure 1: AAR surrounding earning announcements

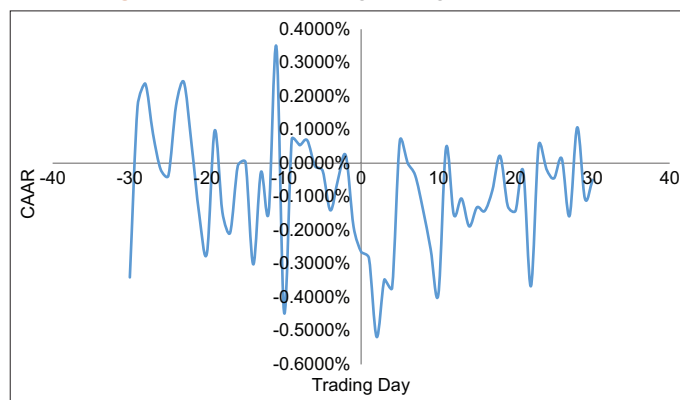


Table 3: AARs surrounding IDX earning announcements

Before earnings announcement				After earnings announcement			
Day	AAR (%)	t-value	Sig.	Day	AAR (%)	t-value	Sig.
-30	-0.3406	-1.80	Sig*	0	-0.2648	-1.40	
-29	0.1692	0.90		1	-0.2833	-1.50	
-28	0.2374	1.26		2	-0.5182	-2.74	Sig***
-27	0.0882	0.47		3	-0.3470	-1.84	Sig*
-26	-0.0189	-0.10		4	-0.3721	-1.97	Sig**
-25	-0.0369	-0.20		5	0.0660	0.35	
-24	0.1732	0.92		6	0.0013	0.01	
-23	0.2422	1.28		7	-0.0366	-0.19	
-22	0.0570	0.30		8	-0.1375	-0.73	
-21	-0.1534	-0.81		9	-0.2565	-1.36	
-20	-0.2677	-1.42		10	-0.3913	-2.07	Sig**
-19	0.0974	0.52		11	0.0466	0.25	
-18	-0.1462	-0.77		12	-0.1534	-0.81	
-17	-0.2077	-1.10		13	-0.1054	-0.56	
-16	-0.0075	-0.04		14	-0.1884	-1.00	
-15	0.0027	0.01		15	-0.1317	-0.70	
-14	-0.3018	-1.60		16	-0.1425	-0.75	
-13	-0.0267	-0.14		17	-0.0811	-0.43	
-12	-0.1467	-0.78		18	0.0220	0.12	
-11	0.3475	1.84	Sig*	19	-0.1280	-0.68	
-10	-0.4455	-2.36	Sig**	20	-0.1423	-0.75	
-9	0.0720	0.38		21	-0.0236	-0.13	
-8	0.0538	0.28		22	-0.3669	-1.94	
-7	0.0683	0.36		23	0.0525	0.28	
-6	-0.0084	-0.04		24	-0.0170	-0.09	
-5	-0.0227	-0.12		25	-0.0448	-0.24	
-4	-0.1405	-0.74		26	0.0135	0.07	
-3	-0.0475	-0.25		27	-0.1576	-0.83	
-2	0.0225	0.12		28	0.1068	0.57	
-1	-0.1885	-1.00		29	-0.1057	-0.56	
				30	-0.0496	-0.26	

Notes: AAR=Average earning announcement, *Significant at the 90% confidence level, **Significant at the 95% confidence level, ***Significant at the 99% confidence level, Each group consists of 621 firms

windows (-30, 0), (-15, 0), (-10, 0), and (-5, 0) at the market level. The hypothesis posits that the cumulative average abnormal return during these event windows differs considerably from zero.

The research used a t-test to examine the hypothesis. Table 4 displays the cumulative average abnormal returns (CAARs), the corresponding standard deviation, number of days, t-values, and the interpretation of the t-values in terms of significance level. The table illustrates that the cumulative abnormal returns (CAARs) exhibit no statistical significance in the time windows of (-30, 0), (-15, 0), (-10, 0), and (0, -5) before the announcements. The observed CAAR values are -0.0088, -0.0076, -0.0076, and -0.0038, and corresponding t-values of -0.85, -1.28, -0.87, and -0.89, respectively. Given that all t-values are below the predetermined significance threshold, it is thus determined that hypothesis H1, which asserts that the cumulative average abnormal returns (CAARs) during the pre-earning announcement event windows (-30, 0), (-15, 0), (-10, 0), and (-5, 0) are not statistically distinct from zero, should be rejected. This conclusion suggests that the occurrence of information leakage before earnings presentations is improbable.

4.4. Post-Earning Announcement Abnormal Return

This study continues to examine the cumulative average abnormal returns following the release of earnings announcements to assess the timeliness of market responses to such announcements. It investigates

Table 4: The significance of CARs during pre-earnings announcement

Window	CAAR	N (Days)	T-value	Sig.
(-30, 0)	-0.0088	30	(0.85)	Not Sig
(-15, 0)	-0.0076	15	(1.28)	Not Sig
(-10, 0)	-0.0064	10	(0.87)	Not Sig
(-5, 0)	-0.0038	5	(0.89)	Not Sig

CAAR=Cumulative average earnings announcement, *Significant at the 90% confidence level, **Significant at the 95% confidence level, *** Significant at the 99% confidence level, Each group consists of 621 firms

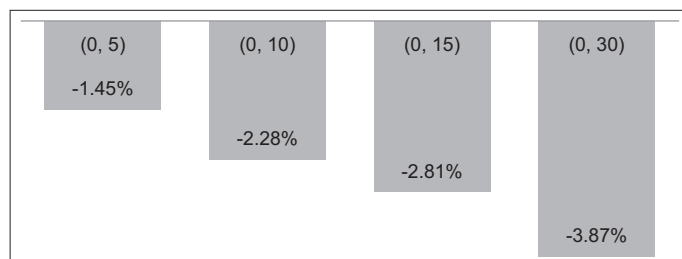
the likelihood of delay time in the market’s reaction to financial information provided in earnings announcements and explores the occurrence of the post-earnings announcement drift phenomenon. Table 5 displays the cumulative average abnormal returns (CAARs), the corresponding standard deviation, the number of days, the t-value, and the subsequent interpretation of the t-value in terms of significance. The presented table indicates a statistically significant negative relationship between the Cumulative Average Abnormal Returns (CAAR) in the IDX market and the event windows of (0, +5), (0, +10), (0, +15), and (0, +30) following the earnings releases. The results indicate that the CAAR values are -0.0387***, -0.0281***, -0.0228***, and -0.0145***, accompanied by corresponding t-values of -3.74, -4.70, -3.11, and -3.44, respectively.

According to the data shown in the table, the t-values for all windows exceed the preset level of significance. This condition

Table 5: The significance of CAARs post-earning announcement

Window	CAR	Standard Deviation	N (Days)	T-value	Sig.
(0,30)	-0.0387	0.00189	30	(3,74)	Sig***
(0,15)	-0.0281	0.00189	15	(4,70)	Sig***
(0,10)	-0.0228	0.00189	10	(3,11)	Sig***
(0,5)	-0.0145	0.00189	5	(3,44)	Sig***

CAAR=Cumulative average earnings announcement, * Significant at the 90% confidence level, ** Significant at the 95% confidence level, *** Significant at the 99% confidence level, Each group consists of 621 firms

Figure 2: Firms' CAARs in the observed post-earning announcement

implies that hypothesis H2, which suggests a significant deviation of the cumulative average abnormal return from zero, is not rejected. The conclusion suggests that the earnings announcements in the IDX market provided new information that had a negative effect on stock returns.

Another noteworthy aspect lies in the analysis of Figure 2, which visually depicts the cumulative average abnormal returns (CAAR) in the IDX market following the release of earnings announcements. The graph illustrates a steady and continuous increase in Cumulative Average Abnormal Returns (CAARs) over a broader period. The outcome is highly significant as it aligns with the market efficiency theory, which suggests that the swift and immediate spread of information directly affects stock prices (Fama et al., 1969). However, the data shown in the graph support the existence of the post-earnings announcement drift (PEAD) phenomena, as indicated by Chordia et al. (2009), indicating an anomaly to the market efficiency theory.

5. CONCLUSION

The result reports that the IDX market exhibits a delayed and inconsequential response to the release of earnings reports, suggesting that the market may need more efficiency in processing and integrating market information. The results imply that the financial reporting processes in Indonesia's equity market have the potential for digital technology improvement to enhance transparency, accountability, and information efficiency within the market.

The study's findings indicate that the likelihood of information leakage before the official release is low, as demonstrated by the weak cumulative abnormal returns captured in the months leading up to the announcement. The 30-day test demonstrated a notable prevalence of post-earning announcement drift, which also signifies a deviation from the semi-strong market efficiency

theory (Fama, 1998; Chordia et al., 2009; Fink, 2021). Hence, the study's findings indicate that the IDX market does not exhibit the characteristics of a semi-strong form of market efficiency. The findings indicate that the Indonesian market regulator should enhance its rules, technology, and infrastructure to enhance the efficiency of information dissemination inside the market.

REFERENCES

- Alam, M.N., Alam, M.S., Chavali, K. (2020), Stock market response during COVID-19 lockdown period in India: An event study. *The Journal of Asian Finance, Economics and Business*, 7(7), 131-137.
- Al-Binali, T, editor. (2023), Impact of Merger Announcements on Stock Price of Participating Banks. In: *Eurasian Business and Economics Perspectives: Proceedings of the 38th Eurasia Business and Economics Society Conference*. Vol. 25. Germany: Springer Nature. p. 181.
- Bänziger, A., Pitthan, A., Gramespacher, T., Hüppin, U. (2023), New evidence on the information content of earnings announcements for the Swiss market. *Journal of Risk and Financial Management*, 16(3), 156.
- Beltratti, A., Bortolotti, B., Caccavaio, M. (2016), Stock market efficiency in China: Evidence from the split-share reform. *The Quarterly Review of Economics and Finance*, 60, 125-137.
- Bhattacharjee, N., De, A. (2022), The market reaction to corporate news in emerging markets: Evidence from India. *Australasian Accounting, Business and Finance Journal*, 16(4), 115-130.
- Chae, J. (2005), Trading volume, information asymmetry, and timing information. *The Journal of Finance*, 60(1), 413-442.
- Chang, H.W., Chiang, Y.C., Ke, M.C., Wang, M.H., Nguyen, T.T. (2023), Market efficiency of Asian stock markets during the financial crisis and non-financial crisis periods. *International Review of Economics and Finance*, 83, 312-329.
- Chen, Y.C., Liu, Y.S. (2023), Market efficiency and stock investment loss aversion guide during COVID-19 pandemic events: The case for applying data mining. *SAGE Open*, 13(4), 1-14.
- Chordia, T., Goyal, A., Sadka, G., Sadka, R., Shivakumar, L. (2009), Liquidity and the post-earnings-announcement drift. *Financial Analysts Journal*, 65(4), 18-32.
- Danquah, R., Nelson, S.K., Nweze, C.N., Sumo, P.D., Achaa, L.O., Arhin, I. (2023), Performance of the African stock market amid COVID-19 global health crisis: Empirical analysis using four events. *Global Business and Economics Review*, 28(2), 134-154.
- Driskill, M., Kirk, M.P., Tucker, J.W. (2020), Concurrent earnings announcements and analysts' information production. *The Accounting Review*, 95(1), 165-189.
- Du, J., Gao, H., Wen, H., Ye, Y. (2024), Public data access and stock price synchronicity: Evidence from China. *Economic Modelling*, 130, 106591.
- Fama, E.F. (1998), Market efficiency, long-term returns, and behavioral finance. *Journal of Financial Economics*, 49(3), 283-306.
- Fama, E.F., Fisher, L., Jensen, M.C., Roll, R. (1969), The adjustment of stock prices to new information. *International Economic Review*, 10, 1-21.
- Fink, J. (2021), A review of the post-earnings-announcement drift. *Journal of Behavioral and Experimental Finance*, 29, 1-13.
- Garfinkel, J.A., Sokobin, J. (2006), Volume, opinion divergence, and returns: A study of Post-earnings announcement drift. *Journal of Accounting Research*, 44(1), 85-112.
- Gupta, P., Sardana, S. (2018), A Study on Semi-strong form of efficiency in Indian stock market. *Effulgence*, 16(1), 94-107.
- Gupta, S., Goldar, B. (2005), Do stock markets penalize environment-

- unfriendly behaviour? Evidence from India. *Ecological Economics*, 52(1), 81-95.
- Hawaladar, I.T. (2016), The reaction of bahrain bourse to announcement of annual financial results. *International Review of Business Research Papers*, 12(1), 64-75.
- Heitz, A., Narayanamoorthy, G.S., Zekhnini, M. (2020), The disappearing earnings announcement premium. Available from: <https://www.ssrn/3296537>
- Julyana, J., Njotoprajitno, R.S., Hadianto, B. (2022), Market responses around the publication dates of annual financial report. *Economics and Business Quarterly Reviews*, 5(1), 1-17.
- Lee, M.J., Choi, S.Y. (2023), Comparing market efficiency in developed, emerging, and frontier equity markets: A multifractal detrended fluctuation analysis. *Fractal and Fractional*, 7(6), 478.
- Liang, L. (2003), Post-earnings announcement drift and market participants' information processing biases. *Review of Accounting Studies*, 8(2), 321-345.
- Martin, I.W., Nagel, S. (2022), Market efficiency in the age of big data. *Journal of Financial Economics*, 145(1), 154-177.
- Rangapriya, S., Lokhande, M. (2023), Testing for market efficiency using news-driven sentiment: Evidence from select NYSE stocks. In: *Artificial Intelligence for Capital Markets*. United Kingdom: Chapman and Hall/CRC. p128-140.
- Singh, B., Dhall, R., Narang, S., Rawat, S. (2020), The outbreak of COVID-19 and stock market responses: An event study and panel data analysis for G-20 countries. *Global Business Review*, 25, 606-631.
- Singh, J.K., Gupta, A., Uppal, C. (2023), Assessing effectiveness of factor investing strategy in generating alpha returns during covid-19. In: Aloysius Edward, J., Jaheer Mukhtar, K.P., Asis, E.R., Sivasubramanian, K., editors. *Current Trends in Economics, Business and Sustainability. ICEBS 2023. Contributions to Environmental Sciences and Innovative Business Technology*. Singapore: Springer.
- Truong, C. (2011), Post-earnings announcement abnormal return in the Chinese equity market. *Journal of International Financial Markets, Institutions and Money*, 21(5), 637-661.
- Wael, L. (2004), Market reaction to annual earnings announcements: The case of euronext Paris. *SSRN Electronic Journal*, <http://dx.doi.org/10.2139/ssrn.498502>, 1-36.
- Woo, K.Y., Mai, C., McAleer, M., Wong, W.K. (2020), Review on efficiency and anomalies in stock markets. *Economics*, 8(1), 20.
- Wright, C., Swidler, S. (2023), Abnormal trading volume, news and market efficiency: Evidence from the Jamaica Stock Exchange. *Research in International Business and Finance*, 64, 101804.
- Ye, Z.J., Schuller, B.W. (2021), Capturing dynamics of post-earnings-announcement drift using a genetic algorithm-optimized XGBoost. *Expert Systems with Applications*, 177, 114892.
- Zhang, T., Zhuang, Y. (2020), Research on the impact of Fintech event on Chinese commercial banks' stock price. *International Journal of Wireless and Mobile Computing*, 18(3), 289-294.
- Zhurakhovska, L. (2023), Investment strategy of banking sector in the context of financial market instability. *Financial and Credit Activity: Problems of Theory and Practice*, 4(52), 4152.